

An Exploration of the Social Factors and Characteristics of Irish Centenarians

By

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Thesis submitted to the
Technological University of the Shannon: Midlands and Midwest



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**Technological University of the Shannon:
Midlands Midwest**
Ollscoil Teicneolaíochta na Sionainne:
Lár Tíre Iarthar Láir

In partial fulfilment of the requirements for the
Doctor of Philosophy (PhD) Degree

Based on research carried out under the supervision of
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Submitted
7th March 2023

Authors Declaration

I hereby declare that the work contained within this thesis, submitted to the Technological University of the Shannon Midlands and Midwest for the degree of Doctorate of Philosophy, has not been accepted for the award of any other degree, in any other higher education institute, and is entirely my own work and to the best of my knowledge contains no work previously written or published by another party, except in the case of referenced material.

Signed:



Alison Fagan

Date:

06/03/2023

Confidentiality Statement

All of the information in this thesis is confidential and shall not be disclosed to any further parties without the permission of the first author due to intellectual property constraints. Details of the information presented shall be decided upon with the members of the projects prior to public dissemination.

This thesis is dedicated in loving memory of my dear dad, Ray, who passed away in November 2020 and so never got to share in the happiness of completing this PhD.

Forever alive in my heart.

Acknowledgements

I would like to sincerely thank my primary supervisor Dr. Mary McDonnell-Naughton who has been by my side since the beginning of this PhD journey and has always been available for guidance, advice, and encouragement when it was needed most. Your constant availability, expertise and faith in my abilities are among the main reasons I have gotten to this stage. I would also like to gratefully thank my co-supervisors. Dr. Patricia Heavey and Ms. Lorraine Gaffney for their guidance and continuous support. Without their knowledge, passion, and determination I certainly wouldn't be here writing my thesis acknowledgements. I count myself lucky to have been mentored by you all. I would also like to acknowledge the funding I received to complete these studies from the Technological University of the Midlands and Midwest (formally known as Athlone Institute of Technology) President Doctoral Scholarship.

To the postgraduate research office and the women that run the show there, particularly, Susan, Amanda, and Lorna, thank you for all your help over the past number of years. To the friends I met in the hub, most especially Dr. Emer O Neill and Dr. Clodagh Reid, it has been a pleasure to have gone through this process with you. I could write pages on the fun, crying and venting shared, but you will have to settle for this blurb! I know I have made lifelong friends in you both.

To the fantastic Fagan's! My brothers David and Brendan and my sister Emma, a special thanks to you for always being in my corner, I know I wouldn't and couldn't have gotten to where I am without you all. To my partner, Pakie, thank you for putting up with the hours, days, months, (years!) spent on the laptop, for reminding me to take time off occasionally and for never failing to make me smile. To my 'G' ladies, thank you for your continued support throughout this journey. Thanks for being interested (or at least pretending to be) in my work. If nothing else, at least you can pronounce centenarian now! Lastly, but most importantly, my mother Mary. None of this would have been possible without you cheering me on mam. I cannot begin to describe how grateful I am for all your support not only in this PhD but in everything I do. I hope I have made you proud.

Thesis Abstract

Globally, societies are amid a longevity revolution. By virtue of their longevous life, centenarians, have been widely accepted as models for successful ageing. Numerous studies have documented their exceptional capacity to overcome major ageing challenges (Jopp *et al.*, 2016a; Montesanto *et al.*, 2017; Borras *et al.*, 2022). Significant research to date recognises the biological and genetic determinants in achieving advanced survivorship, but there is a lack of understanding of the influence of social factors specifically and their role in ageing amongst the oldest old. Population heterogeneity in tandem with current ageing trends highlights the intrinsic need to understand ageing from a biopsychosocial perspective. The aim of this thesis is to explore the social factors and characteristics of Irish centenarians. This is achieved through several sub-studies (four) and employs various research methodologies.

With a basis in phenomenology, the first study explores Irish centenarians' experiences of living to one hundred years and uses a story-telling narrative approach to give them a voice and illustrate their journey to advanced old age. This study is novel in the Irish context. Participants emphasised several social factors as being of immense importance throughout their lives including childhood environment, social connectedness, religion as well as general attitude and outlook. Centenarians nurtured childhoods is one of the key themes that prevailed across the stories they shared. It was clear how throughout childhood most participants were surrounded by people who cared for them and fostered their development positively. The importance of being well connected socially and the strong relations shared with others was not limited to childhood however and was evident among all participants as they discussed the established relationships held with family throughout their lives. Participants also credited their religious beliefs as being influential in their lived experience which echoed findings of other international centenarian research. Additionally, an attitude of acceptance and maintaining a largely positive outlook on life was seen in most participants as they spoke about various life events. Although in many cases centenarians had dealt with significant losses, the centenarians' acceptance of life in dealing with such life events and their resilient nature was very much to the fore throughout their shared stories. Almost all participants positively reflected on their life's achievements whilst simultaneously believing that they still had a purpose and

direction in life. This study provided key insights into the centenarians lived experience and the particular influence of social factors in their lives.

The next study conducted within this PhD is a scoping review, the purpose of which is to examine the available published literature conducted to date pertaining to social factors and their influence on centenarian populations. Providing such an overview is essential for one to make sense of the breadth of research conducted on this topic area. Of the articles retrieved during the initial database search, seventeen articles met the inclusion criteria. These studies concentrated on the following core themes: gender, social relationships, education, environment, socioeconomic status, religion. Although the review noted the positive effect on ageing of some of the factors investigated, its impact is caveated by the subjective nature of the review's findings given the dominance of qualitative research methods. Nonetheless, recognising the pivotal role that social factors have for the individual is particularly relevant for the formation of public policies on ageing and in promoting quality of life amongst future generations of the oldest old and so the findings from this review might provide practical insights for future research in this regard.

Much international centenarian research to date has focussed on examining the physiological and indeed the genetic influences of centenarians ageing with the influence of social factors being among the domains that are less studied in centenarian populations, their significance cannot be overlooked. To address this, the third study employs a quantitative design to identify the salient social factors of Irish centenarians as well as their key characteristics and traits. Its main contribution is to the development of a body of knowledge on Irish centenarians and it presents valuable information on their sociodemographic characteristics as well as exploring the influence of several social factors, providing insight into the oldest old in Irish society and emphasising the importance of promoting health from a biopsychosocial standpoint.

Finally, given that research has highlighted the way by which childhood environments and one's own personal characteristics can have long-term effects on how they age, the final study of this thesis focuses on the offspring of a sample of Irish centenarians. It seeks to explore the concept of the 'inheritance of longevity' to ascertain if being the

child of a long-lived parent offers any potential advantage beyond their genetics. It does this whilst retaining a social factor lens to ascertain if this group were like their parents in relation to their social factors. While this research offered some interesting insights into a sample of the offspring of Irish centenarians, it couldn't determine any social factor advantage as a result of being the child of a centenarian. Regardless, this study has intrinsic value in that it provides researchers with suggestions for further research and draws attention to the need to understand not only the lives of centenarians but also the next generation of the oldest old.

While this thesis makes important and original contributions to our understanding of the role of social factors in centenarian survivorship in the Republic of Ireland, it also has relevance in other geographic and cultural contexts by mapping Ireland onto the nexus of global centenarian research. Its findings have important implications for social conceptualisations of successful ageing, and for development of health and social policies specific to the older person. Given the changing demographics seen in population ageing worldwide this thesis also suggests that future investment in additional mixed-method, multi-perspectival cohort studies could make valuable contributions to the field of gerontology and assist in best preparing for the future generations of older people in the Republic of Ireland and beyond.

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List of Abbreviations

ADL	Activities of Daily Living
APOE	Apolipoprotein E
CAPI	Computer Assisted Personal Interview
CASP	Critical Appraisal Skills Programme
CSO	Central Statistics Office
FOXO3A	Forkhead box class O 3a
HLA	Human Leucocyte Antigen
HSE	Health Service Executive
JBI	Joanna Briggs Institute
NIA	National Institute on Aging
OECD	Organisation for Economic Co-operation and Development
QoL	Quality of life
ROI	Republic of Ireland
SCQ	Self-completed questionnaire
SRH	Self-Rated Health
TA	Thematic Analysis
TILDA	The Irish Longitudinal Study on Ageing
UK	United Kingdom
UN	United Nations
US	United States
WHO	World Health Organisation

Research Outputs and Dissemination

Submissions for publication (in progress)

Fagan, A., Heavey, P., Gaffney, L, McDonnell-Naughton, M. (2023). A qualitative exploration of the lives lived by Irish centenarians.

Fagan, A., Heavey, P., Gaffney, L, McDonnell-Naughton, M. (2023). The influence of social factors on centenarian ageing; a scoping review.

Presentations

Living to 100. A qualitative exploration of the lives lived by Irish centenarians. Sports, Health, and Exercise Group Research Seminar. Athlone, Ireland. June 2022.

An exploration of the social Factors influencing Irish centenarians. Shannon Region Postgraduate Research Conference (online). May 2021.

Examining the factors affecting health and wellbeing of centenarians living in Ireland. Irish Gerontological Society Annual Conference. Cork, Ireland. September 2019.

To examine the factors affecting health and wellbeing of centenarians living in Ireland. British Gerontological Society Annual Conference. Liverpool, England. July 2019.

To examine the factors affecting health and wellbeing of centenarians living in Ireland. Irish Gerontological Society Postgraduate Research Day. Dublin, Ireland. March 2018

Posters

Living to 100. A qualitative exploration of the lives lived by Irish centenarians. Royal College of Surgeons Ireland, Faculty of Nursing and Midwifery Annual Conference. Dublin, Ireland. February 2023.

An Examination of the Factors Affecting the Health and Wellbeing of Centenarians Living in Ireland. International Association of Ageing and Geriatrics – European Congress Conference. Gothenburg, Sweden. May 2019.

To Examine the Factors Affecting Health and Wellbeing of Centenarians Living in Ireland. National University of Ireland Galway Annual Health Promotion Research Conference. Galway, Ireland. July 2018.

Other

The social factors influencing Irish centenarians. Pint of Science. Athlone, Ireland. May 2019.

The Secret to Ageing as told by Irish Centenarians. Higher Education Authority of Ireland 'Making an Impact Competition' Final. Dublin, Ireland. February 2019.

Press

Cullen, P (2019) Young people need to learn from older generation to put down phones and talk. *The Irish Times* Available at: <https://www.irishtimes.com/news/health/young-people-need-to-learn-from-older-generation-to-put-down-phones-and-talk-1.3834124>

Radio

Shannonside FM. Interview 4th April 2019.

Midlands 103FM. Interview. 20th March 2019.

Chapter One

Introduction to the Study

1.0 Introduction

This chapter outlines the current knowledge of successful ageing and centenarians in addition to providing a rationale for this thesis by describing population ageing and its societal implications. The nature and scope of this study is to explore the social factors and key characteristics of centenarians living in the Republic of Ireland. While nurses theoretically work within evidence-based biopsychosocial models of care; understanding, knowledge and the translation of such into practice remains somewhat elusive. Through the author's work as a registered general nurse and having worked with older persons' populations across several clinical settings the concept of advanced survivorship and ageing 'successfully' is something that fascinated the author and challenged some of their ideas about nursing theory and practice in relation to the older person. Beyond biological changes, ageing is often associated with other key psychosocial life transitions. Thus, the author was interested in exploring centenarians beyond the genetic and physiological influences that may explain their survivorship and instead explore the specific influence of social factors. Given the dearth in literature pertaining to centenarians and the specific influence of social factors in their lives, the extent to which social environments such as one's home, neighbourhoods, and communities, as well as personal characteristics including their sex, ethnicity, or socioeconomic status could influence their experiences of ageing appeared ambiguous. This was the motivation and rationale for undertaking this study.

1.1 Background

Longevity has been considered as being one of the greatest achievements of modern society (Crimmins, 2015; Gorman, 2017; Aliberti *et al.*, 2022). With global population ageing occurring at an unprecedented speed the need to understand longevity has taken on a new importance (Ferrucci *et al.*, 2020). Although longer life brings with it a host of opportunities at both an individual and a societal level, the extent of these opportunities is heavily dependent on one specific factor, namely, health. Research has highlighted that despite advances in life expectancy, the number of years spent in good health has remained broadly constant, indicative of the additional years gained being dominated by poorer health (Jivraj *et al.*, 2020; Lee *et al.*, 2020). Thus, while society is achieving longer life, its people are not necessarily living any healthier in their journey to old age. Therefore, if these added years are to be defined by increased

prevalence of disease and illness, the implications for not only older people but also for society may inadvertently be more negative. In response to this concern, the concept of the longevity dividend was coined. According to Olshansky, (2016) the longevity dividend can be defined as the gains that can be achieved if increases in life expectancy are matched by health improvements in how one ages and changes in individual behaviours and social norms to achieve healthy longer purposeful and productive lives. Driving the necessary changes in how people experience ageing can bring about this longevity dividend at the individual, economic and social level which is pertinent considering the ageing trends of modern society (O'Neill, 2019). However, this shift towards optimal ageing is not yet unilateral in gerontology as the longevity dividend is too often undermined by the antonym of failed ageing (Rozanova *et al.*, 2016; Pickard, 2018).

Scientific theories define successful health and ageing principally in terms of maximising life expectancy and synchronously minimising physical and cognitive decline (Bakshi, 2014; Dinius, 2020). Rowe and Kahn's (1987) model of successful ageing is regarded as the most well-known and widely published approach and it defines successful ageing as the "avoidance of disease and disability, maintenance of high physical and cognitive functioning and sustained engagement in social and productive activities" (Rowe and Kahn 1998, p. 39). While ageing is still primarily understood and operationalised within a biomedical framework (Orr, 2019), the predomination of such has been challenged in recent times with biopsychosocial models becoming popularised in exploring ageing constructs (Carver *et al.*, 2018; Pearson-Stuttard *et al.*, 2019). A biopsychosocial model of health argues for the need to understand health as 'affected by multiple levels of organisation, from the societal to the molecular' (Borrell-Carrio *et al.*, 2004, p. 576). Hence when researching health in the context of ageing and longevity, there is much to be gained not only from understanding the physiological processes, but also the psychological and socio-environmental circumstances which interact with and influence these processes.

Amongst the myriad of genetic and behavioural factors responsible for longevity, it is important to understand what are the various influences that can modify one's experience of ageing. Evidence has suggested that longevity has been associated with specific lifestyles, such as the tendency to avoid conflict, the ability to respond

positively to stress (Darviri *et al.*, 2009), social capital (Scelzo *et al.*, 2017) and individual personality factors (Pizza *et al.*, 2020). Therefore, increased emphasis is now being placed on these factors in recognising their importance and influence on one's experience of ageing (Charles and Carstenson, 2010).

Given their delay of mortality (and in some instances, morbidity), interest in exploring centenarians as models for successful ageing has piqued given the 'intriguing mystery' that surrounds them (Bennati *et al.*, 2010). Increasing numbers of people around the world are celebrating this milestone birthday as centenarians are among the fastest growing age cohorts in the developed world (Terblanche, 2015; He *et al.*, 2018; Teixeira *et al.*, 2020; Wang *et al.*, 2020). The United Nations have predicted that the global number of centenarians will continue to increase, expecting to reach more than 25 million people in 2100 (Robine and Cubaynes, 2017). Demographic research to date has highlighted the significant changes seen in the prevalence of centenarians. When the New England Centenarian Study began in the early nineties, centenarians were seen to occur at a rate of about 1 per 10,000 (Sebastini and Perls, 2012), comparatively, more recent research approximated their prevalence at 1 per 5,000 (Teixeira *et al.*, 2017). According to some estimates the odds of living to one hundred have risen from approximately 1 in 20 million to 1 in 50 for women in some low-mortality nations (Sebastini and Perls, 2012; Pignolo, 2019).

Although susurrations of the existence of 'alleged' centenarians in the Republic of Ireland date back to the mid 1800s (Berry, 1900) the first official confirmation of a person having achieved centenarian status in the Republic was in 1940, wherein the first 'Centenarian Bounty' was awarded by then President Douglas Hyde (Áras an Uachtárain, 2022). As a collective however, there is limited reliable data detailing the prevalence of centenarians in the Republic of Ireland. According to Dean and Barry (1987), early data obtained from census is an unreliable method of enumerating centenarians. While the calculated number of centenarians increased five-fold in England and Wales during the period 1961–1981 (Thatcher, 1981), this figure only doubled in the Republic of Ireland (CSO, 1981). Nonetheless, steady growth in the Irish centenarian population has been observed in modern day going from 289 persons in 2006, to 389 persons in 2011 and finally to 456 persons at the time of the last reported census (CSO, 2016). If progress in reducing mortality continues at the

same pace as it has over the past two centuries, it is anticipated that many, if not most children born in low-mortality countries in this millennium can expect to see their hundredth birthday (Vaupel, 2000; Saito *et al.*, 2021; Vaupel *et al.*, 2021).

Several reasons are discussed in the literature to explain the rapid growth of centenarians, and these include a decline in infant and child mortality rates, advances in medicine, better nutrition in developed countries and improved living conditions generally (Richmond *et al.*, 2011; Crimmins, 2015; Marcos-Perez *et al.*, 2021). Thus, centenarians once considered rare are now regarded as living testaments to these remarkable societal advancements (Willcox *et al.*, 2008a). Notwithstanding this, in tandem with exceptional survivorship global ageing has had and will continue to have considerable implications for societies, both for the individual and wider society (Smith and Kydd, 2016).

In the first instance, demographic variations in older person populations have to be considered. Most older people are categorically female and amongst the oldest old this proportion rises (Zarulli *et al.*, 2018; Crimmins *et al.*, 2019). As in most other studies of western countries, this gender ratio applies in centenarian populations (Gjonca *et al.*, 2005; Jha *et al.*, 2006; Bennati *et al.*, 2010; Zeng *et al.*, 2018). Women typically outlive men but are more likely to experience both earlier and greater disability (Lopes *et al.*, 2021). Population-based studies of centenarians have revealed comparable results with centenarian populations being overwhelmingly female except in rare areas of the world (Poulain *et al.*, 2004). Yet despite their superiority in numbers, research has revealed that the few males who do live to 100 tend to have higher levels of functioning when compared to their female counterparts (Perls, 2017; Barak *et al.*, 2021). Although there is currently a predominance of women in older age groups, there is a growing convergence between older men and women in morbidity and mortality (Crimmins *et al.*, 2019). Other important factors include the decline in marriages and a high divorce rate (Case and Deaton, 2022; Simons *et al.*, 2022). The subsequent changing patterns of family life are likely to have a great impact on family care in later life for future generations. Additionally, the socioeconomic implications of an ageing population are becoming a challenge for Governments worldwide. This is especially true in developed countries where issues such as increased healthcare costs, a decline in the working age population, unsustainable pension commitments,

an increase in the dependency ratio as well as changes in economy drivers are flummoxing policymakers (Gorman, 2017).

As centenarian studies, like most centenarians themselves, have been a phenomenon of only the past several decades, there has been no large repository of prior biological, psychosocial, demographic, genetic, or clinical data from which to inform researchers or other interested parties. However, centenarian studies that were once in their infancy are beginning to mature and new knowledge is being generated with several significant discoveries emerging. The study of centenarians has helped to capture the phenotype of this unique cohort in terms of body composition, ageing biomarkers, and biochemistry (Ravaglia *et al.*, 1997; Arai *et al.*, 2008; Willcox *et al.*, 2008; Hausman *et al.*, 2011; da Silva *et al.*, 2018), disease risk profiles (Franceschi *et al.*, 2000; Franceschi and Bonafe, 2003; Vasto *et al.*, 2007; Galioto *et al.*, 2008), physical and cognitive functioning (Andersen-Ranberg *et al.*, 2001; Gondo *et al.*, 2006; Willcox *et al.*, 2007; Terry *et al.*, 2008; Davey *et al.*, 2010), and personality traits (Martin *et al.*, 2002; Masui *et al.*, 2006; Law *et al.*, 2014; Baek *et al.*, 2016), amongst other ageing related phenotypes (Poon *et al.*, 1992; Evert *et al.*, 2003).

Some important findings relate to the field of genetics and their influence on centenarian ageing and include the identification of the first “longevity genes” which resulted from a study of HLA polymorphisms in centenarians in Okinawa in the 1980s (Takata *et al.*, 1987). Following on from this was the widely replicated APOE study which brought about several genome-wide association studies in the early 2000s (Willcox *et al.*, 2006a; Chung *et al.*, 2010; Puca *et al.*, 2018). The pivotal discovery of the FOXO3A gene which has proven significant for healthy ageing and longevity in humans has also emerged from research conducted with centenarians in Hawaii (Willcox *et al.*, 2008b) and was quickly replicated in centenarian populations from Germany, France (Flachsbart *et al.*, 2009) and Italy (Anselmi *et al.*, 2009) as well as other independent cohorts of the oldest old (Pawlikowska *et al.*, 2009). A snapshot of the other important findings includes that centenarians may carry a reasonably favourable risk profile with respect to cardiovascular disease, as first evidenced by Perls (1995) and Perls *et al.*, (2000), and later echoed in a small study of Belfast centenarians in Northern Ireland (Bennati *et al.*, 2010) alongside others more recently (Arai *et al.*, 2019; Rasmussen *et al.*, 2022). Additionally, it appears that centenarian

families seem to be longer-lived and healthier than the rest of us (Newman *et al.*, 2011) and also have brothers and sisters, as well as children, who tend to live longer with lower risk for age-associated disease (Willcox *et al.*, 2006b; Adam *et al.*, 2008).

While the role of genetics in longevity attainment is apodictic given centenarian heterogeneity and the diversification of global gene pools, researchers must look beyond genetics alone in determining advanced survivorship. Understanding the factors behind one's ageing from a societal viewpoint is crucial in the context of rapidly ageing populations. Within the Irish environment, the impact of social factors on ageing outcomes is particularly important. However, despite of their importance these concepts have been somewhat understudied in the Irish context and there is remarkably little known about centenarians in Ireland (Bennati *et al.*, 2010).

The centenarian population in Ireland today was born and raised in the early 20th century. This period was a time of great social, economic, and cultural change such as the Irish Revolution, World War One and Two, the economic depression and several recessions amongst others. These events shaped the population's lives and futures in countless ways and so the Irish context provides a unique and interesting opportunity to study the influence social factors amongst oldest old. Despite this phenomenon not being explored in the Republic of Ireland, centenarian ageing is not new in research. As aforementioned, most evidence that has been gathered to date has focussed on the physiological and genetic associations between this population and their longevity. Although some research has been done to explore psychosocial influences, these determinants have often been dovetailed making it hard to make any distinct correlations. Given the heterogeneity seen within centenarian populations research is necessary to explore social factors independently in order to ascertain their influence (if any). Thus, this thesis endeavours to specifically identify the social factors of influence to the centenarian population and to explore this knowledge gap.

1.2 Research Aim and Thesis Overview

The aim of this thesis is to explore how social factors have helped shaped longevity attainment in Irish centenarians. To address this aim four distinct studies were conducted which are as follows:

1. A qualitative study exploring the lives lived by Irish centenarians.
2. A scoping review of the literature published on the influence of social factors on centenarian ageing.
3. A cross-sectional quantitative study examining the sociodemographic traits and social factor characteristics of Irish centenarians.
4. A cross-sectional quantitative study exploring a sample of centenarian offspring and their social factors in comparison to their centenarian parent and their peers.

Chapter one describes the background to this thesis, the concept of centenarian longevity, population projections and societal implications. Findings emerging from centenarian research to date and the rationale for the current thesis is also discussed within the realms of this chapter.

Chapter two presents the first empirical study conducted within an Irish environment namely: An Exploration of the Lives Lived by Irish Centenarians. This qualitative exploration aimed to develop a knowledge base relating to the centenarians' journey to one hundred years of age as told by them.

Chapter three reports on the second study conducted within this thesis which was a scoping review informed by Study one that sought to examine the available literature on the influence of social factors on centenarian populations.

Chapter four describes the third study of this thesis. This was a quantitative exploration of Irish centenarians, their social factors, and key characteristics. This study aimed to address the knowledge gap further exploring the social factors affecting Irish centenarians.

Chapter five presents the findings from the fourth and final study of this thesis. This study involved the offspring of a number of centenarian participants from study three. Given the ever-increasing life expectancies seen globally and in considering the concept of the 'inheritance of longevity', this study aimed to explore if any social factor advantages existed amongst a sample of the centenarian offspring cohort by virtue of being the child of a long-lived parent.

Finally, Chapter six will draw conclusions from the studies presented. Limitations of the current work will be discussed and recommendations for future work will also be acknowledged.

Chapter Two

A Qualitative Exploration of the Lives Lived by Irish Centenarians

2.0 Abstract

Background:

Society has witnessed a paradigm shift in ageing demographics. Centenarian cohorts are now recognised as being one of the fastest growing population groups and it is estimated that the number of centenarians will increase tenfold by 2050. Although centenarians have received some attention in research, they still represent a grossly understudied population. Longevity attainment has been described as an epidemic as the prevalence of those living to exceptional ages increased significantly in the last century. Such changes in ageing trends alongside advances in contemporary medicine, escalating healthcare costs and increased demands on social services has piqued interest in centenarians as models for successful survivorship. The aim of this qualitative study is to ascertain as the influence of social factors on the lives lived by Irish centenarians. By identifying these salient social factors, a more inclusive picture of what factors biopsychosocially denote successful ageing.

Methodology:

The study focused on selecting a sub-sample of participants aged 100 years or older and employed storytelling to give the centenarians a voice in sharing their lived experience of reach one hundred. This study had a total of 17 cognitively sound participants aged 100 to 105 years of age living in both private dwellings and residential care facilities across the Republic of Ireland. Participants engaged in face-to-face interviews in the presence of a significant other of their choosing and following a topic guide discussed their lived experiences and what the centenarians themselves felt were of importance in their journey to one hundred years.

Findings:

Participants were seen to place immense importance on the role of several social factors in contributing to their lives lived. Analysis of the research transcripts led to the development of four key themes within the Irish centenarian cohort, including, the childhood environment, social connectedness, the role of religion as well as participant attitude and outlook.

Conclusion:

This study of the lived experience sheds light onto the importance given by centenarian participants to a number of social factors in their lives. Given the heterogeneity of the centenarian phenotype and in considering future ageing trajectories understanding the holistic needs of the oldest old has never been so pertinent. Through its findings this research presents further opportunities to explore this topic area in greater depth and ultimately contribute to the development of appropriate care and services to meet the demands of the increasing ageing population.

2.1 Introduction

Despite society witnessing a paradigm shift in societal ageing with people now living longer than ever before, there exists no single accepted age threshold for longevity attainment (Christensen *et al.*, 2008; Newman and Murabito, 2013) As centenarians live to the furthest extremity of age and have survived the most important pathologies likely to be responsible for their morbidity and mortality, centenarian status is a generally easily understood and well-accepted criterion for longevity (Hitt *et al.*, 1999; Jeune and Vaupel, 1999; Jeune, 2002; Perls *et al.*, 2002; Deng *et al.*, 2018). Centenarians are the fastest growing age group in developed countries as year-on-year numbers of people around the world are reaching this milestone birthday. (Magnolfi *et al.*, 2007; Terblanche, 2015).

Exploring centenarians and their successful survivorship has been of great interest and understanding their longevity has taken on new importance. Whilst most centenarian research conducted to date has quantitatively focused on the genetic and physiological factors that have influenced longevity (Hensley *et al.*, 2012; Sebastiani and Perls, 2012; Kim, 2013; Sachdev *et al.*, 2013; Caruso *et al.*, 2019), the importance of psychological or social influences on one's experience of ageing should not be overlooked. The World Health Organisation (2018) has gone beyond the biological or genetic components of ageing in recognising the 'bigger picture' of ageing as including the social and economic environment, the physical environment and an individual's personal characteristics and behaviours as being the true determinants of health and that the context of a person's life better shapes their ageing as opposed to their

physical wellbeing alone (Woolf and Braveman, 2011; Braveman and Gottlieb, 2014). While research has begun to examine factors beyond those simply genetic or physiologic factors, most of these studies remain in their infancy and so these concepts remain vastly understudied.

Given the heterogeneity of the centenarian phenotype and the constant dilution of nations respective genetic pools due to increased diversity amongst populations, increased emphasis is now being placed on factors such as social relationships, maintaining purpose in life and resilience in character in recognising the gravity they can have when it comes to living longer (Charles and Carstenson, 2010). Therefore, this study aimed to reveal insights about centenarians in the Republic of Ireland with aspirations that this research will pioneer the development of a body of knowledge to enable us to better understand the lives lived by Irish centenarians. At present, within the Irish context, there exists no primary research that examines Irish centenarians either quantitatively or qualitatively. Documenting the profiles of centenarians not only biologically but also psychologically and indeed from the social perspective will assist stakeholders including researchers, practitioners, and policymakers and inform strategies to support the growing population of older adults in the Republic of Ireland and add to the existing literature on centenarians globally.

2.2 Literature Review

2.2.1 Introduction

A narrative literature review was undertaken to examine the current published works in relation to centenarian longevity and adopted a specific lens that focussed on social factors that may have shaped their ageing. A variety of keywords were considered for use and those used included, 'centenarian', 'longevity', 'oldest old', 'social determinants', 'social factors', 'wellbeing', 'successful aging/ageing', 'positive aging/ageing'. Results obtained from the databases were screened according to a number of predetermined conditions namely the inclusion and exclusion criteria as highlighted in Table 2.1:

Table 2.1: Inclusion and exclusion criteria for qualitative study literature review

Inclusion Criteria	Exclusion Criteria
1) Studies directly related to the population, phenomena of interest and context of the research topic.	1) Studies published in languages other than English.
2) Peer-reviewed, full-text journal articles.	
3) Studies published in English due to lack of resources and facilities for translation.	

While the search had initially been controlled in relation to the publication era to include only literature published between 2014 and 2019 to accommodate exploration of literature deemed current (Lobiondo-Wood and Haber, 2014) due to a paucity in research available the author was forced to remove the publication year restriction to broaden the search and facilitate a more all-encompassing review. Similarly, the search was also restricted geographically to examine research conducted with Irish centenarians however this proved futile with no related publications returned. The author widened the search to examine U.K based work which again was scarce and so again the author was forced to remove the restriction that had been put in place. Subsequently, literature from a host of countries was examined. The search did however remain restricted to include only peer-reviewed journal articles published in the English language.

2.2.2 Tenants of the Literature

Longevity and survivorship are influenced by a variety of factors and a number of themes were found to be recurring within the literature in relation to the factors that centenarians consider as being significant in their experiences of longevity. While this literature review concentrated on the social factors that may contribute to centenarian ageing and longevity, a small number of psychological factors were also discussed as the two concepts were frequently juxtaposed in the literature. Thus, several key tenants emerged as those that expounded the centenarian ageing beyond

physiological and genetic means by those aged one hundred years and older. namely: social inclusion, education, religion and spirituality and personality and outlook.

2.2.2.1 Sociological Determinants

Social Inclusion

Social inclusion and family support are discussed frequently as a key ingredient in the recipe for long term survivorship (Béland *et al.*, 2005; Merz and Consedine, 2014). Individuals that have engaged fully with society have better physical and psychological functioning and are more likely to thrive in later life versus those who are socially isolated (Bennett, 2002; 2005; Thomas, 2011; Zhou *et al.*, 2018a). A lack of social relationships is thought to have similar negative connotations on health as established risk factors such as physical activity, obesity, smoking and hypertension (House *et al.*, 1982; O Donoghue *et al.*, 2016) and the possession of a 'richness of social attachments and friends' is thought to protect against mortality (House, 1988). Familial ties are regarded as a defining factor in the promotion and conservation of health by contributing to the maintenance of both physical and cognitive vigour through supporting meaningful engagement with life and this has emerged as a fundamental factor of centenarian longevity across several centenarian studies. Koch *et al.*, (2007) in examining Australian centenarians' self-perceptions of old age resonated that family unity and frequent contact with others who cared was a crucial characteristic of ageing. Similarly, Freeman *et al.* (2013) drew attention to the importance of being connected to others for centenarians and noted communication and strong family and friend relationships were wholly necessary in living long and doing so well. Social support is believed to influence centenarians' health to the extent that family and friends exert social control by encouraging and supporting salubrious health behaviours (Luo *et al.*, 2012). Social support is recognised as being instrumental not only in terms of good health behaviours but also in relation to coping skills (McReynolds and Rossen, 2004; Davis *et al.*, 2017; Northwood *et al.*, 2018). Expectedly then social disengagement in cognitively sound older people is a proven risk factor for cognitive decline and centenarians that report less social sustenance, including social provisions and social resources are subject to quicker deterioration compared to those that are better supported (Randall *et al.*, 2010). Although social supports are established as a factor that increases the probability of living long, they often present a quandary for those

aged 100 years or more. While marriage and social partners are essential during all phases of life, their purpose in maintaining autonomy and wellbeing becomes strikingly apparent due to the intensified care needs that dovetail exceptional age. In stark contrast to their younger peers, 50% of centenarians are at risk of social isolation particularly within their friend networks as unlike family who are likely to transverse generations, friends tend to be close in terms of age and therefore a reduced friend network is almost a guarantee of exceptional old age (Lubben *et al.*, 2006; Jopp *et al.*, 2016a). Surprisingly, despite the weight of evidence supporting the value of social support as a determinant for longevity the lack of sufficient support in some centenarians is acknowledged (Forte, 2009). This is often due to 'family insufficiency' wherein the family unit lacks the appropriate psychological or social conditions or the financial and human resources to care for its older members (Mazza *et al.*, 2005; De Sousa *et al.*, 2015).

Education

Education has been recognised as being a key determinant of longevity (Adu-Acheampong and Jensen, 2019). As education has been shown to be a reliable predictor of longevity (Michalos, 2017) the causative relationship between education and longevity has been discussed by several authors throughout the literature (Jencks and Riesman, 1968; Taubman and Wales, 1975; Cutler and Lleras-Muney, 2006). A study conducted by Vallesi *et al.*, (2018) into the social determinants of health in Aboriginal populations demonstrated that barriers to educational opportunities negatively correlated with health outcomes. Lutz and Kebede's (2018) research equally reflected this understanding and reiterated how higher levels of educational attainment positively impacted on an individuals' health. A high level of education has been proven to have a direct impact upon longevity with higher education leading to improved health as it is argued that better educated persons are more equipped to make better informed, health related decisions for themselves and their families (Farrell and Fuchs, 1982; Deaton, 2003; Dewalt *et al.*, 2004; Sanders *et al.*, 2009; Bravemen *et al.*, 2011; OECD, 2017). According to Ross and Mirowsky (2010) education creates most of the association between higher socioeconomic status and better health as education is a root cause of good health. As education shapes employment opportunities and impacts directly on economic and financial resources

for individuals (Shankar *et al.*, 2013), those with a better education status will experience lower rates of unemployment, thus will be privy to improved health outcomes and lower mortality rates (Segeberg, 1982; Axelrad *et al.*, 2018; Wood and Burchell, 2018; Faber *et al.*, 2019).

Religion and Spirituality

Existential beliefs such as religion and spirituality serve as a critical support component in the everyday lives of the oldest old including the centenarian (Malone and Dadswell, 2018; Okun and Nimrod, 2019). Despite this, Malone and Dadswell (2018), acknowledge that religion and spirituality have received little attention despite the positive influence they can perpetuate on one's ageing. They argue that religion and spirituality represent key priorities for many people as they allow for structure, meaning and understanding to be applied to everyday life and act as a support mechanism and enhance coping during difficult life challenges (Rote *et al.*, 2013; Manning, 2013). Manning *et al.* (2012) also discusses religion adding to one's longevity as it fulfils a role as a key support mechanism and is a resource relied upon in later life. Living longer and approaching death inevitably evokes contemplative thought regarding the meaning of life (Ardelt, 2008). Spirituality can be heavily relied on and provides a framework that guides some throughout life whether it is in times of celebration or of sadness and so for the older person it may provide comfort or solace in times of adaptation as they age (Nelson-Becker, 2003; 2015). The importance of existential resources to resilience, mental health and well-being in advanced age is certainly credible and Araújo *et al.* (2017) highlighted this in their research with Portuguese centenarians. According to Archer *et al.* (2008) religiosity is an integral part of centenarians' lives as high levels of religiosity were positively related to successful adaptation and coping and high levels of life satisfaction in the lives of centenarians in Barbados, which in turn, may have contributed to their longevity. Freeman *et al.*, (2013) also lend support this theme in their study which focused on centenarians' self-perceptions of factors responsible for their extended health and longevity. However, the role of religiosity in longevity is not a new concept as religion and spirituality as a determinant of health and wellbeing in the lives of centenarians and those in advanced age has been repeatedly verified throughout research (Koeing *et al.*, 1988; Beard, 1990; Courtenay *et al.*, 1992; Pascucci and Loving, 1997; Crowther

et al., 2002; Larson *et al.*, 2002; Koeing *et al.*, 2015; Egan and Timmins, 2019; Ziedonis, 2019).

2.2.2.2 Psychological Determinants

Sense of Purpose

Purpose and the continuation of having a 'role' to play in society is another tenant that has emerged from the literature. The idea of maintaining a sense of purpose as being a key contributor to successful survivorship has been discussed across several early psychosocial theories. The Continuity Theory proposes that as people age and continue to participate in hobbies, goals, roles, and activities that would have been central in early adulthood they maintain a stronger sustain a sense of stability and security in old age (Atchely, 1989). Rowe and Kahn (1998) echo similar sentiments suggesting that socio-emotional support is potentially the most important aspect of longevity as it reinforces individuals' beliefs that they are still valuable in society despite ageing, and this has been evidenced throughout the literature. According to a study by Freeman *et al.* (2013), the establishment of a purpose to continue living is imperative for centenarians. This sense of purpose can be derived from an abundance of sources in the centenarian's life whether it be family, community or religion and beliefs among others.

Positive Attitude and Outlook

Lamond *et al.* (2009), define resilience simply as the ability to adapt positively to adversity. The Fordham study conducted by Jopp *et al.*, (2016a) focused on the physical, cognitive, social, and mental health of centenarians and near centenarians in New York and highlighted the resilience within this cohort in overcoming challenges faced. These findings align with other studies from the United States (Adkins *et al.*, 1996; Bishop *et al.*, 2010), Australia (Evert *et al.*, 2003; Sachdev *et al.*, 2013) and Germany (Jopp and Rott, 2006) reaffirming the remarkable resilience amongst the oldest old. According to Scelzo *et al.*, (2018) exceptional longevity can be characterized by a balance between acceptance of and grit to overcome adversities along with a positive attitude among other determinants. The positive sway of resilience was also recorded in the oldest old by Robertson (2019). With advanced age and survivorship centenarians face potential challenges such as widowhood, loss

of children and contemporaries, the move to long term care facilities or perhaps a reduction in their economic resources (Poon *et al.*, 1992; Zeng and Shen, 2010; Martin *et al.*, 2010) and so the salience of resilience in the older person is again distinguishable (Martin *et al.*, 2019). Concurrently, in their lifetime centenarians have overcome a century of life events such as economic depression (twice), world wars, and other historical events pertaining to their country of residence (Smith, 1997; Martin *et al.*, 2010). Despite these virtues, most centenarians are satisfied with their lives. The fact that most of this cohort declare good life satisfaction resounds harmoniously across centenarian studies including those of Sweden (Samuelsson *et al.*, 1997), Barbados (Archer *et al.*, 2005), Australia (Randall *et al.*, 2011) and the Heidelberg Centenarian Study (Jopp and Rott, 2006).

2.2.3 Conclusion

While the role of genetics in ageing is irrefutable, given the heterogeneity of the centenarian phenotype one must acknowledge the factors of longevity that go beyond biological explanation. The global increase in ageing has driven the demand for researchers to continue to explore the determinants of ageing and their influence on exceptional survivorship human populations. As discussed, social inclusion and connectedness are central to well-being and functioning for older persons and the importance of social relations for centenarians has been recognised consistently throughout the literature as being a key determinant in the maintenance of not only autonomy and health for older persons but also their longevity. Educational attainment also proved significant in the ageing experience as it was shown how education influences a number of aspects within an individual's life notably health related behaviours, cognitive functioning, and the development of social and psychological resources (Hummer and Hernandez, 2015). Religion and spirituality were two important aspects to many centenarians when they reflected on their lives and has throughout the literature has been identified as being a key factor in supporting the older person in later life (McFadden, 1995). Religion appeared to offer centenarians a sense of guidance and direction as well as mitigate support and comfort for them throughout their lives. It has also been shown to influence the maintenance of a sense of continuity over the life course (Manning *et al.*, 2012) and thus is seen as positively enhancing one's longevity.

Having a purpose in life has been nominated consistently as an indicator of healthy ageing for several reasons including its potential for reducing mortality risk among older persons (Boyle *et al.*, 2009; Hill and Turiano, 2014). Centenarian research also recognises that centenarians themselves are notably more resilient than other age groups of older persons (Koch *et al.*, 2007; Zeng and Shen, 2010) and as evidenced in the literature resilience contributes significantly to exceptional longevity even at advanced ages (Zeng and Shen, 2010; MacLeod *et al.*, 2016; Amaral *et al.*, 2021). These findings are not only scientifically valuable but also have policy relevance and policies and programmes aimed at the promotion of resilience among older persons need to be considered going forward in planning for future generations. Therefore, it cannot be disputed that a combination of variables is key to ageing and longevity.

In summary, while centenarian ageing has been the subject of research for some time, it is important to recognise that most studies conducted to date are quantitative in nature and can be somewhat restricted by the predetermined and exact measures used to examine the determinants of ageing. This review concluded that there remains a notable lack of empirical evidence from the centenarian's perspective that illustrates personal experiences and feelings surrounding their longevity. While the author was aware of the lack of research in the Irish context prior to conducting the review, the author now also acknowledges the gap in the literature that examines the centenarians' understandings and meanings they derive from their longevity. The gaps in knowledge identified in this literature review can be deduced to; a dearth of empirical data on centenarian ageing both generally and specifically relating to the influence of social factors in their lives, in addition to limited qualitative data both nationally and internationally into the lives lived by centenarians. The lack of robust empirical research from qualitative methodologies into centenarians is significant, as to provide a comprehensive overview of centenarian longevity both qualitative and quantitative paradigmatic approaches are essential. Given the above background, this study's overarching objective is to develop, based on the experiences of Irish centenarians a broad body of knowledge exploring the lives lived by Irish centenarians. This study aims to do this by considering the following key questions:

- 1) What do centenarians appear to place importance on in their lives?
- 2) What are centenarians' perceptions of the lives they have lived?

3) What influence (if any) have social factors played in the lives of Irish centenarians?

To effectively meet the aims and objectives of this study It is important to situate the study within its theoretical framework, thus the following chapter presents a review of the underpinning ideologies behind this study's philosophical assumptions.

2.3 Theoretical Framework

2.3.1 Introduction

The study of ageing has expanded substantially, and this growth has been predominantly catalysed by the extraordinary lengthening of average life expectancies worldwide. The root questions and answers to ageing have long been debated and many theories have been proposed by way of explaining the phenomenon of ageing. While theories of ageing are widespread and vary greatly in their perspectives and there exists no well-developed explicit conceptual or theoretical framework of longevity but rather several theories appear to interact with each other to address this concept. Theories not only provide context and richness to research in gerontology but also drive research questions, methods, and hypothesis testing. Thus, a theoretical perspective is essential for any research study as it frames the research whilst justifying the approach used by the researcher (Creswell, 2014).

2.3.2 Theories of Ageing and Centenarians

Psychosocial models of successful ageing emphasise independence, life satisfaction, social engagement, personal growth, adaptability, self-worth, autonomy, and social participation as being essential for ageing well (Bowling and Dieppe, 2005). Although there are many theories of ageing proposed in the literature, how these theories relate to the oldest old is often poorly discussed (Heinz *et al.*, 2017). Amongst the most common psychosocial theories of ageing are Activity, Selective Optimization with Compensation, Gerotranscendence, and Rowe and Kahn's Successful Ageing. However, apart from the Theory of Gerotranscendence (Bishop *et al.*, 2010; 2011; 2019), there is limited evidence highlighting of how these theories apply to centenarians.

First introduced by Cavan *et al.*, (1949) and later expanded on by Havinghurst and Albrecht (1953), the Activity Theory is based on the idea that older adults gravitate towards and participate in community, society, and social roles (Knapp, 1977; Heinz *et al.*, 2017). The theory also states that higher levels of activity and engagement correlate with greater life satisfaction and consequently enhanced well-being in later adulthood (Diggs, 2008). The Activity Theory has been widely used in research, particularly when assessing or predicting successful ageing in older persons with researchers noting significant evidence of Activity Theory relating to both well-being and survival in older adults (Menec, 2003). However, critics of this theory stipulate factors including socioeconomic status, personality, and lifestyle (among others) may explain the relationship between life satisfaction and increased activity level and that this should be taken into consideration in applying this theory.

Lars Tornstam's Theory of Gerotranscendence emerged in 1989 (Tornstam, 1989). This theory was based upon the premise of three specific levels including the (1) cosmic; (2) the self; and (3) social and individual relations (Tornstam, 2005). The cosmic level is related to perceived changes to time, space, and decreased fear of death. Individuals take on new characterisations of the self, including increased understanding of hidden aspects of the self. There is also a significant shift away from the self and on to others (altruism). Social and individual relations may refer to increased focus on solitude and pondering as well as some role relinquishment (Tornstam, 2005). The theory has been used to better understand the importance of reminiscence in older adulthood (Tornstam, 2005), spirituality (Dalby, 2006) and life satisfaction (Wang *et al.*, 2011). Some researchers have been critical of the view that spirituality may change with age. Instead, Dalby (2006) pointed out that dimensions of spirituality may change due to other reasons. Similarly, questions surrounding the universality of the theory have been raised, for example Jewell (2014) theorised that gerotranscendence may be dependent on the individual or culture.

Baltes and Baltes (1993) developed the Selective Optimization with Compensation Theory (SOC) wherein they proposed older adults can successfully adapt and cope with growing older by focusing on the gains and strengths (rather than losses) and engage in compensation strategies when encountering challenges, that is, a person selects valued activities and domains in everyday life according to their own personal

goals and what they consider to be essential (Legg *et al.*, 2016; Tuntland *et al.*, 2017, Metzeltin *et al.*, 2022). This model gained increasing importance in older age research due to the increased vulnerability, reduced reserve capacity and increasing individualisation of life trajectories and this theory has been used frequently as a framework to help understand successful ageing in older adults (Gignac *et al.*, 2002; Camacho *et al.*, 2019). A criticism of the theory is that it is a bit reactive rather than proactive and Ouwehand *et al.* (2007) argue that theories or models that focus on proactive coping would better lend to a greater understanding of ‘successful’ ageing. Arguably the best known and commonly applied model of successful ageing (Dillaway and Byrnes, 2009), Rowe and Kahn’s theory of ‘successful ageing’ was first launched in 1987 (Rowe and Kahn, 1987). Their model claims successful ageing is the cumulation of three components, namely, avoiding disease and disability, high cognitive and physical function, and engagement with life as highlighted in Figure 2.1:

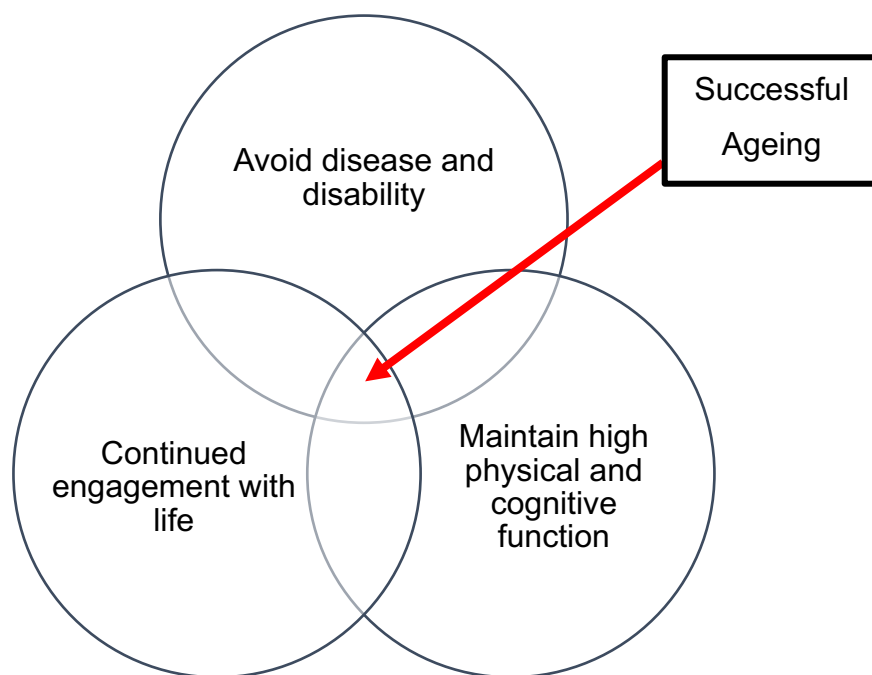


Figure 2.1: Rowe and Kahn’s Model of Successful Ageing. Source: (Rowe and Kahn, 1997)

Rowe and Kahn considered high levels of cognitive and physical functioning to be necessary for independent living and quality of life, and a high level of functioning is therefore a proxy for successful ageing. Rowe and Kahn's concept of successful ageing assumes that aged-related decline can be explained by several extrinsic factors, and that these factors can be altered. They explained that, from a medical

perspective, extrinsic factors such as diet and exercise are potential predictors of various disease conditions in old age. Moreover, these factors may be influenced by psychosocial factors that are also shaped by the conduct of family members, friends, and health professionals. Thus, Rowe and Kahn (1987; 1997) suggested that there is evidence for the manipulation of the ageing process. Rowe and Kahn's approach represents a model of successful ageing that is associated with ideas that focus on continuity, active engagement, and the optimisation of functioning, suggesting that later life is merely a continuation of a person's overall life trajectory and their development throughout life. From this perspective, being actively engaged in activities of everyday life and optimising functional abilities seems to be both the means and an end in increasing the likelihood of one surviving to advanced age. While Rowe and Kahn primarily dealt with the medical and epidemiological perspectives, a problem with their model, is its sole focus on late adulthood to make a static assessment of an individual's successful ageing. Therefore, it fails to capture developmental processes and trajectories of continuity and change in function over time. Additionally, it has been argued that a successful ageing model that encompasses all age groups, backgrounds and cultures is not realistic or even feasible (Martinson and Berridge, 2015) as the perception and experience of old age is influenced by cultures, individual experiences, and societal expectations (Löckenhoff *et al.*, 2009; Martin *et al.*, 2015).

As centenarians surpass the current human life expectancy by approximately 20 years, numerous research studies have explicitly reported on the centenarian phenotype as being the benchmark for healthy ageing through merit of the attainment of exceptional longevity and so many consider centenarians to be models of successful ageing (Hitt *et al.*, 1999; Andersen-Ranberg *et al.*, 2001; Franceschi and Bonafe, 2003; Berzlanovich *et al.*, 2005; Motta *et al.*, 2005; Gondo *et al.*, 2006; Andersen *et al.*, 2007). This ideology however has become a matter of intense debate in more recent times as successful ageing is largely subjective and can have many different interpretations. Thus, it remains unclear as to what exactly denotes successful ageing, how it can be measured, how best one can achieve it or if there is even such a thing as 'ageing successfully' (Strawbridge *et al.*, 2001; Depp and Jeste,

2006; Nusselder and Peeters, 2006; Cosco *et al.*, 2013; Katz and Calasanti, 2015; Martin *et al.*, 2015).

Although Rowe and Kahn's definition of successful ageing still remains the most widely cited, it has also attracted the most criticism, largely owing to the the converse implication derived, scilicet, that those who do not meet its definition are deemed unsuccessful or indeed to have failed at ageing (Minkler and Fadem, 2002; Holstein and Minkler, 2003; Richardson *et al.*, 2011). Alternative definitions for successful ageing have been proposed in the literature and include productive aging, optimal aging, and comfortable ageing, none of which specify the criteria predetermined by the Rowe and Kahn model (Crowther *et al.*, 2002; Helmuth, 2003; Hardy *et al.*, 2004). While it is acknowledged that life expectancies are generally continuing on an upward trajectory with people living longer, people are not necessarily living any healthier in their journey to advanced age and so it is unrealistic to assume that the majority of people will remain disease-free later in life (Bowling and Dieppe, 2005; Beard *et al.*, 2016). Moreover, few people will die without experiencing a significant period of disability (Christensen *et al.*, 2009; Richardson *et al.*, 2011; McIsaac *et al.*, 2020). With the average person then expecting to spend a significant length of time near the end of life with disabilities which only extrapolate the inherent need for change in perceptions on this matter (Jia and Lubetkin, 2020).

Therefore, the author acknowledges that given the complexities of ageing there is no perfect theoretical fit and that it is likely that elements of several theories of ageing will be seen in the results of this study. With this in mind, the author suggests that an eclectic model based on the teachings of Tornstam's theory of gerotranscendence, Baltes and Baltes theory of selective optimisation with compensation and the work of Rowe and Kahn be used as the overarching framework for this research. This adapted framework will attest that for centenarians, while optimal ageing may be achieved through positive associations with good physical and cognitive functioning, optimal ageing may also coexist alongside poorer physical health should other domains be satisfied. Furthermore, the author proposes that these components be considered within their objective and subjective measures but that the weight attached to each component does not need to be equal, that being, strength in one may outweigh

weakness in centenarian's successful survivorship and so permit the older person to age 'successfully' in spite of any vulnerabilities they may have (Figure 2.2):

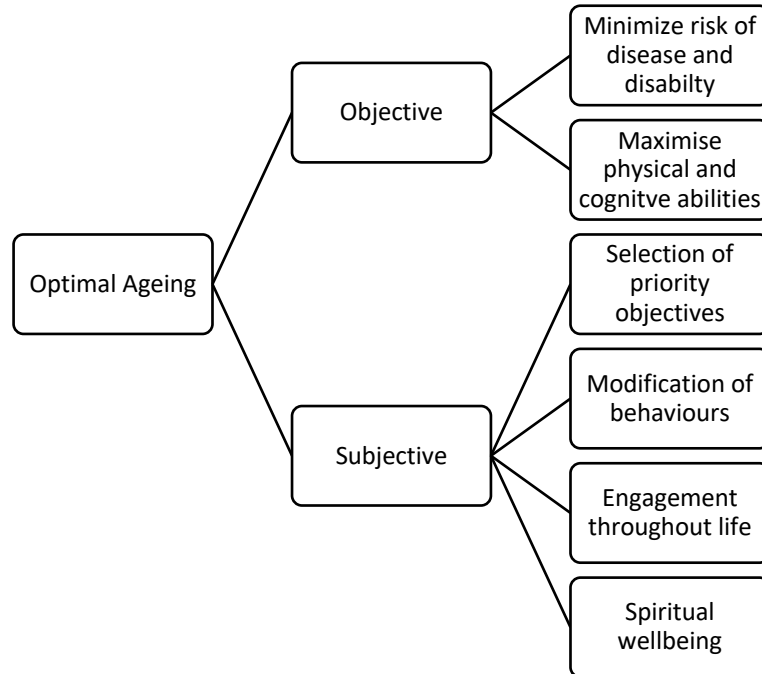


Figure 2.2: Diagrammatic depiction of proposed eclectic model of optimal ageing for centenarians

2.3.4 Conclusion

This chapter has provided the reader with information about the theoretical framework chosen for use in this study. Several of the prominent theories of ageing have been discussed and the work of those that has contributed to the research perspective and design of this study have been highlighted. The concept of centenarians as 'models' for successful ageing has also been deliberated and the appropriateness of the application of an eclectic theory to support optimal ageing in centenarians has also been described.

2.4. Methodology

2.4.1 Introduction

Here the author presents the research methodology adopted for this study and highlights the methodological reasoning and the underpinning philosophical assumptions for this study.

2.4.2 Qualitative Research

Qualitative research is defined as “the study of the nature of phenomena”, including “their quality, different manifestations, the context in which they appear or the perspectives from which they can be perceived”, but excluding “their range, frequency and place in an objectively determined chain of cause and effect” (Busetto *et al.*, 2020). Phenomenology is the study of how ideas, events and images ‘appear’ to us, that is, how we view and perceive them as they happen (Parahoo, 2014). Heidegger famously explained phenomenology as being the act of letting what shows itself [to] be seen from itself, just as it shows itself from itself (Brennan, 2015; van Manen, 2019). What phenomenology aims to reveal, therefore, or what was hidden from our view, is an essential aspect of the phenomenon necessary for the phenomenon to have meaning (van Manen, 2017). It is not simply the experience that one is describing; one conceptualises each experience to frame it in a way that provides meaning. Thus, phenomenology is also a study of the *meaning* ascribed to each experience (van Manen, 2017). Phenomenology has been described as both a philosophy and method (Speziale *et al.*, 2011). Phenomenological research questions how we experience the world. Moreover, because we are simply living ‘in the world’, phenomenological questions are often about the quotidian existences we might have. The experience of being a centenarian is one such existence.

The telling of life stories for the older person is a way of reconnecting with their past and reliving memories that hold significant importance for them in their lives. Storytelling and reliving memories, especially for older people can be therapeutic. A life review is considered as the final psychosocial stage of wisdom and peace as this can bring the older person closer to integrity (Ramsey and Blieszner, 2016; Sharif *et al.*, 2018). In reflecting on participants’ life stories, the researcher adopted a phenomenological approach to this study based on the principles of hermeneutical

phenomenology. Hermeneutics is the theory and practice of interpretation (van Manen, 1990; 1994). It involves interpreting the text of interviews to isolate common themes, thereby gaining understanding, and meaning of the phenomenon under investigation. Hermeneutics is a “process and method for bringing out and making manifest what is normally hidden in human experience and human relations” (Lewis *et al.*, 2004). Through analysing the texts of interviews, a researcher can uncover common themes as shared by the participants to gain new knowledge about living through a particular phenomenon or life experience. The purpose, therefore, of hermeneutic phenomenological research is to bring to light and reflect upon the lived meaning of experience (Grbich, 2012). Hermeneutic phenomenology is very successful in research studies with older people (Wicks, 2006; Joseph and Southcott, 2017; Toivonen *et al.*, 2018). It lends social science research another resource from which various topics can be explored. It enables the understanding of human experiences and life story telling and transcends barriers between researcher and participant (Josselson, 2006) allowing researchers to study and interpret biopsychosocial aspects of participants’ life stories in greater detail.

2.4.3 Ontological and Epistemological Considerations

Thematic analysis can be an essentialist or realist method, which reports experiences, meanings, and the reality of participants, or it can be a constructionist method, which examines the ways in which events, realities, meanings, experiences and so on are the effects of a range of discourses operating within society (Braun and Clarke, 2022a; 2022b). It can also be a “contextualist” method, sitting between the two poles of essentialism and constructionism, and characterised by theories such as critical realism (Willig, 1999), which acknowledge the ways individuals make meaning of their experience, and, in turn, the ways the broader social context impinges on those meanings, while retaining focus on the material and other limits of “reality” (Braun and Clarke, 2022a). While this flexibility in thematic analysis can be considered as being quite advantageous, it can also lead to inconsistency and a lack of coherence if researchers are not clear on the theoretical position that they are adopting within their research (Holloway and Todres, 2003). Therefore, Braun and Clarke (2006) emphasize the importance of establishing the theoretical position of all thematic analyses to ensure that there are well-defined and transparent as any theoretical

framework carries with it several assumptions about the nature of the data, and what they represent and so influencing the outcome of any analyses being conducted.

While several approaches were considered in the quest to find the best theoretical fit for this study, the author favoured the use of contextualism as it broadly maps onto a critical realist ontology which was fitting with the insights that this research sought. Akin to how critical realism overlaps realism and relativism, contextualism blurs the lines between epistemologies of (post) positivism and constructionism. Contextualism offers an epistemology that is more compatible with Big Q qualitative research and emphasizes that people cannot be studied in isolation from the context in which they live and that give meanings to their lives (Madill *et al.*, 2000; Kaushik and Walsh, 2019). Data analysis in a contextualist epistemology is acknowledged to be partial and subjective as it is dependent on the contexts of the research in addition to the interpretation of the researcher. Regardless of this, for Madill *et al.*, (2000, p. 17), “the onus on researchers is to make their relationship to the material clear and to ground analysis in participants’ own accounts’.

2.4.4 Sampling

In any research study it would be advantageous to have the ability to investigate an entire population (Palinkas *et al.*, 2015) however, it is rarely possible to study any population. Alternatively, a researcher will examine a ‘sample’ which is sufficiently large and representative of the entire population (Dawson *et al.*, 2004). The process of sampling is subdivided into two main types of namely probability sampling and non-probability sampling. In probability sampling, random selection ensures that all population members have a known nonzero chance of being selected (Battaglia, 2008; Engel and Schutt, 2012; Sarstedt *et al.*, 2018). On the other hand, with nonprobability sampling, randomization is not important in choosing the sample to represent a population of interest but instead, subjective methods are used to decide which elements are included in the sample. Hence, nonprobability sampling is a sampling technique whereby the samples are gathered in a process that does not give all the participants or units in the population equal chances of being included. As phenomenology is concerned with the meaning of phenomena within the lived experience of an individual (van Manen, 2001; Alasse, 2017; Bush *et al.*, 2019),

probability sampling would be completely incompatible as the aim of a probability sample is to seek generalisability (Higginbottom, 2003; Elo *et al.*, 2014). Qualitative research usually (though not always) employs the use of non-probability sampling techniques (Murphy *et al.*, 1998; Delice, 2010; Etikan *et al.*, 2016). Sample size is not determined through the need for generalisability (as would be expected in quantitative research) but instead by the desire to provide information rich data (Saunders *et al.*, 2018). It is very crucial then that the researcher determines which nonprobability sampling technique is applicable to their study specifically. The technique used depends on the type, nature, and purpose of the study. Non-probability sampling can be further subdivided into several distinct categories including convenience sampling, purposive sampling, theoretical sampling selective sampling, within-case sampling (Higginbottom, 2003; Guest *et al.*, 2013).

Data gathered during the research process is supposed to contribute to a better understanding of a theoretical framework (Bernard, 2002) and so choosing the way by which data is obtained as well as from whom the data will be acquired must be done with sound judgment, as no amount of analysis can make up for improperly collected data (Tongo, 2007; Roller and Lavrakas, 2015; Etikan *et al.*, 2016). The purposive sampling technique, also commonly referred to as judgment sampling in the literature, is one whereby a participant is chosen due to the qualities they possess and was the method employed for this study as it is most appropriate (Tongo, 2007). It is a non-random technique that does not need underlying theories or a set number of participants. Simply put, the researcher decides what needs to be known and sets out to find people who can and are willing to provide the information by virtue of knowledge or experience (Bernard, 2002). It is typically used in qualitative research to identify and select the information-rich cases for the most proper utilization of available resources (Patton, 2002). This involves identification and selection of individuals or groups of individuals that are proficient and well-informed with a phenomenon of interest (Creswell and Clark, 2003). In addition to knowledge and experience, Carey (1993), Patton, (2002) and Jeanfreau and Jack (2010), note the importance of availability and willingness to participate, and the ability to communicate experiences and opinions in an articulate, expressive, and reflective manner in providing rich qualitative data. Unlike random studies, which deliberately include a diverse cross section of ages, backgrounds and cultures, the idea behind purposive sampling is to concentrate on

people with characteristics who will be able to assist with the relevant research and the sample is selected then on the basis that they fulfil the inclusion/exclusion criteria for the study population.

The identification of inclusion and exclusion criteria for any research study participants is a standard required practice when designing high quality research protocols (Patino and Ferreira, 2018). Inclusion criteria and exclusion criteria together make up the eligibility criteria that rule in or out the participants in a research study. Inclusion criteria refers to the key identifiers of the population under examination and common inclusion criteria include demographic, clinical and geographic characteristics (Hulley *et al.*, 2007). Conversely, exclusion criteria can be defined as a set of predefined definitions that are used to identify subjects who will not be included or who will have to withdraw from a research study after being included (Salkind, 2010). The inclusion criteria for this research project were very clear and in order for an individual to take part they had to; be 100 years of age or older (birth year of 1918 or before) at the time of the interview, be an Irish citizen residing in the Republic of Ireland and have had the capacity to self-consent to participation. Participants of this centenarian research study were selected and included on the basis that they satisfied the inclusion criteria for the study.

2.4.5 Participant Recruitment

Researching centenarians poses some unique challenges that have been documented throughout the literature such as obtaining a representative sample, problems of identification, verification of age, motivation of gatekeepers as well as gatekeepers who may limit access to the centenarian, frailty, cognitive impairment, high morbidity and mortality rates, and withdrawals from research owing to ill health. (Sachdev *et al.*, 2013; Yang *et al.*, 2013).

Initially, to ensure clear objectivity and equality, the author contacted the *Áras an Uachtaráin* (Office of the President of Ireland) to request a list of all centenarians living in the Republic of Ireland as this is held by the President's office as all persons in Ireland who reached 100 years of age is awarded The Centenarian Bounty. However, in accordance with General Data Protection Regulations (GDPR) as supervised by the

Data Protection Commission it was not possible to be furnished with this resource. Advertisement of the study was done using a wide variety of media outlets and this included newspaper adverts, magazine advertisements, parish newsletters and bulletins, radio promotion of the project (with a focus on local radio), word of mouth, and poster displays in specified locations such as church notice boards, library notice boards, town hall notice boards, primary healthcare centres and GP practices. Participant recruitment was also done by contacting all nursing homes in the Republic of Ireland via email or phone as they were listed on the Nursing Homes Ireland website (www.nhi.ie) and also as discovered through general searching of archives online. Further recruitment was also conducted through advertising on social media platforms including Facebook and Twitter. Persons interested in participating in the project were then invited to seek further information on the project through email or via telephone and were subsequently invited to volunteer to participate in the study. Due to the age of the participants being recruited, it was acknowledged from the beginning that there is an increased likelihood that a recruited person may have a disease or illness such as dementia that could deem them as being unsuitable for interview. In ensuring reliability and validity as well as protecting the vulnerable populations only narratives from those with none or mild cognitive deficits and the capacity to self-consent were deemed eligible to participate in the research study as supported by their significant other.

Choosing to participate in the research study was voluntary and it was emphasised to participants that participation was exclusively altruistic. It was made clear to those recruited that they could decide to opt out at any time. Participants in research studies often describe feeling good about sharing information that may contribute positively to others as it can heighten their sense of purpose (Hutchinson *et al.*, 1994). Telling one's story and really being heard (key elements of the 'storying' interview process) have also been documented as being empowering for research participants (Corbin and Morse, 2003; Riessman and Quinney, 2005; Sfard and Prusak, 2005; Mager, 2019). While there were no immediate benefits for those that chose to participate in the project, it was envisaged that this resulting work would guide policy makers and help them better understand the lives lived by Irish centenarians which in of itself would allow for the delivery of adequate provisions and vital requirements for future generations of older persons in Ireland going forward. It was anticipated then that this

cohort of participants and their families along with the growing number of the older persons will benefit from this study and it was as that they will get something of value through increased awareness' and knowledge regarding the factors that have contributed to somebody living past 100 years or more, which is wholly unique.

A total of seventeen centenarians were interviewed as part of the research study. Of the participants interviewed, four resided in residential facilities whilst the remaining thirteen lived in the community either alone in their own residence or with family members. Participants' age was confirmed by individual themselves providing a form of identity (birth certificate, passport, G.P or medical card, or public services card) and was confirmed by their significant other present at interview.

2.4.6 Data Collection

Qualitative research is used to gain impactful insights into people's feelings and thoughts, which may then act as the basis for a future stand-alone qualitative study or may help researchers to map out survey instruments for use in quantitative research (Holloway and Galvin, 2016; Minor and Knight, 2017; King *et al.*, 2018). Regardless of the philosophical point of view that the researcher opts to take and irrespective of the data collection method chosen for use the process will involve the generation of large amounts of rich data.

2.4.6.1 Narrative Approach

Qualitative semi-structured interviews are one of the most dominant and widely used methods of data collection within the social sciences (Bradford and Cullen, 2012). The popularity of semi-structured interviews within the social sciences partly reflects their independence from a single theoretical framework or epistemological position and as such can be used to explore the meanings and reality of participants' experiences as informed by the discourses, assumptions or ideas which exist in wider society (Braun and Clarke, 2006). They are valuable as they allow researchers to explore subjective viewpoints (Flick, 2009) and to gather in-depth accounts of peoples' experiences. In line with the narrative paradigm postulated in this research the collection of data was done through face-to-face interviews that adopted a narrative approach. The narrative interview seeks rich descriptions of people as they exist and unfold in their natural

worlds. Mishler (1986) emphasises that within this inquiry the researcher's role is to listen and not to suppress narrators' storytelling.

To promote a relaxed atmosphere, interviews were held at a time and place chosen by the centenarian participant and in the presence of a significant other of their choosing. Data collected in a natural setting facilitates immediate follow-up for clarification which encourages cooperation and collaboration as was the case in this study. Furthermore, the interview setting curated enhanced the development of a positive rapport between the centenarians' and the researcher which positively added to the storytelling experience. Interviews were conducted in the persons own private residence or in their long-term care environment.

An interview topic guide was used to allow the researcher to address defined topics whilst permitting the respondent to answer in their own terms and to discuss issues and topics most pertinent to them (Appendix II) (Denscombe, 2010; Choak, 2012; Lindgren *et al.*, 2015; Palacios *et al.*, 2015). By conducting the interviews in this way, interviews resembled a 'flowing conversation' which was in keeping with the chosen methodology of narrative storying (Rubin and Rubin, 2005; Choak, 2012). Field notes were also utilised in the interview process and allowed the researcher to note and comment on impressions, environmental contexts, behaviours, and nonverbal cues that weren't necessarily communicated through the audio-recordings of the interviews. Field notes give important context to the interpretation of audio-taped data and can help remind the researcher of situational factors that may be important during data analysis (Flick, 2014; Taylor *et al.*, 2015; Merriam and Tisdell, 2015; Phillipi and Lauderdale, 2018).

2.4.6.2 The Interview Process

In narrative interviewing Rosenthal (2003) suggests that the interview should be broken down into distinct phases known as sub-sessions. While Wengraf and Greenhalgh (2008) propose that in conducting biographical narrative interpretative research, such sessions should take place on separate occasions, previous qualitative centenarian research by Naiker-Ratan (2016) instead loosely adopted this suggested technique and conducted their sub-sessions within one sitting which allowed them to

overcome feasibility issues amongst this vulnerable age cohort. As this research of Irish centenarians recognised similar issues, it was decided that all data collection would be done in one sitting but would adopt a recognised phased approach. The four-step approach to narrative interviewing proposed by Anderson and Kirpatrick (2016) was utilised in this study. The first step involves introducing and providing explanations about the research, detailing the interview process itself, answering any questions interviewees may have and obtaining consent. The next step is described as 'the narrative' wherein the interview starts, and the participant begins to share their story. Within this step the interviewer should use non-verbal cues to encourage the interviewee to talk freely. According to Creswell (2009), the use of non-verbal prompts, such as nodding, is seen as supportive to acknowledge and encourage participants to tell their stories and this was used effectively throughout all interviews conducted. Additionally, it is important that the interviewer avoids interrupting until there are clear signs that the interviewee has finished their story. This is essential as narrating lived experiences of the participants through uninterrupted methods is what produces rich data (Scheffelaar *et al.*, 2021). The third phase is the questioning phase which frequently takes the shape of a combined narrative/semi structured interview and is when the active listening by the interviewer becomes useful and the interviewer can use the participant's own language to fill in any gaps or to ask for more detail about an issue of interest. Occasionally, the researcher did observe hesitancy in relation to certain topics introduced by participants and so appropriately timed clarification was sought if needed. These participants, on completion of their narratives, were asked several additional questions pertaining to points they had raised in their recounts to seek clarification and elaboration. Creswell (2009) attests that this is accepted as good practice. Interpretation starts during the narrative interviews by seeking clarification to enhance verification and meaningful dialogue, but not to influence the narrations. The final phase of the narrative interview is 'the conclusion'. At this point the interview is finished, and the interviewer explains the next steps, for example, the process of transcription, whether the participants will have any further input and so on. The lengths of the interviews were determined by the participants and varied from 30 minutes to 2 hours and 10 minutes.

2.4.6.3 Transcribing the Interviews

The verbal interviews were audio-taped to enable transcription. To maintain confidentiality and anonymity, interviews were conducted and transcribed by the author personally. The transcriber has an ethical responsibility towards the research participants namely how they transpose their spoken words into text (Marshall and Rossman, 2011). The ethical principle of respect for the person is particularly relevant when participants' words are formed into analysed categories and presented for public forum.

The author commenced transcription immediately which resulted in the concurrent processing of data collection and data analysis. In completing the task of transcription, the author listened and re-listened to the interviews and then read and re-read the transcriptions to immerse themselves into the data and derive meaning from the significant volumes of data collected. This was done intentionally to reduce the problematic nature of handling data interpretations and judgements inherent in transcription.

For audit purposes and in ensuring accuracy and transparency, audio-recordings and transcriptions were independently reviewed by the primary research supervisor. By undertaking the transcription role, the author gained an in-depth awareness of the data and the depth and wealth of information that each narrative contained. While this was time and labour intensive, it was an essential strategy aimed at ensuring accuracy in interpretation.

2.4.7 Data Analysis

2.4.7.1 Framework for Data Analysis

Data analysis in qualitative research can be regarded as the most complex stage of the research process itself (Thorne, 2000) yet qualitative researchers regularly fail to provide an in-depth description of how they analysed their data in publications (Sandelowski, 1995; 2000; 2010; Stige *et al.*, 2009). Qualitative data analysis requires the researcher to choose a recognised data analysis methodology and apply it to the primary data collected in the field. These processes allow the researcher to make two statements through an audit trail of the processes deployed during data analysis: first,

that the work was done and secondly, that it was done in a manner consistent with the guidelines.

Qualitative approaches are incredibly diverse, complex, and nuanced (Braun and Clarke, 2006). Qualitative analytic methods can be generally divided into two broad categories. In the first instance, there are those that are tied to a particular theoretical or epistemological position. For some of these such as conversation analysis (Hutchby and Wooffitt, 2008) and interpretative phenomenological analysis (IPA) (Smith *et al.*, 1999; Clarke, 2009) – there is limited variability in how the method is applied, within that framework. While with others – such as grounded theory (Glaser, 1992; Strauss and Corbin, 1998; Thomas and James, 2006; Thornberg, 2012; Thornberg and Dunne, 2019), discourse analysis (Burman and Parker, 1993; Willig, 2003; Mullet, 2018) or narrative analysis (Riessman, 1993; Murray, 2003) – there are different categories of the method from within the broad theoretical framework. Secondly, there are methods that are effectively independent of theory and epistemology and can be applied across a range of theoretical and epistemological approaches. Thematic analysis is firmly rooted amongst the latter and as it is compatible with both essentialist and constructionist paradigms although frequently is framed as a realist or experiential method (Aronson, 1995; Roulston, 2001).

Thematic analysis (TA) has long been regarded as the most used method of analysis in qualitative research as it offers an accessible and robust method for analysing qualitative research (Thomas and Harden, 2008; Terry *et al.*, 2017). At a very basic level it is a method for identifying, analysing, and interpreting patterns across a qualitative dataset (Braun and Clarke, 2021a; 2022) and is a method of analysis driven by both theoretical assumptions and the research question itself (Boyatzis, 1998). Through its theoretical freedom, thematic analysis provides a flexible and useful research tool, which can potentially provide a rich and detailed, yet complex account of data. However, despite its wide use, there is no clear agreement about what thematic analysis is and how you go about doing it (Boyatzis, 1998; Attride-Stirling, 2001; Tuckett, 2005) as it does not appear to exist as a recognised analysis in the same way that other methods do (for example, narrative analysis, grounded theory) thus total clarity around what process and practice of the method is being used is vital due to there being several recognised approaches in doing TA.

Thematic analysis differs from other analytic methods that seek to describe patterns across qualitative data such as discourse analysis, IPA, and grounded theory. Both IPA and grounded theory seek patterns in the data but are theoretically bounded. IPA is wed to a phenomenological epistemology (Smith and Osborn, 2003; Smith *et al.*, 2013), which prioritises experience, and is about understanding people's everyday experience of reality, to gain a deeper understanding of the phenomenon in question. Grounded theory on the other hand, while it manifests in different versions (Charmaz and Mitchell, 2001) has an overall goal of generating a plausible theory of the phenomena that is grounded in the data. As thematic analysis does not require the detailed theoretical and technological knowledge of approaches such as grounded theory, it can offer a more accessible form of analysis. In contrast to IPA or grounded theory, thematic analysis is not wed to any pre-existing theoretical framework, and so it can be used within different theoretical frameworks.

Ultimately, thematic analysis is an approach in analysing qualitative data to answer broad or narrow research questions about people's experiences, views and perceptions, and representations of a given phenomenon and adopts a unique focus on complex phenomena to best capture the holistic and meaningful characteristics of events and possibilities (Braun and Clarke, 2021a). Importantly, it does not profess to be neutral and instead recognises that all analysis is influenced by the researcher or researchers. Thus, the result of such analysis is a theme explaining people's experiences, perceptions, views, or representations of a given topic. Whilst several methods of data analysis were considered in the quest for the trustworthiness and thoroughness of this research, with respect to the overall aim of the research it was determined that Braun and Clarke's method of TA was the most appropriate analysis method as it would allow for the development of a deeper understanding of the stories of the lives lived by Irish centenarians and so was selected for use in this study.

2.4.7.2 Using Software in Data Analysis

The main function of Computer Assisted Qualitative Data Analysis Software (CAQDAS) is not to analyse data but instead to assist in the analytical process which the researcher will always remain in control of. The researcher does not capitulate the hermeneutic task to the logic of the computer rather the computer is used as a tool for

efficiency and not as a tool which in and of itself conducts analysis and draws conclusions (Fielding and Lee, 1998; 2002; Gibbs, 2014). Additionally, such software also serves a tool for transparency. The production of an audit trail is arguably the most important criteria on which the trustworthiness and plausibility of a study can be established. Qualitative analysis software's logging of data movements and coding patterns, and mapping of conceptual categories and thought progression, render all stages of the analytical process traceable and transparent, facilitating the researcher in producing a more detailed and comprehensive audit trail than solely manually mapping this complicated process (Tummons, 2014). For this reason, an NVivo software package (version 12) was utilised in this research study. NVivo is an effective management tool that assists researchers to identify trends and cross examine thematic relationships through the coding of nodes. The highlighting of words and sentences into meaningful clusters revealed combinations of subtle analysis with linking, shaping, searching and modelling aimed at exposing themes, subthemes and relationships (QSR International, 2015). The use of NVivo involved three separate cycles of coding, two cycles of managing codes, one for initial categorisation of open codes and one for data reduction through consolidating codes into a more abstract theoretical framework (superordinate themes) (Bazeley, 2013; 2019) and one which used writing itself as a tool to prompt deeper thinking of the data and led to findings from which conclusions were then drawn by the author. NVivo software ultimately assisted the author in organising the research data systematically and supported the comprehensive analysis of the data that was undertaken.

2.4.7.3 Data Analysis

As aforementioned, within this research, the author adopted a TA approach, specifically reflexive TA, as described by Braun and Clarke (2022). Reflexive TA captures approaches that are fully embedded within the values of a qualitative research paradigm. Researcher subjectivity is the primary tool for reflexive TA, as knowledge generation is inherently subjective and situated and so was well suited to this research study. Subjectivity of the research is not considered a problem in need of control but rather should be understood and treated as a resource for conducting the analysis (Gough and Madhill, 2012; Levitt *et al.*, 2020).

Braun and Clarke's (2021a; 2021b) reflexive approach to TA is a six-phase process which while sequential should be seen as a more fluid or cyclical process that allows the researcher to move back and forth between different phases as highlighted in Figure 2.3:

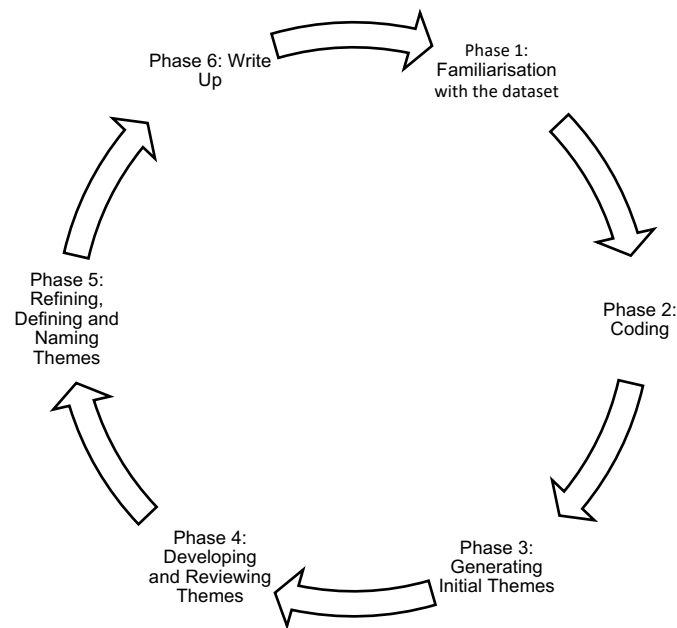


Figure 2.3: Braun and Clarke Reflexive TA Process. Source: (Braun and Clarke, 2022)

As outlined above, this method of analysis started with dataset familiarisation which itself comprises of reading and re-reading the data to become immersed within the content. This was achieved by the author through both the conducting of interviews and the transcription process. The next phase involved generating labels or codes that captured and evoked important features of the data that may have been important in addressing the research question. The third phase related to initial theme generation and entailed examining the codes and collated data to develop significant broader patterns of meaning in the form of potential themes. The organisation and management of nodes, codes, subordinate and superordinate themes using NVivo allowed for reflexive TA to be easily applied in the analytical process and facilitated several cycles of analyses to be conducted across the iterative process of reflexive TA. The fourth phase relates to developing and reviewing themes and requires the researcher to check the candidate themes against the coded data and the entire

dataset, to determine their accuracy in addressing the research question. The next (fifth) phase consists of developing a detailed analysis of each theme, working out the scope and focus of each theme and involved deciding on an informative name for each theme. The final phase then involved producing the analytic narrative and data extracts and contextualising the analysis in relation to existing literature (Braun and Clarke, 2006; 2020; 2022). It is important to remember that themes were conceptualized throughout based on the data and based on the research question (Braun and Clarke, 2020).

2.4.8 Ethical Considerations

Ethical considerations in any research are concerned with ensuring participants interests and rights are safeguarded through maintaining respect and participants integrity throughout the research process. Due to the nature of this research study being biographical and the rarity of the participants in the study the researcher acknowledges the difficulty in concealing participant's identities in publicly available work, however, as far is possible the anonymity of the participants was safeguarded, and their confidentiality maintained without distorting the data. Interviewing as a means of data collection in qualitative research is regarded as moral inquiry (Creswell, 2009; Kvale and Brinkman, 2009; Turner, 2010). It is paramount then that all steps and actions taken avoid marginalisation of or disempowerment of the research participants. In ensuring this, ethical approval was sought and gained from The Technological University of the Shannon Midlands and Midwest Ethics Committee. No amendments were requested by the committee on the project's application. All participants that volunteered to participate along with their significant person were provided with an information sheet prior to consenting to interview. The information sheet clearly provided details of the researcher including contact information, the reasons for the research, the benefits and risk associated with participation (Appendix I). Prior to the commencement of the interview, the participant and their significant other were both given the opportunity to ask any questions they had and were encouraged to ask questions that arose during the interview or post completion of the interview process.

2.4.9 Challenges

Research in the healthcare domain is systematic inquiry designed to develop trustworthy evidence about issues of importance not restricted to a singular profession but more significantly to the public such as practice and development, health education, policy, and informatics (Polit and Beck, 2008; Parahoo, 2014). A challenge for any health professional engaging in research practice is the potential for the blurring of roles between care giver and researcher. Qualitative health researchers typically immerse themselves into their research environment (Dickinson-Swift *et al.*, 2007) and subsequently experience a certain level of emotional involvement with their participants because of the subjective nature of qualitative research. Qualitative researchers must engage in a rapport building process with a participant to build a research relationship that will allow the researcher access to that person's story, and this is particularly pertinent in this research study as the centenarian must feel at ease with the researcher to share their life account openly (Ceglowski, 2000; Minichiello *et al.*, 2008; Draper and Swift, 2011). It is essential that in conducting the research for this study that the researcher remains focused on the role of researcher itself then and separate it from their healthcare provider in keeping the centenarian as the main focus of the study.

2.5 Findings

2.5.1 Introduction

The following sections present the study's findings. Consistent with the thematic methodology utilised, evidence from the rich narrative accounts is given to support interpretations. Examples are drawn from the data to support each theme and category to provide verification that the themes were grounded in the research data.

2.5.2 Themes

Four main themes were identified from the narratives namely, 1) the importance of childhood environment, 2) social connectedness, 3) religion and spirituality, and 4) attitudes and outlook. This exploration into the centenarian experience of longevity tapped into the richness of data curated from their lives lived and each theme consists of a number of subthemes that represented participants' perspectives of living to one

hundred years exploring the characteristics, nuances and complexities that may have shaped the longevity of Irish centenarians.

2.5.3 Demographics

Seventeen centenarians participated in this research study with a total of ten females and seven males comprising the sample. The age range was 100 years to 105 years at the time of the interview (see Table 2.2). In satisfying the inclusion and exclusion criteria all the participants had been born in the Irish Republic and were residing there at the time of participation. Table 2.2 below provides a brief overview of the participant demographics. Pseudonyms have been used to ensure continued confidentiality of the participants.

Table 2.2: Overview of qualitative study participant demographics

Pseudonym	Age	Sex	County	Rural or Urban Resident (Current)	Rural or Urban Resident (Childhood)	Emigrated	Occupation	Marital Status	Children
Betty	102	F	Westmeath	Urban	Rural	Yes	Nurse	Widowed	Yes
Tom	101	M	Roscommon	Rural	Rural	Yes	Farmer and Carpenter	Widowed	Yes
Joe	103	M	Tipperary	Rural	Rural	No	Farmer	Widowed	Yes
Nancy	104	F	Roscommon/Galway	Rural	Rural	No	Seamstress	Single	No
Claire	100	F	Cavan	Rural	Rural	Yes	Nun	Single	No
Roger	105	M	Kerry	Rural	Rural	Yes	Aviation	Widowed	Yes
Philip	102	M	Limerick	Urban	Urban	No	Electrician	Widowed	Yes
Bernie	100	F	Roscommon	Rural	Rural	No	Secretary and Housewife*	Widowed	Yes
Eva	101	F	Sligo/Mayo	Rural	Rural	Yes	Midwife	Widowed	Yes
Jenny	102	F	Laois	Rural	Rural	Yes	Receptionist and Housewife*	Widowed	Yes
Denis	100	M	Dublin	Urban	Urban	No	Carpenter	Widowed	Yes
Rita	100	F	Kilkenny	Rural	Rural	No	Housewife	Widowed	No
Peggy	105	F	Kildare/Carlow	Rural	Rural	Yes	Housewife	Widowed	Yes
Martin	100	M	Waterford	Urban	Urban	No	Shopkeeper	Widowed	Yes
Lucy	100	F	Galway	Rural	Urban	No	Housekeeper	Widowed	Yes
Caroline	100	F	Sligo	Rural	Rural	Yes	Nurse	Widowed	Yes
Matt	100	M	Roscommon	Rural	Rural	No	Farmer	Single	No

*On marrying participant left formal workforce and became a housewife/stay at home mother

2.5.4 Importance of Childhood Environment

While extreme longevity constitutes a global phenomenon, historical, cultural, biological, psycho-behavioural, and socioeconomic factors shape variations across countries and this theme reflects a number of societal and cultural norms and expectations that participants experienced from an early age which they believe contributed to their personal growth and development and as such may have had a contributing role in their experiences of ageing.

Work and Responsibilities from a Young Age

This subtheme reflects the roles and responsibilities that were placed upon the centenarians from a very young age. Centenarian participants recalled the expectation placed on them to work and contribute to the survival of the family and participants avidly recalled childhood days working on the farm and acknowledged the sense responsibility and duty ingrained into their upbringing from a young age:

Table 2.3: Importance of Childhood Environment - Work and Responsibilities from a Young Age

Main Theme	Sub-theme	Quotations
Importance of Childhood Environment	Work and Responsibilities from a Young Age	<p>“I started on the farm when I was a young lad. Well, we would cut and gather the corn and tie it ready for selling. Bag the potatoes and some other vegetables, whatever we were growing at the time. As you got older you got heavier jobs like and had longer hours to work you know as you were more able at that stage like” (Tom, 101 years)</p> <p>“We’d be out fetching corn in the fields, doing a man’s day of work when only a young lad – maybe around 13 but I could do a full man’s work” (Joe, 103 years)</p> <p>“There was always a lot of work to be done back home as we had to do everything. I worked really hard on our farm at home, milking cows, going to the bog, and feeding the animals” (Nancy, 104 years)</p>

Those with a rural background also discussed in detail how this work was inherent in their life with many starting to ‘work’ whilst still attending school and oftentimes the farm taking precedence:

Table 2.4: Importance of Childhood Environment - Work and Responsibilities from a Young Age

Main Theme	Sub-theme	Quotations
Importance of Childhood Environment	Work and Responsibilities from a Young Age	<p>“...it was the way of life. In from school and straight to the bog to foot and collect the turf, sow the potatoes and other tasks” (Betty, 102 years)</p> <p>“You see my father was a farmer. We had to work on the farm, milking cows, picking potatoes for the pit, and helping out with the hay. The only day we would get off would be Sunday” (Caroline, 100 years)</p>

Although almost all participants with a rural background generally farmed to generate income, for others it was a case of doing enough to be self-sufficient themselves. Thus, while self-sufficiency and independence were something developed by participants during their formative years, they carried these lessons with them throughout life:

Table 2.5: Importance of Childhood Environment - Work and Responsibilities from a Young Age

Main Theme	Sub-theme	Quotations
Importance of Childhood Environment	Work and Responsibilities from a Young Age	<p>“when I was your age and wanted potatoes for my dinner, there was no problem in having them provided you planted them yourself and not only for today or tomorrow but for the whole year, and if you wanted heat to cook them and keep your house warm you could have it provided you cut the turf and stored it properly and saved it, sufficiently enough for it to last the whole year. Anything you want in life you can have, if you did it yourself... we just knew how to survive ourselves and live the way we knew – anything you wanted you could have provided you got it for yourself” (Roger, 105 years)</p>

		"I would only travel to town when we needed something from the shops that we didn't have and that was fairly rare as we lived off the land and made do with what we had. We grew our own vegetables, reared the animals for meat, my mother made flour and we had hens for eggs. That was pretty much our daily diet" (Nancy, 104 years)
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Similarly, participant Joe when highlighting how financial support simply did not exist for anyone never mind those who may have needed it most of all, he chatted airily about the financial situation at home as a child following the death of his father, and despite the insurmountable difficulties faced explained plainly how they got by:

Table 2.6: Importance of Childhood Environment - Work and Responsibilities from a Young Age

Main Theme	Sub-theme	Quotations
Importance of Childhood Environment	Work and Responsibilities from a Young Age	"I mean back then you didn't get any home help or widows pension or children's allowance or any of that, all you had was an empty table looking at you. That's why I started killing the rabbits quite young. We used to eat what I didn't sell too" (Joe, 103 years)

Participants were also observed to have placed significant emphasis on having a good work ethic and again this was inherent in them from childhood as result of the work and responsibilities given to them early in life. There appeared to be an intrinsic need to develop and maintain a strong work ethic for participants and the value of hard work learnt from a young age is something the centenarians carried with them throughout their lives:

Table 2.7: Attitude and Outlook - Work and Responsibilities from a Young Age

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Work and Responsibilities from a Young Age	"We owned a big lot of bog, so I spent a good chunk of time on the bog footing, turning, and stacking the turf. By the end of the summer by hands would be raw from the blisters and splinters you'd gather working. And your back

		<p>would be bent backwards from all the bending. The bog is tough old work” (Peggy, 105 years)</p> <p>“Yes, but you know I loved to work and accomplish tasks” (Betty, 102 years)</p> <p>“Well working as a midwife back then was hard work. I often did house calls, and I didn’t have a car so would have to get up on the bicycle to make the house calls. And it didn’t matter the weather, if you were called you were needed and so you just got on with its bad weather and roads and all. I used to have no problem doing it though” (Eva, 101 years)</p>
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Additionally, the value of hard work and having a good work ethic is something that the centenarians recognised and admired in others with many complimenting the people in their lives on the merit of their own work ethic:

Table 2.8: Attitude and Outlook - Work and Responsibilities from a Young Age

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Work and Responsibilities from a Young Age	“He was a hardworking man. He never stopped really. I reckon he was too busy to notice that he was getting old. Always a fresh man. Would have passed for a man in his early 80s at the time” (Martin, 100 years)

Teaching their own children and future generations about having a good work ethic is something that was also of great importance for participants, again highlighting its significance in their lives:

Table 2.9: Attitude and Outlook - Work and Responsibilities from a Young Age

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Work and Responsibilities from a Young Age	“It’s good for people to have a work ethic and they learn that from their parents” (Tom, 101 years)

The value of possessing a good work ethic is something that resounded throughout the transcripts and participants were observed to have a created strong sense of self-reliance and independence despite the adversities they faced. As Roger highlighted through one’s own hard work you could achieve anything:

Table 2.10: Attitude and Outlook - Work and Responsibilities from a Young Age

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Work and Responsibilities from a Young Age	“Dependence was never a part of my life; you get what you want yourself so that you’re not dependent on anybody. Go after what you want because you are responsible for your own success. No one else” (Roger, 105 years)

Poor Ireland

It has been well documented in history that poverty reigned in the Republic of Ireland in the early twentieth century. In particular, the 1930s were years stained with political turmoil, economic crisis and change in Ireland. The final years of the government in power since the establishment of the Irish Free State in 1922 brought significant decreases in exports, trade and indeed employment across the country which impacted greatly on the people of Ireland (Neary and Gráda, 1991). Several participants discussed and shared their experiences of living the reality that was poor Ireland. However, despite the notable challenges they face, the vast majority remained quite ‘matter of fact’ in relation to this era of their lives:

Table 2.11: Importance of Childhood Environment – Poor Ireland

Main Theme	Sub-theme	Quotations
Importance of Childhood Environment	Poor Ireland	“Ireland was very, very poor in those days. People don’t realise how poor it really was...we took off our shoes on May Day and they didn’t go on again until September. We went around in our feet. That was the usual thing to do...We had stone bruises and thorns and God knows what but so what, you just got on” (Betty, 102 years)

		<p>“Everyone just got on with it. You had no other choice. I didn’t view it as a challenging time. Poor Ireland was poor Ireland. You didn’t miss things if you never had them. I don’t think I ever had a challenge to face in life but it’s because I never viewed things as challenges or obstacles. You just carried on through” (Nancy, 104)</p> <p>“Ireland wasn’t only poor, but it was pauperised” (Roger, 105 years)</p>
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5.4.3 Emigration and World War

As all participants were born shortly after the beginning of the First World War in 1914 many centenarian participants were forced to emigrate in their late teens and early twenties in search of new opportunities due to a lack of prosperity in Ireland as the Irish economy struggled:

Table 2.12: Importance of Childhood Environment – Emigration and World War

Main Theme	Sub-theme	Quotations
Importance of Childhood Environment	Emigration and World War	<p>“There was no work in Ireland then. We had had our first child by then and so there was someone else to consider you know?” (Jenny, 102 years)</p> <p>“I left for England. There were little opportunities here in Ireland, so I went to find the opportunities” (Jenny, 102 years)</p> <p>“Well, there was no work here. He was a worker and there were no jobs here, so we went to England in the hope of getting more fixed work you know?” (Peggy, 105 years)</p>

Tales of World War Two however, were also openly by many participants as they personally or family members had been either directly or indirectly involved:

Table 2.13: Importance of Childhood Environment – Emigration and World War

Main Theme	Sub-theme	Quotations
Importance of Childhood Environment	Emigration and World War	<p>“... during the wartime I actually worked in a munitions factory” (Peggy, 105 years)</p> <p>“I worked in house repairs when I was over there. War damage repairs in particular...” (Tom, 101 years)</p> <p>“Well, we all were in the service in WW2, and he was killed... My younger brother, he was also in the army, but he lived out through it and came through it. I went out to sea. I spent 5 years at sea and then I got an opportunity, I was three years in the war...” (Roger, 105 years)</p>

One participant recalled a more tragic story from the time she spent nursing in England during this period however, she did not speak about the incident as being distressing to her personally and remained quite matter of fact about the situation and the role she had:

Table 2.14: Importance of Childhood Environment – Emigration and World War

Main Theme	Sub-theme	Quotations
Importance of Childhood Environment	Emigration and World War	<p>“... you were a nurse and you had to step up and just get on with it. That’s what we do though isn’t it. I remember working in casualty after a bomb dropped and the ward was just full of oxygen cylinders and there was a poor man lying there on a trolley with his brains hanging out. Of course, he died’ (Betty, 102 years)</p>

For the remaining participants that had emigrated, daily living simply continued as normal and although they acknowledged the difficulties of the time they adapted to the changes as they occurred secondary to the war:

Table 2.15: Importance of Childhood Environment – Emigration and World War

Main Theme	Sub-theme	Quotations
Importance of Childhood Environment	Emigration and World War	“I did, throughout the whole war... spent all the war years in Birmingham. Seen plenty of bombs coming down” (Tom, 101 years) “Well when it was good, it was really good, very, very enjoyable however it was very very tough during the war. Very scary, I’ll tell you” (Roger, 105 years)

Despite the adversities faced, participants narrated some rather happy memories from life during this time specifically the social gatherings and dances. Participants shared tales of the great comradery and friendships that were built and reflected fondly on the time he spent in in war torn England:

Table 2.16: Importance of Childhood Environment – Emigration and World War

Main Theme	Sub-theme	Quotations
Importance of Childhood Environment	Emigration and World War	“I danced three nights a week in London... I play a bit on the accordion... I used to play in the Irish clubs over there in different bands and that... We had our own community over there. We mixed with the English too there were some great people but not quite the same as the Irish” (Tom, 101 years)

2.5.5 Social Connectedness

The Importance of Family

One of the most prevalent themes derived from the research was the pivotal role played by the family and it was clear that the family was paramount in their lives from a young age. Although participants life stories and experiences are highly individualised, commonalities could be seen across the interviews particularly in relation to their upbringing and their memories of childhood. The centenarian participants highlighted how they were nurtured and protected by their families during their formative years and most recalled their childhoods in a remarkably positive manner despite their experiences of hardship during this time in their lives:

Table 2.17: Social Connectedness – The Importance of Family

Main Theme	Sub-theme	Quotations
Social Connectedness	The Importance of Family	“Well, I had a great upbringing” (Tom, 101 years) “...both my parents were fantastic and gave me a wonderful upbringing and never left me wanting...” (Philip, 102 years) “I have no unhappy memories from when I was young so that in itself is saying something right?” (Eva, 101 years)

Many centenarian participants shared sentiments of having been raised in loving and supportive environments and stressed the influence of positive interactions they shared with their parents:

Table 2.18: Social Connectedness – The Importance of Family

Main Theme	Sub-theme	Quotations
Social Connectedness	The Importance of Family	“My parents were wonderful role models that gave us a fantastic childhood without having much” (Rita, 100 years) “She was a hard-working and caring mother, and I couldn’t have asked for better. My dad too was also a great influence on me. He always believed in me growing up and even when I didn’t, he did” (Peggy, 105 years)

Participants also acknowledged the influential role that their parents had on them early in life and were grateful to have had such positive role models growing up:

Table 2.19: Social Connectedness – The Importance of Family

Main Theme	Sub-theme	Quotations
Social Connectedness	The Importance of Family	“I think my parents were the biggest influence in my life. They taught me the true meaning of hard work and were great role models for me and my brothers” (Nancy, 104 years)

		<p>“My mother? Oh, she was wonderful. I wanted to be as kind as her all my life. You could say she was my inspiration. She would inspire many around her. She was just one of those kinds of people you know?” (Martin, 100 years)</p>
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Also of notable significance was the close relationships that the centenarians shared with their own siblings growing up, as participants remarked that their siblings were oftentimes their only friends. Several participants went on to discuss how despite moving on with their lives in adulthood they maintained these close relations with their siblings throughout life:

Table 2.20: Social Connectedness – The Importance of Family

Main Theme	Sub-theme	Quotations
Social Connectedness	The Importance of Family	<p>“My brothers were my friends” (Nancy, 104 years)</p> <p>“I was quite close to my brother. We were the only company each other had you see” (Martin, 100 years)</p> <p>“We got on well as children and stayed close even after we went our separate ways” (Rita, 100 years)</p> <p>“I was always close with one of my sisters right up to when she died” (Caroline, 100 years)</p> <p>“Ah he was good really. We got on fierce well especially later on” (Matt, 100 years)</p>

The importance of family was carried by participants from childhood into all other phases in life. When discussing their early adult years, it was noted that most participants had married. All married participants shared positive reflections on their experiences of marriage and complimented their significant others for a number of endearing characteristics:

Table 2.21: Social Connectedness – The Importance of Family

Main Theme	Sub-theme	Quotations
Social Connectedness	The Importance of Family	“... we had a great marriage” (Philip, 102 years) “He wasn’t the best-looking man, but he was very kind and that’s what matters” (Bernie, 100 years) “Well, he was a very nice man, He was a bit older than me and not the most handsome, but he was a very good person – he would give you the shirt off his back if he thought you needed it” (Lucy, 100 years)

Of the three who chose not to marry, two were female and one was male. Each of the participants that forwent marriage had very different reasons for remaining single. However, the participants who opted not to marry didn’t feel like they missed out and were wholly content with their decision to remain single:

Table 2.22: Social Connectedness – The Importance of Family

Main Theme	Sub-theme	Quotations
Social Connectedness	The Importance of Family	“Not everyone needs to get married you know. I am very happy with who I am” (Matt, 100 years)

All of the centenarians who married had had children and positively recalled parenthood:

Table 2.23: Social Connectedness – The Importance of Family

Main Theme	Sub-theme	Quotations
Social Connectedness	The Importance of Family	‘I have so many wonderful memories that it would be hard to just pick one. I loved when I became a mother though and will always be grateful to God for giving me that gift’ (Bernie, 100 years)

Not having children of their own however did not directly translate into not having the opportunity to raise children for participants as those that did not have children mentioned having played an active role in the upbringing of other family members:

Table 2.24: Social Connectedness – The Importance of Family

Main Theme	Sub-theme	Quotations
Social Connectedness	The Importance of Family	“Both of my sisters went on to have children of their own, so I was surrounded my nieces and nephews and although I didn’t get the opportunity to have my own children, I was very involved in their upbringing and often helped to mind them with my sisters of course” (Rita, 100 years)

The positive relationships shared between participants and their families from an early age proved to be of importance throughout their lives. There was a recognition amongst the centenarian participants who had children of the pivotal role played by their parents. This was something they sought to weave intergenerationally within their own families:

Table 2.25: Social Connectedness – The Importance of Family

Main Theme	Sub-theme	Quotations
Social Connectedness	The Importance of Family	“I think all parents do that for their children. It’s their job to set them on the right path...my own parents did for me” (Eva, 101 years)

Participants also spoke about not only the importance of developing strong bonds with family members but also highlighted the significance of fostering these relationships:

Table 2.26: Social Connectedness – The Importance of Family

Main Theme	Sub-theme	Quotations
Social Connectedness	The Importance of Family	“We are a very close family and would be together all the time, very close knit. But that’s the way it should be” (Roger, 105 years)

		<p>“Oh, we were all close. All for one was my motto in this house” (Philip, 102 years)</p> <p>“Oh I am. I would say that as a family we were always close. That’s what family is about though” (Denis, 100 years)</p>
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The supportive relationships that the centenarians fostered in raising the next generation (own children, nieces, nephews) proved to be cyclical as the centenarians relayed the role their families now played in their lives:

Table 2.27: Social Connectedness – The Importance of Family

Main Theme	Sub-theme	Quotations
Social Connectedness	The Importance of Family	<p>“They visit me often. And when I was at home, they often would stay the night, or the grandkids would stay with me. I have raised a wonderful family and am very proud of everything they do...” (Jenny, 102 years)</p> <p>“Most of them went on to have their own families but they are very good to me” (Caroline, 100 years)</p>

It was also noted across several interviews that participants had a profound sense of pride in their families as recognised in the way by which they acknowledged them and their achievements:

Table 2.28: Social Connectedness – The Importance of Family

Main Theme	Sub-theme	Quotations
Social Connectedness	The Importance of Family	<p>“So, at the end of the day anyhow between the children and the grandchildren, at the minute anyhow we have 4 doctors, 3 academics, one doctor in training and 2 more academics down the line” (Roger, 105 years)</p> <p>“My family is what I am most proud of...” (Eva, 101 years)</p> <p>“I have raised a wonderful family and am very proud of everything they do...” (Jenny, 102 years)</p>

Sense of Belonging

While the influence of family in promoting good social connectedness is irrefutable, centenarian participants also remarked on the value of belonging to their communities as being important and recognised the significance of supporting your neighbours and the concept of the “rambling house” was discussed by participants. Irish author, dramatist, and folklorist MacMahon (1976) described the rambling house as being a place where the locals would gather to share “superstitions, songs, genealogies, riddles, stories of the Danes...odd bits of local lore” (Feder and Schrank, 1977). According to MacMahon, the rambling houses served an important function in creating a sense of belonging, and were responsible for preserving much traditional lore in Irish history (Franklin, 2009):

Table 2.29: Social Connectedness – Sense of Belonging

Main Theme	Sub-theme	Quotations
Social Connectedness	Sense of Belonging	“... there were neighbours and they used to come in, they were what you called ramblers. And our house was a great house for rambling. So, we always nearly had people in” (Betty, 102 years) “Oh, there is always someone in here to see me, sure aren’t you here today. People would just ramble in but that was the nature of this house. It was known for being a rambling house. But even the house at home was a rambling house” (Joe, 103 years)

When asked if they were engaged with their communities the participants not only shared details on how they have remained active in their communities but also demonstrated how they were well connected with both friends and neighbours and stressed the importance of such interactions throughout their lives:

Table 2.30: Social Connectedness – Sense of Belonging

Main Theme	Sub-theme	Quotations
Social Connectedness	Sense of Belonging	“I am of course engaged with the community. I have a host of people that come to see me” (Betty, 102 years)

		<p>“We have small sessions in here. A man and his band come in and I join them for a few songs. One could say I’m the star of the show. At least that’s what I tell myself” (Tom, 101 years)</p> <p>“I go down to the community centre every Thursday afternoon too for a couple of hours – there’s an activity group down there and we do different things each week but it’s good to catch up with friends” (Philip, 102 years)</p> <p>“Definitely. I still get out and about though not as much as before and can go down the local shop and say hello to lots of people. And then when I get to mass on a Sunday, I often meet people I know and get to chat them. Since I turned 100, I’ve been asked to come to lots of different events so that also means I’m not just sitting around” (Denis, 100 years)</p>
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For participants, being engaged and connected with others helped in preventing isolation. Participants remarked on their ability to form and maintain relationships with others throughout their lifetime resulted in a feeling of being connected to others and ultimately never feeling lonely:

Table 2.31: Social Connectedness – Sense of Belonging

Main Theme	Sub-theme	Quotations
Social Connectedness	Sense of Belonging	<p>“I’m surrounded by people my age and interact with them daily on top of whatever visitors I get. The staff are great too and are always there to chat if you want... I have never felt lonely. I have always been surrounded by people that I care about both friends and family” (Peggy, 105 years)</p> <p>“I have so many people in my life that you couldn’t be alone even if you wanted to!” (Caroline, 100 years)</p>

2.5.6 Religion and Spirituality

Lifelong Affiliation

It was clear that religion played an essential role in the lives of this participant group who demonstrated their lifelong affiliation to their religion throughout the interview process:

Table 2.32: Religion and Spirituality – Lifelong Affiliation

Main Theme	Sub-theme	Quotations
Religion and Spirituality	Lifelong Affiliation	<p>“I think it has. It has been the one constant in my life from when I was born up until now and hopefully right after” (Peggy, 105 years)</p> <p>“I was baptised in a church as were my children, got married with the church and said too many goodbyes there too but still it brings me great comfort to know that I have it in my life” (Bernie, 100 years)</p>

Several of the centenarian participants highlighted how religion has been a source of influence from an early age:

Table 2.33: Religion and Spirituality – Lifelong Affiliation

Main Theme	Sub-theme	Quotations
Religion and Spirituality	Lifelong Affiliation	<p>“I can remember going to mass on my mother’s hip so it’s safe to say religion has always been a part of my life” (Jenny, 102 years)</p> <p>“My parents made sure that we went to church every single week” (Rita, 100 years)</p> <p>“Ah it did. I grew up with religion and in a house that was very committed you know. So, it was always in me” (Denis, 100 years)</p> <p>“Oh, every Sunday, she would haul you out the bed – even my father to go down to the 9am mass. And you dare not</p>

		step a toe out of line when you were down there. She was very religious my mother” (Matt, 100 years)
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Although introduced to religion from a young age, maintaining their religious practice through mass attendance appeared to be a pivotal feature of the centenarians lives in adulthood with many participants discussing their frequency of engagement:

Table 2.34: Religion and Spirituality – Lifelong Affiliation

Main Theme	Sub-theme	Quotations
Religion and Spirituality	Lifelong Affiliation	<p>“I continued going to mass every single Sunday in my adulthood without fail and more often than not would go one or two evenings in the week as well” (Rita, 100 years)</p> <p>“Every single day nearly, at least 4 days a week I would go down the church and say a few extra prayers... I still pray everyday morning and night and the angelus too. It’s a part of me” (Bernie, 100 years)</p> <p>“Oh yes, a couple of times a week. I have a bit freer time now, so I go 2 or 3 times in the week. The children come and bring me out to the local church and then they have it here too once in the week. I get plenty of it in the week on top of my own prayers. It’s still a very big part of my life” (Tom, 101 years)</p>

As participants got older their also preference for continued mass attendance did not go unrecognised and while some participants highlighted that they have had to adapt their practice, their engagement with religion is still of paramount importance in their day to day lives as centenarians:

Table 2.35: Religion and Spirituality – Lifelong Affiliation

Main Theme	Sub-theme	Quotations
Religion and Spirituality	Lifelong Affiliation	“... I try to go every Sunday up to St. Mary’s as it’s the parish church, but I do have a special place for the Friary. I have mass every day on the television EWTN, it’s a catholic

		<p>programme. The priest comes into me every Friday and the Eucharistic minister comes in every Sunday when I can't make it to mass myself. I say the angelus every day and pray frequently throughout the day. Religion is so very important" (Betty, 102 years)</p> <p>"While I was still driving, I used to go to mass myself every Sunday but now I am limited to when there is someone able to bring me to and from mass. Whether it is one of my family or a neighbour. That being said, I was at mass last Sunday and with the help of God I will be at mass this Sunday" (Roger, 105 years)</p> <p>"I still love to go but it depends each week on whether I have someone to go with and really how I am feeling you know. The priest calls every Friday morning with the blessed sacrament anyhow and he stays for a short while and we chat which is nice" (Caroline, 100 years)</p>
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Intergenerational Beliefs

Most participants raised their own children by the teachings of their religion which in turn resulted in future generations also being raised by the same faith much to the participants delight:

Table 2.36: Religion and Spirituality – Intergenerational Beliefs

Main Theme	Sub-theme	Quotations
Religion and Spirituality	Intergenerational Beliefs	<p>"I was raised catholic, and I raised my own children in that way" (Bernie, 100 years)</p> <p>"I often bring them to the church with me. The eldest girl knows the most she's 18. I often thought she would be nun but she studies music instead. She sings in the choir for church and plays the piano too. She was over in Lourdes last Easter and is going to Rome this Easter.</p>

		She is very involved and it's great to see" (Bernie, 100 years
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There was also an element of community engagement and social activity attached to religion by the participants:

Table 2.37: Religion and Spirituality – Intergenerational Beliefs

Main Theme	Sub-theme	Quotations
Religion and Spirituality	Intergenerational Beliefs	<p>"There's a sense of community that comes with being involved in the church" (Bernie, 100 years)</p> <p>"Oh, I love it and I get to see all the people going by and who's who and what's going on" (Lucy, 100 years)</p>

Comfort in Religion

It was obvious that participants placed exceptional worth on simply having religion in their lives as it provides for them a moral compass and indeed supports a sense of morality:

Table 2.38: Religion and Spirituality – Comfort in Religion

Main Theme	Sub-theme	Quotations
Religion and Spirituality	Comfort in Religion	<p>"Religion is vital for us all. God is there not to act all powerful although he is but to be a compass for when we get lost. Our morality as humans is based upon our belief system and without religion well it's a very sad place" (Lucy, 100 years)</p> <p>"It gives you a sense of purpose and its teachings can direct us to live the best lives in the light of the Lord. I think that religion can shape a person and is a silent companion at all times. That's why I think it's important" (Jenny, 102 years)</p> <p>"I think religion is a great thing to give people morals and a way to live by. I think that religion is most beneficial to those who lack a sense of know how if you know what I'm saying.</p>

		Or for people that might have sort of lost their way. Religion has a great way of grounding you” (Denis, 100 years)
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Participants expressed how they found great solace in religion, particularly during troubling or difficult times in their lives, they found calm in their spirituality:

Table 2.39: Religion and Spirituality – Comfort in Religion

Main Theme	Sub-theme	Quotations
Religion and Spirituality	Comfort in Religion	<p>“I learnt a lot from religion. It gave me my values and to this day gives me hope” (Bernie, 100 years)</p> <p>“It gave me a way by which to live my life and was a strength for me on many a tough day as well as the good days” (Peggy, 105 years)</p>

When discussing death and dying, interestingly participants did not display any signs of distress or emotional despair. Participants appeared to have an innate acceptance of grief and loss. Each of the participants had had their own experience with loss over the life course with all having lost loved ones be it family or close friends. The centenarians recognised and verbalised that they were saddened by these losses but there were no tears or intense feelings around these experiences. One participant on reflecting on the death of her first husband, sought comfort in that her life may have been completely different otherwise:

Table 2.40: Religion and Spirituality – Comfort in Religion

Main Theme	Sub-theme	Quotations
Religion and Spirituality	Comfort in Religion	“I guess if you have to pull a bright side out of it, if he didn’t pass, I wouldn’t have met my second husband or had my daughter” (Peggy, 105 years)

Ultimately there was a sense of acceptance of grief and loss, and it was apparent that they had dovetailed grief and loss as simply being part of living and resultingly had developed coping strategies that allowed them to successfully manage these poignant moments:

Table 2.41: Religion and Spirituality – Comfort in Religion

Main Theme	Sub-theme	Quotations
Religion and Spirituality	Comfort in Religion	“Losing people has definitely been the hardest part of reaching this age. But you adapt, you have no choice but to” (Martin, 100 years)

Belief in a God and indeed a higher power also seemed to reign true with the participants who referred to ‘God’s plan’:

Table 2.42: Religion and Spirituality – Comfort in Religion

Main Theme	Sub-theme	Quotations
Religion and Spirituality	Comfort in Religion	“God has a plan for us all and we just need to trust him” (Philip, 102 years) “I wasn’t able to have children, but they obviously weren’t a part of God’s plan for me” (Rita, 100 years)

So devout were some participants that on reflecting on the changing times of Ireland and her youth and the perceived lack of religion in their lives, some participants appeared dismayed:

Table 2.43: Religion and Spirituality – Comfort in Religion

Main Theme	Sub-theme	Quotations
Religion and Spirituality	Comfort in Religion	“Ireland has gone down the tubes very badly since I was a boy” (Roger, 105 years) “Sadly, we don’t get enough of it now. There’re not enough priests for everyone. Men are too busy running around after woman these days. Totally mad. We still get our communion in here twice a week which is good I suppose” (Nancy, 104 years) “I think young people are missing out bigtime because they aren’t privy to our Lords teachings. Just turn on the TV and all the madness out there and the killings and you have to

		say – where’s their religion – I’ll tell you where, they don’t have it and have no leader or person holding them accountable” (Lucy, 100 years)
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Ultimately however, it resounded that the participants lives were heavily influenced by religion and their beliefs and several expressed gratitude to God for the lives that they have lived:

Table 2.44: Religion and Spirituality – Comfort in Religion

Main Theme	Sub-theme	Quotations
Religion and Spirituality	Comfort in Religion	“I thank God for the long and happy life I have had even to this day” (Rita, 100 years)

2.5.7 Attitude and Outlook

Maintaining Purpose in Life

All of the centenarian participants evidenced themselves as being aware of their purpose in life from a young age whether it related to school going, their career in adulthood or even in retirement. Each detailed how they maintained purpose in their own lives and attributed their being of value as a factor that positively influenced their ageing. As previously outlined many participants viewed themselves as having joined the workforce early in life as a result of their childhood work on the family farm and from this, they derived a sense of purpose that they appear to have sought to maintain throughout life. All participants discussed their work life in adulthood and almost all were in paid employment at some point of their adult lives. Despite a high number of participants originating from a rural farming background only three of the male participants continued to farm in their adulthood as many sought to establish themselves in other fields. While most centenarians had been raised in lower to middle-class families, irrespective of their socioeconomic status growing up, all participants appeared to have experienced upward mobility in life. As was customary for that era the majority of female participants who married left paid employment and concentrated on other aspects of their lives including raising children, however, some did continue to work whilst simultaneously raising their families. Betty, continued to nurse while similarly Eva continued her career as a midwife:

Table 2.45: Attitude and Outlook – Maintaining Purpose in Life

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Maintaining Purpose in Life	“Then I went to England in 1937... in 1945 I left that then and I went on to do my district training and I worked in the district then until I retired” (Betty, 102 years) “... a job came up. It was originally for four months, and it went on for four years as a temporary thing and they eventually made me permanent and from there I was here working for 40 years in the end” (Eva, 101 years)

While their work in adulthood likely contributed to the maintenance of purpose in life, what’s interesting to note is how this transferred into their retirement. Few centenarian participants acknowledged that they had retired in life:

Table 2.46: Attitude and Outlook – Maintaining Purpose in Life

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Maintaining Purpose in Life	“I’ll let you know once I do...” (Tom, 100 years) “Sure, I don’t think I ever stopped. I was 34 years married when he (participant’s son) started working here and I was well able to keep working at that point sure I had to show him how to do it and what needed to be done. I stayed working anyways until I was 92 or 93” (Joe, 103 years)

Those that had formally retired from their place of work spoke of how they substituted other activities in lieu of their nine-to-five. Many participants continued to engage actively in work although in different capacities, be it developing new skills, childminding, or participating in voluntary work in their communities both at home and abroad:

Table 2.47: Attitude and Outlook – Maintaining Purpose in Life

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Maintaining Purpose in Life	<p>“I went over and helped him out in Africa for a couple of months and then we came back here” (Betty, 100 years)</p> <p>“When I stopped farming, I started making walking sticks and shepherds crooks” (Tom, 100 years)</p> <p>“But in my retirement anyhow I took up fishing. I was also always into bridge playing so immediately took up playing that. Nowadays I don’t fish but I only stopped that in the last 2 years, I was fishing up until my 103rd birthday but I have continued to play bridge” (Roger, 105 years)</p> <p>“... when the grandchildren came along, I minded them because Betty was out working, she never gave up work, so I became the mother you know and that kept me busy” (Lucy, 100 years)</p>

Active Lifestyles and Routine

It was observed that most participants made mention of their busy and active lifestyles. Centenarian participants appeared to put great emphasis on the importance of maintaining regular routines in their day-to-day life and how maintaining structure in their lives was beneficial:

Table 2.48: Attitude and Outlook – Active Lifestyles and Routines

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Active Lifestyles and Routines	<p>“I would finish work at 4pm if I was on day duty. I was living in Limerick, and it was hours travel on the bus and I would be in home just before 5pm, ten to five and would grab a cup of coffee then would get into the gardening clothes immediately and go into the back garden, no hanging around” (Roger, 105 years)</p>

		“Well, it was hectic for sure. I would get up early in the morning about 5.45am and make my breakfast. I was always used to being up in the morning. I still get up at that time now and make my breakfast now (the grandchildren call me predictable but it’s what I was used to doing all my life” (Eva, 101 years)
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It was also observed how even in present day participants strove to maintain the routines that they had become accustomed to in their childhood and early adulthood:

Table 2.49: Attitude and Outlook – Active Lifestyles and Routines

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Active Lifestyles and Routines	<p>“I’m a creature of habit and have my own routine” (Martin, 100 years)</p> <p>“I used to try go to bed around 9.30pm but now it’s much later after 10pm due to this new one. But I still get up every morning at quarter past eight” (Betty, 102 years)</p> <p>“I take smaller portions now though I am not as active. I try to keep to my routine though” (Eva, 101 years)</p>

Maintenance of routine was not something that was restricted to life in general but too could be seen in the minute details in life and several participants discussed the idea of maintaining routine when it came to mealtimes:

Table 2.50: Attitude and Outlook – Active Lifestyles and Routines

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Active Lifestyles and Routines	“Well, I never skip breakfast that’s one thing. My mother said that to me when I left to go to my aunts. She said now gossan remember one thing when you’re going to do a day’s work – make sure that your stomach is fully and that you’re ready to attack the day before you. So since then, I never missed a meal” (Denis, 100 years)

On a similar vein, several participants discussed the concept of sticking to three meals a day and recognised its perceived health benefits:

Table 2.51: Attitude and Outlook – Active Lifestyles and Routines

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Active Lifestyles and Routines	<p>“I always from when I was a young girl have had 3 meals a day routine and so I think that has stood to me. I never had any weight on. Not even when I was pregnant” (Peggy, 105 years)</p> <p>“When I was younger it was more 3 meals a day but that was what suited me and my husband though we did things different to how they are done now” (Rita, 100 years)</p> <p>“My wife was very exact on three meals a day. Breakfast, dinner around midday and tea in the evening. Everything was homemade. All home produces. I kept a lovely garden with fresh vegetables – peas, carrots, parsnips, potatoes; fruit; apples, strawberries, blackberries” (Tom, 101 years)</p>

In considering structure and mealtime habits, the importance of moderation in terms of diet was a staunch belief shared by most participants:

Table 2.52: Attitude and Outlook – Active Lifestyles and Routines

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Active Lifestyles and Routines	<p>“Everything in moderation is my philosophy and I never weighed more than 10 stone all my life. What’s wrong with all the fat people is that they don’t know when to stop” (Bernie, 100 years)</p> <p>“Moderation is the important word there. You can have too much healthy stuff too you know!” (Rita, 100 years)</p>

Acceptance of Ageing

Centenarians' acceptance of age-related changes was particularly noticeable throughout the interview process. This acceptance did not just account for their own ageing processes but also was reflected in their opinions of themselves and also about how they felt about those around them. Their candid attitude to ageing and general feeling of ease or being 'laid-back' was a personality trait recognised among almost all participants. Although they admitted to having to 'slow down' in some aspects of life participants did not view their ageing as burdensome and demonstrated adaptability to their changing abilities over time. Their overall attitude of acceptance demonstrated how they had found ways and means to overcome the obstacles and events that go somewhat hand in hand with ageing generally:

Table 2.53: Attitude and Outlook – Acceptance of Ageing

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Acceptance of Ageing	"A lot of my peers have passed, or they are no longer able to visit me or even talk to me due to different illness but that's the nature of life isn't it" (Rita, 100 years)

Many of the participants expressed how they couldn't understand why they had lived to such exceptional ages citing that they were just ordinary people:

Table 2.54: Attitude and Outlook – Acceptance of Ageing

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Acceptance of Ageing	"You'll be disappointed when you figure out that there is nothing special about me, I am just a normal man that lived a fairly normal life here" (Philip, 102 years)

When asked what they believed to be the 'secret' to ageing well is, they stressed there was no secret, or at least if there was, they weren't aware of it:

Table 2.55: Attitude and Outlook – Acceptance of Ageing

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Acceptance of Ageing	"I can't understand why I'm 102. Is there a secret? Maybe it's luck!" (Betty, 102 years)

Instead, they advocated that they just made the most of what they had:

Table 2.56: Attitude and Outlook – Acceptance of Ageing

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Acceptance of Ageing	<p>“Well, it’s certainly not a question of doing anything differently, you play the hand you get” (Roger, 105 years)</p> <p>“I feel like I did the best with what I had in life and there is nothing I would change” (Joe, 103 years)</p>

Each of the centenarian participants relished in the everyday and were positively animated in discussing their day-to-day life and celebrations such as birthdays and other family events that afforded them with more time with their loved ones:

Table 2.57: Attitude and Outlook – Acceptance of Ageing

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Acceptance of Ageing	<p>“I’ve celebrated 3 more milestone birthdays and each time we throw a party and my family spend the day here with me ...I convinced them to bring the Brandy out earlier on my 104th birthday this year but I won’t tell you what time. I slept for 2 days after it!” (Nancy, 104 years)</p>

Attitude to Life

Embedded within the interviews was the participants attitudes towards life and it appeared that most had a penchant for ‘making the most’ of things regardless of the unavoidable challenges that came hand in hand with living through the 20th century. In spite of adversity they faced, the centenarian participants embraced a largely positive outlook and were keen to explore any and all opportunities afforded to them in life, and this was apparent in their desire to thrive and survive:

Table 2.58: Attitude and Outlook – Attitude to Life

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Attitude to Life	“... remember, you are born into this life with a purpose, make sure you go out with having done with what was expected of you” (Roger, 105 years) “Don’t wait for tomorrow, if you really want something, don’t wait just get out there” (Philip, 102 years)

Their attitude towards taking chances and seizing the day was also expressed in the advice that they offered to future generations:

Table 2.59: Attitude and Outlook – Attitude to Life

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Attitude to Life	“I’d tell them to take the first train out of here. Go to England. Or go anywhere but get to see more of the world than you know. And don’t waste your time there either – gather all the experience you can like. Travel everywhere you can and see the world. Learn and get experience from everywhere. Don’t be afraid to take chances” (Tom, 101 years)

The centenarians’ viewpoint when it came to ageing was analogous and reflected their position in life. There was a unanimous sense of acceptance and overall satisfaction with life lived. It was very apparent that they were content. They did not express any concerns or indeed highlight any worries about the future, but rather were happy with the lives they had lived:

Table 2.60: Attitude and Outlook – Attitude to Life

Main Theme	Sub-theme	Quotations
Attitude and Outlook	Attitude to Life	“I can’t say that I have a favourite memory, but I had had a fantastic life. And if I got to do it all again – I wouldn’t change a thing and when the time comes, I will die a happy man” (Philip, 102 years)

		<p>“I don’t think I would change a thing. Everything happens the way it’s supposed to” (Bernie, 100 years)</p> <p>“I like to think I have. I am very happy with how I’ve lived” (Jenny, 102 years)</p> <p>“I have a lovely life and have never wanted for anything” (Caroline, 100 years)</p>
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2.5.8 Summary

In conclusion, this chapter has presented this study’s findings through four key themes exploring participants’ experience of living to and being one hundred years of age in the Republic of Ireland. Thematically participants’ childhoods, the changing eras in which they lived from a socioeconomic perspective, their social connectedness throughout life, the role and influence of religion as well as their own attitudes and experiences were identified as having been significant in their lives. Participants perceived many factors as having influenced their life journeys and their longevity and despite the weight of evidence that exists in support of the argument that life expectancy in humans can be largely attributed to the role of genetics (Perls and Terry, 2003; De Gray and Rae, 2007; Deeg *et al.*, 2018) due to the heterogeneous presentations of longevity as evidenced in this study, further merit needs to be given to the psychological and sociological factors at play in respect to the successful ageing and the following chapter will discuss the aforementioned findings of this study in the context of contemporary literature.

2.6 Discussion

Individuals successful ageing and longevous life can be influenced through increased emphasis on social interaction, life satisfaction and well-being (Crosnoe and Elder Jr, 2002; Jopp *et al.*, 2016b). Centenarian participants in this study were noted to have placed significant importance on a number of social factors as having been influential throughout their lives. Positive childhood sociodemographic dynamics including their physical and social environments, as well as their social connections with others and some psychological factors were clearly seen as being advantageous in life by

centenarians and the influence of these factors have been highlighted in previous research by others (Schwartz *et al.*, 1995; Huang and Elo, 2009; Smith *et al.*, 2009).

Several studies highlight how social factors that are intrinsic with early life strongly correlate to mortality in adult life (Ben-Shlomo and Kuh, 2002; Hayward *et al.*, 2004; Montez and Hayward, 2011). Social connectedness and perceived social support are considered to have significant impact on one's health throughout life (Goswami *et al.*, 2010; Stephens *et al.*, 2011; Holt-Lunstad, 2022). Social relationships are fundamental to human survival and are significantly involved in the attainment and maintenance of good health and wellbeing (Asante and Castillo, 2018). Positive social relations with others have been proven as being significant to human survivorship and more so fundamental in the attainment and maintenance of good health and wellbeing. Several definitions and measures of what constitutes social relationships exist however though two major components of social relationships that have been consistently studied are social networks and social support (Holt-Lunstad *et al.*, 2010; Antonucci *et al.*, 2011; Valtorta *et al.*, 2018) and clear links have been established between both social networks and social support and their influence on health among older persons. Strong ties with families and friends have been found to improve mental and physical health, positively influence health behaviours, and even reduce mortality risk (Uchino, 2012; Chen *et al.*, 2013, Steptoe *et al.*, 2013; Rook and Charles, 2017; Salinas-Rodríguez, 2018). Supportive relations with others have also been linked to positive emotional security for older persons (Ermer and Proulx, 2018). Additionally, the absence of positive social relationships often goes hand in hand with social isolation and loneliness (Drennan *et al.*, 2008) and as such research has shown how older adults often appraise their social connectedness on the basis of the degree to which they feel connected and supported (Cornwell and Waite, 2009; Hsu and Chang, 2015; Beller and Wagner, 2017; Hodgkin *et al.*, 2018).

One's social environment has been proven as being a significant contributor to their health (Leon *et al.*, 1998; Whalley and Deary, 2001; Moore *et al.*, 2015) in the same way as parental influence, and one's relationships with other family members in their immediate environments have been proven to be pivotal in the formative years of childhood and adolescence (Smith *et al.*, 2009). Many centenarian participants credited their parents as being their primary role models and commented on the

positive influence and impact that they had on the development of their character overall. According to Morgenroth (2015) role models are often suggested as a means of motivating people to set and reach ambitious goals. The influence of the centenarian participants families on their lives was something repeated throughout the interviews. According to Allen *et al.*, (2015) providing care while simultaneously implementing responsibilities in a positive manner fosters the development of character and independence in a child as was observed with the centenarians who discussed at length the sense of duty given to them from a young age in the form of childhood work and responsibilities. Centenarians nurtured childhoods is one of the key themes that prevailed across the stories they shared. It was clear how throughout childhood most participants were surrounded by people who cared for them and fostered their development positively. The positive manner by which they recalled memories of their immediate family and how they were held in high esteem was evident. Trust was also highlighted by the centenarians in their discussions about coming from close-knit families who kept an eye on one another and backed one another. The early exposure to caring and nurturing gave them the ability to develop the confidence and build the independence that they themselves needed for their own roles as parents and carers of the next generation in adulthood. These findings were previously highlighted in two other studies of centenarians (Scelzo *et al.*, 2018; Ratan and de Vries, 2020) wherein participants placed a strong emphasis on being loved and nurtured as being a contributing factor in reaching one hundred years.

The importance of being well connected socially and the strong relations shared with others was not limited to childhood however and was evident among all participants as they discussed the established relationships held with family throughout their lives. The importance of good family life and supportive community relations was a commonality uncovered in several other qualitative studies of centenarians (Power *et al.*, 2006; Darviri *et al.*, 2009; Wong *et al.*, 2014, Holston and Callen, 2017; Scelzo *et al.*, 2018, Ratan and de Vries, 2020). Being well connected to the family was stressed by the participants of this study as being of particular importance when it came to having strong social connections with others. It is significant to note however, that while the majority of the centenarians had married those who remained single were not impacted negatively by their marital status as they detailed being well connected socially and spoke about the significance of other family members and the lifelong

friendships they had curated thus being married was not explicitly defining or distinguishing of the level of social connectedness for participants. In line with other research maintaining meaningful social contacts and a supportive social network generally was seen as much more important (Ryff and Singer, 1996; MacDonald, 2007; Kim, 2013; Wang *et al.*, 2020).

Akin to the majority of participants in this study, rural upbringing and growing up in a farming environment is well documented as not only reducing the likelihood of childhood mortality (Preston *et al.*, 1998; Gagnon and Bohnert, 2012) but specific to centenarians has been shown to contribute positively to their longevity (Koch *et al.*, 2006; 2007; Gavrilov and Gavrilova, 2012). Holston and Callen's (2017) study of centenarians stressed the self-sustainability and self-sufficiency that participants were exposed to in childhood as contributing to their longevity. Similarly, the qualitative descriptive study by Ratan and de Vries (2020) also detailed the self-sustainability of participants and credited their extended longevity in part to this. Earlier work by Scelzo *et al.*, (2018) also noted that among their participants, for those that were 'rural dwelling', 'love of the land' was a significant factor in their lives.

An attitude of acceptance and maintaining a largely positive outlook on life was seen in most participants as they spoke about various life events. Although in many cases centenarians had dealt with significant losses, discussion surrounding such losses was not done from a negative perspective. Although this is surprising, as the centenarians lived through very difficult historical times it is possible that they were more focused on maintaining their emotional well-being and chose not to ruminate on these events. It is also possible that the centenarians may have thought the interviewers did not want to hear about such losses and therefore decided to focus on more positive events. Nonetheless, the centenarian's acceptance of life in dealing with such life events and (to a degree) their resilient nature was very much to the fore throughout their shared stories. Research on resilience and its influence on successful ageing has increased substantially over the past two decades (Windle, 2011) and centenarians have long been regarded as examples of resilience for successful ageing with this viewpoint garnering significant increased attention in recent years (Martin *et al.*, 2010; Rosado-Medina *et al.*, 2012; Borrás *et al.*, 2020; Amaral *et al.*, 2021; Jopp *et al.*, 2021; Perls, 2021). Their resilience was reiterated in their individual tales of their

experiences of World War. By the same token, they displayed robustness in their nature in how they recounted their financial struggles, notably during their earlier years in what they regarded as a much more austere Ireland. Another example whereby the centenarian participants displayed their unique hardiness in times that would warrant otherwise included their experiences of the death of loved ones within their family and friend circle. The impact of traumatic events, social isolation and functional decline in older people is well known and documented in literature (Perissinotto *et al.*, 2012). When coping mechanisms are not developed and utilised as needed and appropriately the risk of emotional distress, depression and ultimately increased mortality is dramatically increased (Davenhill, 2007). However, study participants spoke rather nonchalantly about such events that occurred and accepted them as going hand in hand with living.

Similarly, the concept of death and dying and were not topics that particularly stressed participants or that they were overly concerned about with many turning to their spirituality and asked about this. When asked specifically what their thoughts were around death and dying, participants accepted this as a normal process in life and appeared not to dwell on it or on the implications of it. Staudinger *et al.*, (1995) first proposed that attitude to bereavement and loss should be considered at a lower level as a form of resilience, given the nature of the adversity and this was supported by Bonnano *et al.*, (2011) who recognised the potential threat to wellbeing posed by adversity in the form of adult loss and bereavement, highlighting the significance of an individual being able to maintain equilibrium and go on with life despite such experiences.

Therefore, it can be argued that a great deal of gerotranscendence was evident within the interview transcripts. Gondo (2012) described gerotranscendence as a gradual yet adaptive change that allows older adults to maintain higher levels of psychological well-being. It is interesting that none of the participants reported having many worries in life despite the adversities some faced. Perhaps the challenges they were exposed to earlier in life allowed them to develop useful coping strategies, which continue to be useful in late adulthood. It is not surprising that centenarians spent significant time engaged with religion, thinking about family, and reflecting on life events and choices. Tornstam (2005) indicated that reflecting and pondering about life are two of the prime

examples depicting gerotranscendence. Additionally, it appeared that centenarian participants strove to find meaning and purpose in each day. For some this purpose was derived from prayer or mass attendance, while for others it rested on their social connectedness in their life. Generally, many of the individuals seemed to turn their thinking inward. This seems to be related to what Tornstam (2005) described as changing priorities to more cosmic and spiritual matters. These findings may also add to our understanding of the gerotranscendence or at least build on this theory. For example, throughout the oral history interview centenarians were reflecting on their lives and discovered aspects of themselves that they had not considered or reflected on before the interview. In that sense, this research provides additional evidence for Tornstam's (2011) work on the self-confrontation element of gerotranscendence with older adults. Relatedly, many centenarians reported great difficulty and challenges throughout their lives, most seemed to transcend any negative feelings about the obstacles. Instead, focusing on what they learned from such experiences and how it ultimately shaped their lives.

This was also reiterated in participants discussion of their own ageing, for example when discussing their decline in physical abilities, the participants remained largely upbeat and accepted their deterioration as being a normative part of ageing and the 'status quo'. According to Fry and Keyes (2010) a generally negative perspective on ageing is that it ultimately renders the person incapacitated both physically and psychologically. Old age associated diminishing has been argued as being merely a misconception and that instead individuals should be viewed as being able to successfully capitalize on their existing resources, skills, and abilities to achieve new learning, continued growth, and enhanced life satisfaction overall. Older adults, while coping with adversity and losses, can be helped to maintain a complementary focus on psychological strengths, positive emotions, and regenerative capacities to achieve continued growth and healthy longevity which was well reflected by all centenarian participants.

Almost all participants positively reflected on their life's achievements whilst simultaneously believing that they still had a purpose and direction in life. Finding a purpose to continue living was highly valued by participants. For many, this purpose was found in continued employment and contributions to society through volunteering

or charity work. The deep-rooted lifelong work ethic that was evident in participants echoed findings in Wong *et al.*, (2014), Scelzo *et al.*, (2018) and Ratan and de Vries (2020) studies wherein their attitude and willingness to work were attributed as being contributing factors to the attainment of longevity. Comparably, centenarian participants in Freeman *et al.*, (2013) study also credited: 'Good clean living and hard work' to their achievement of advanced age. These ideals emulated one of the core pillars of the Blue Zones of centenarians proposed by Buettner and Skemp (2016) which was that of continued participation and activity in day-to-day life. Centenarian participants placed significant importance on maintaining an active lifestyle in their day to day. They also did not wholly recognise having retired and instead were noted to have substituted other activities in lieu of work on exiting the workforce. The health benefits as a result of the participation of older people in voluntary activity and other forms of social interaction has been well documented (Sloane-Seale and Kops 2008; Filges *et al.*, 2020) and the resulting sustained social interaction and physical activity provides not only a sense of positive self-awareness but also emphasises self-satisfaction which itself positively impacts on people as they age (Diener, 2009; Tabet, 2016). Across all transcripts the concept of being engaged throughout life is one that was very much to the fore and could be positioned within almost all the resulting themes and sub-themes as it was apparent that from an early age and throughout their lives, participants were well engaged in both their physical and more notably their social environments. The active and engaged lifestyles maintained by centenarians appeared to be of innate significance for participants and echoes the potential role this plays in longevity in line with other studies of centenarians that previously highlighted this (Freeman *et al.*, 2013; Martin *et al.*, 2015; Baek *et al.*, 2016; Nair and Collins, 2020). This positively correlates also with one element of the adapted model of Rowe and Kahn whereby continued engagement in life is seen as being a factor contributing to successful ageing and is supported by the centenarians' own perceptions of what has been important to them in their journey to advanced age.

Consistency in terms of routine and rituals also proved significant for this cohort and was clearly evident in term of their mealtime habits. It was apparent in the interviews that centenarians ate a simple diet and adhered to a silent policy of three meals a day. Centenarians reported that in general they didn't snack but interestingly acknowledged believing in moderation in all things. The premise of consuming basic diet and

maintaining routine at mealtimes echoed that of other centenarian studies and was in line with research that explored longevity in Blue Zone populations (Willcox *et al.*, 2004; 2007; Buettner, 2012; Vasto *et al.*, 2014). The idea of moderation in diet that was stressed by participants mirrored that of other studies in relation to influence on longevity attainment (Galioto *et al.*, 2008; Venturelli *et al.*, 2012). Koch *et al.*, (2006) however did not limit moderation as being applicable to diet *alone* and in their study of Australian centenarians stressed the importance of moderation in life generally as being important for longevity and this viewpoint was shared by others (Malik and Singh, 2012; Miao *et al.*, 2022).

Ireland, a country with high historic religiosity and the fixed beliefs of the centenarians and the value they placed on religion in their lives was clear as evidenced by the research findings through the themes and subthemes developed. The weight given to the role of religion by centenarian participants echoes that of the literature and affirms the positive influence the role of religion, spirituality and existential beliefs has been proven to have on successful ageing for centenarians (Archer *et al.*, 2005; Koch *et al.*, 2007; Araújo *et al.*, 2017, Jones, 2018; Jones *et al.*, 2022). What is worth considering however is how the influence of religion may change for future cohorts of older adults in Ireland considering the increasing secular society and what impact (if any) these may have but it cannot be argued that for this participant group religion has always been an important and contributing factor in their lives.

2.7 Conclusion

Exceptional longevity represents an extremely well lived phenotype (Pignolo, 2019; Pradas *et al.*, 2019). Current centenarians are survivors of cohort who display delayed onset of age-related diseases and/or resistance to disease and illness otherwise occurring earlier in life (Kolovou *et al.*, 2014; Pignolo, 2018). Associations have been drawn in previous research in respect to the genetic disposition of ageing however, it is highly unlikely that there exists just one single biomarker responsible for the attainment of long life (Sandana and Michael, 2019). Societies around the world are faced with the challenge of improving the health of their populations, meeting their health and social service needs, assuring quality of care, and guaranteeing equity — all the while striving to be cost-effective in a finance orientated world. The anticipated

intensified growth in population ageing will bring increased numbers of individuals requiring complex care who will have higher levels of dependency which will put pressure on healthcare services that may not be able to cope with the demand. An adequate response to the transition requires a strong emphasis on primary prevention and an equitable distribution of resources. Informed knowledge generated from this evidenced based research should facilitate the development of guidelines and policies for use in providing adequate care for the oldest old.

The research has demonstrated how centenarians may be notably content and happy with their life journeys, and very appreciative of their good health, and supportive social networks. The ability to obtain a higher sense of being and acceptance of ageing with a positive outlook on the past, present, and future events is not a coincidence in these centenarians. The resilience and positive outlook in life can be credited to a childhood that was filled with parents, grandparents and siblings caring and nurturing for them. Despite their experiences of poverty, they all recalled having grown up in a stable and happy family life, all of which contributed to these centenarians' experience of a good quality of life. Stability in terms of their family and environment meant that they were able to deal with adverse events such as death of loved ones with ease. It can also be argued that their positive adaptability to circumstances emerged as a result of their positive upbringing in childhood. The centenarians' social network, that is, their family and friends played a significant role in providing social support and emotional security.

The centenarians in this study credited their physical and emotional wellbeing to the social support that was provided to them by their close family members, as well as continued engagement in active lifestyle. This provided them with not only a sense of belonging but also purpose which they strove to maintain throughout their lives. Investigating their social and emotional development has theoretical and practical value. As views of ageing are much more elaborate than broad stereotypes suggest, including not only basic resources such as health but also psychological factors such as well-being and coping skills (Jopp *et al.*, 2015). By identifying such sources there will be an enrichment of theories of ageing. From a practical perspective, such studies may suggest interventions to alter views on ageing, which could positively enhance everyone's ageing processes.

The study of the lived experience of centenarians not only captures the characteristics of this population but also reveals extensive heterogeneity amongst individuals in this age cohort and some paradoxes that have been associated with amongst this age group as discussed. The influences and attributes associated with their positive adaptation to the life course and the ageing process have been of great interest in centenarians' research over the last years, with emphasis on lifestyle factors, psychological attributes, and social and economic resources as determinants of health and wellbeing (Martin *et al.*, 2010). The study of centenarians and their longevity not only allows for a better understand the phenomenon itself but also presents the opportunity to explore the process of survivorship and acts as a reminder of what needs to be considered to best prepare for a rapidly ageing society.

Some reflections regarding the limitations of this study are required, as all participants were Irish, different cultures and ethnic groups that may have also obtained extended longevity were omitted and not explored in this study. Additionally, as there were only seventeen participants in this study it must be acknowledged that this research only provides a view of lived experience of being a hundred years of age and over from the perspective of its participants. As this is the first qualitative study of Irish centenarians, a broad approach was taken in terms of data collection for the purpose of generating a baseline body of knowledge pertaining to the Irish centenarian thus there is scope to examine this topic further with a more in-depth and greater focus. Finally, it should be noted that all research participants were all in moderately good health thus this sample could be considered as a healthy cohort thus their stories may have told in a more positive light. According to Lupien and Wan (2004) older aged individuals who readily volunteer to participate in studies are generally found to be more educated and to be in better physical and cognitive health and this should be accounted for when considering the results of this research.

The results of this study indicate that several psychosocial factors can have a positive influence on one's health and wellbeing and ultimately contribute to their successful ageing however, there is abundant room for further exploration on this topic as this study has only scratched the surface in terms of what knowledge could be generated from further examination. A complete understanding later life requires a total reconceptualization of society's current understanding of advanced age and demands

that cognisance is taken in relation to what older people themselves perceive as the key elements of health and well-being in later life (O'Neill, 2020). As previously highlighted, there is a dearth in the literature pertaining to the centenarians in the Republic of Ireland and that the factors that influence their health and wellbeing. It is well documented throughout the literature that there has been a significant rise in life expectancy globally which in turn has led to an increasingly older population, and Ireland and its centenarian population is no exception (Sinnott *et al.*, 2015; Hogan *et al.*, 2021). The ageing of populations worldwide, in conjunction with urbanisation and industrialisation, has resulted in an important epidemiological transition marked by a widespread increase in the prevalence of chronic diseases and their sequelae reflective of the fact that although people are now living longer, they are not living longer healthier. As earlier highlighted by Olshansky *et al.*, (2007; 2012) and later reiterated by Muenning *et al.*, (2018) it is likely that healthy life expectancy will decline further in the future as that the longer we live, the greater is the influence of biological ageing on morbidity and mortality. If the rate of ageing continues without amelioration, the progress being made against major disease fronts will eventually face a point of diminishing returns (Olshansky, 2016). As a result, it is imperative that more research is conducted to explore further the concept of the longevity dividend and how the psychosocial factors in particular shape ageing and how these can be better addressed and incorporated into guidelines and policies on both a micro and macro level to maintain and improve quality of life for people as they age.

Chapter Three

The Influence of Social Factors in Centenarian Populations; A Scoping Review

3.0 Abstract

Introduction:

The purpose of this scoping review is to give an overview of the extent, range, and nature of the current literature available that highlight the influence (if any) of social factors on centenarian ageing. Providing such an overview may be helpful, for policy makers, researchers, communities, and service providers, to make sense of the versatility and uses of the concept and allow the improvement and increase the success of efforts to contribute to the quality of life of older people.

Methods:

This review referred to the Joanna Briggs Institute Reviewers' Manual and its literature search was conducted in four bibliographic databases, namely, PubMed, Scopus, SocIndex with full text and CINAHL to identify relevant studies.

Results:

Out of 1,235 articles retrieved, 17 articles met the inclusion criteria. These studies concentrated on the following core themes: gender, social relationships, education, environment, socioeconomic status, religion. Although the review noted the positive effect on ageing of some of the factors investigated, this is caveated by the subjective nature of the review's findings given most of the studies included (n=11) adopted qualitative research methods. While qualitative research is important in addressing the "how" and "why" research questions to enable deeper understanding of experiences, phenomena, and context, more quantitative research is needed to support these findings explicitly.

Conclusion:

Recognising the significant role that social factors can have for the individual is particularly relevant for the formation of public policies on ageing and in promoting quality of life amongst future generations of the oldest old. As scoping reviews can be helpful precursors to systematic reviews and can be used to confirm the relevance of inclusion criteria and potential questions, the findings from this review might provide practical insights for future research in this regard.

3.1 Introduction

Human ageing and longevity are of broad interest to health researchers, policymakers, and the public. Globally, society is witnessing significant changes in its age demography. Population ageing, defined as “the inevitable increase in the share of older persons that results from the decline in fertility and improvement in survival that characterize the demographic transition” (United Nations, 2017, p. 53) is occurring throughout the world and thus the number of older persons is increasing steadily (Tuomilehto *et al.*, 2001; Batini *et al.*, 2006; Chang *et al.*, 2019). In 2019, there were 703 million individuals aged 65 or over worldwide and this number is predicted to double by 2050 to 1.5 billion (United Nations, 2019). Near centenarian and centenarian populations, are also increasing rapidly (Robine and Cubaynes, 2017). At the end of last century, centenarian’s prevalence in Europe was 1 per 10,000 people, and nowadays their prevalence rate is around 1 per 5,000 (Teixeira *et al.*, 2017). The number of centenarians was initially projected to rise during this century from 441,000 in 2013 to 20.1 million in 2100 (United Nations, 2013) however more recent research published by the Population Division of the United Nations have indicated that it should reach more than 25 million people by the turn of the next century (Robine and Cubaynes, 2017).

Interestingly, this shift in ageing demography was somewhat unexpected as biologists in assuming that the ageing process is a rigid biological occurrence, viewed that a reduction in early and mid-life-mortality due advances in preventive and therapeutic medicine would result in a larger number of older people dying at the same ages as in previous generations. However, death rates at advanced ages continued to fall and this surprising phenomenon has been attributed to non-genetic factors that affect the ageing and longevity of individuals, including lifestyle factors such as smoking, alcohol consumption, body weight, physical activity, advances in healthcare and medicine, environmental contamination, socioeconomic status, and social support (Rizzuto and Fratiglioni, 2014; Stringhini *et al.*, 2017). Although people now live longer, increased disability and sickness often accompany the last years of life and with it bring amplified demands for social and health services. The high cost of these services will strain the health, social and even political infrastructures of developing, and most developed and industrialised nations (Zheng *et al.*, 2020). Thus, there is an onus on policymakers in

the developing world to invest in better structures and systems to meet these challenges in the coming decades.

In tandem with people living to the furthest extremities of age, interest in centenarians' survivorship has increased (Hagberg and Samuelsson, 2008; Yang *et al.*, 2018). It has become a common opinion that centenarians may represent a model of successful ageing given their longevous life (Willcox *et al.*, 2010). Studying centenarians may provide insight into the genetic, familial, environmental, and life-course factors associated with lower mortality and better survival. While it is understood that longevity and health are influenced by complex interactions among biological, psychological, and sociological factors most centenarian research has focused on internal factors such as, genetic determinants or physiological health, that is., genetic markers and metabolic processes (Perls *et al.*, 1997; Poon *et al.*, 2000; Motta *et al.*, 2005; Govindaraju *et al.*, 2015; Cheng *et al.*, 2019), or psychological factors (personality and cognition) (Poon *et al.*, 1992; Gondo and Poon, 2007; Martin and Sheaff, 2007) with little attention being given to the social factors that may contribute to longevity. However, research among general populations does highlight that socioeconomic factors are fundamental in shaping health across a wide range of health indicators, settings, and populations (Braveman *et al.*, 2008; Adler and Stewart, 2010; Koch *et al.*, 2010, Marmot *et al.*, 2012) thus highlighting an important gap in the existing knowledge. In exploring the social determinants of health, The World Health Organisation (2015; 2017) identified several factors that proved influential to one's health and they included, social support networks as greater support from families, friends and communities is intrinsically linked to better health, education as low education levels are linked to poorer health and increased stress and lower self-confidence, income and social status as higher income and social status are inherently linked to better health with greater the gap between the richest and poorest people, the greater the differences in health and finally, the physical environment.

This is the first scoping review to summarise the literature on the social factors that may predict longevity in centenarians as no review has focussed on them or given them their sole attention. Uncovering the social factors associated with longevity in the oldest old may improve our understanding of the significance of these factors on older persons health and subsequently support healthy living during ageing (Cherry *et al.*,

2013; Rico-Urbe *et al.*, 2018; Scelzo, 2019). Identification of pertinent associations, mediators and moderators of social factors and their influence on ageing and wellbeing may reveal the most important determinants of longevity and furthermore provide insight into the complex interplay between biological, cognitive, and social factors contributing to ageing. Consequently, this could help develop interventions to support the successful ageing of future generations of centenarians to come.

3.2 Research Methodology

3.2.1 Introduction

This chapter provides the rationale, methodology and protocol for the scoping review. The author conducted a review of the literature to clearly identify the existing evidence in relation to the influence of social factors on the lives lived by centenarians. A clear literature review strategy and a standard format was used guided by the overarching research aim of ascertaining the relationship between social factors and centenarian ageing.

3.2.2 Research Design

Grant and Booth (2009) defined scoping reviews as being the "preliminary assessment of potential size and scope of available research literature". According to Munn *et al.*, (2018), scoping reviews can be used for the following purposes:

- To identify the types of available evidence in a given field
- To clarify key concepts/ definitions in the literature
- To examine how research is conducted on a certain topic or field
- To identify key characteristics or factors related to a concept
- As a precursor to a systematic review
- To identify and analyse knowledge gaps

One distinct advantage of scoping reviews is that they can be used to examine emerging evidence when it is still unclear what other, more specific questions can be posed and valuably addressed by a more precise systematic review (Armstrong *et al.*, 2011). Additionally, they can report on the types of evidence that address and inform practice in the field and the way the research has been conducted. While scoping

reviews can be arguably compared to a systematic review in that they follow a structured process, they are performed for different reasons and have key methodological differences. The significant differences between these two review styles as detailed by Brien *et al.*, (2010) (see Table 3.1).

Table 3.1: Scoping Review Vs. Systematic Review (adopted from Brien *et al.*, 2010)

Scoping Review	Systematic Review
Broad research question.	Focussed research question.
No critical appraisal of included studies.	Quality and risk of bias assessment included.
Research protocol develop but it involves iterative approach with changes based on initial search results.	Research protocol developed a priori.
More qualitative than quantitative evidence synthesis.	Often quantitative analysis.
Used in mapping the literature to identify gaps in a body of literature, identify key terms and concepts.	Used to formulate a conclusion about a focussed research question; assesses the quality of existing evidence.

The author chose scoping review as a research methodology as it was consistent with goal of this research study which was to ascertain the influence of social factors on centenarians. As scoping reviews are a recognised useful approach for reviewing evidence rapidly in emerging fields or topics, identification and analysis of knowledge gaps is a common and valuable indication for conducting a scoping review as was the case with this review. It is also important to recognise that the author, in acknowledging the diverse research that examines centenarian ageing, adopted methodological assumptions of inclusivity rather than exclusivity to guide this study.

3.2.3 Scoping Review Protocol

In creating a scoping review protocol, the author referred to the Joanna Briggs Institute Reviewers' Manual (2014) (JBI, 2014) and the Centre for Reviews and Dissemination guidance for undertaking reviews in healthcare (CRD, 2009). The following review protocol delineates the author's strategy with respect to: (1) the review question, (2) data collection, (3) data analysis, and (4) data synthesis.

3.2.3.1 Review Question

To clearly define the focus, scope and applicability of the review, the author framed the main review question with reference to the core elements of “PCC” (Munn *et al.*, 2018) which identifies: Population (centenarians), Concept (the influence of social factors on ageing), and Context which is guided by more specific research questions (what are the social factors that have influenced the ageing experience of centenarians).

3.2.3.2 Data Collection

Search Strategy

A three-step search strategy was utilised to identify peer reviewed publications (JBI, 2014): (1) initial search on databases, (2) second search with all identified keywords, and (3) scanning the reference list of relevant articles for additional studies. It is essential to perform a comprehensive literature search to identify all published studies relevant to the specific research question (Aagaard, *et al.*, 2016). Should an author neglect this necessity, the risk of scoping reviews producing biased conclusions becomes inherently increased (Beyer and Wright, 2013), and so to conduct a thorough and robust scoping review when searching for relevant references, it is advisable to use multiple databases (Bramer *et al.*, 2017). Due to the multi-disciplinary nature of the research question for this review, it was essential that several varied databases were examined to ensure that the review undertaken was encompassing of the various related disciplines as such the following four databases were utilised: (1) PubMed, (2) Scopus, (3) SocIndex with full-text, and (4) CINAHL.

PubMed is a free resource provided via the National Center for Biotechnology Information (NCBI) and through its provision of MEDLINE and access to the National Library of Medicine (NLM) holds veracity amongst other scholarly resources and is recognised as being one of the most widely accessible databases globally (Williamson and Minster, 2019). PubMed references medicine, nursing, and related health sciences and as a result health science practitioners, academics, researchers, and other faculty cite it as one of the few sources they avail of when searching the literature (Codgill *et al.*, 2000; De Groote *et al.*, 2014; Dunn *et al.*, 2017). Scopus is the largest abstract and citation database of peer-reviewed literature: scientific journals, books

and conference proceedings and so hosts a comprehensive overview of research in the fields of science, technology, medicine, social sciences, and arts and humanities (Elsevier B.V, 2020). The Scopus database hosts full text journal articles and additionally allows access to the references included in those articles which enables the searcher to become transient in time when navigating the database (Burnham, 2006). SocINDEX is a full-text research database covering sociology and related disciplines and covers a broad range of studies, including gender studies, criminal justice, social psychology, religion, racial studies, and social work dating as far back as 1895. It features hundreds of full-text journals and millions of records with subject headings from a sociological thesaurus. In addition to full-text journals, the resource is complete with extensive indexing for books, monographs, conference papers and other non-periodical content sources, the database also includes searchable cited references (EBSCO, 2020). The CINAHL (Cumulative Index to Nursing and Allied Health) database is a complete indexing of the highest ranked nursing and allied health literature available at any given time. The literature available on this database covers a broad range of topics including nursing, biomedicines, health sciences, alternative and complementary medicines, and consumer health in addition to 17 allied health disciplines. CINAHL allows access to full text journals, book chapters, dissertations, conference proceedings, research instruments and clinical trials in addition to other published materials (Oermann and Hays, 2018).

Inclusion and Exclusion Criteria

Inclusion criteria for this review included primary studies: (1) which were directly related to the population, phenomena of interest and context of the research topic, (2) peer-reviewed journal articles, (3) studies published in English due to lack of resources and facilities for translation. The search was not controlled in relation to year of publication to ensure an all-encompassing review of the available literature including seminal work. Exclusion criteria included: (1) studies not relating to the social factors under investigation, for example, studies that explored biological or genetic influences of centenarian ageing and (2) studies published in languages other than English.

Furthermore, no geographical search limit was applied in conducting this literature review as the search was going to have to go beyond Ireland and Europe to generate

sufficient data and thus no restrictions were employed in this regard. Also, the author chose not to apply any limitation in relation to study design (qualitative or quantitative) to allow for a more diverse form of evidence on the proposed subject matter.

Study Selection

To ensure that all relevant studies were included for this review, the author conducted the selection of studies in two stages (CRD, 2009), (1) Stage 1: Titles and abstracts of studies were assessed against the predefined inclusion criteria, and (2) Stage 2: Full text of possible relevant papers were obtained, and a more thorough examination was undertaken with respect to the inclusion criteria. The author employed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) Flow Diagram (Moher *et al.*, 2009) to reflect the detailed flow of the study selection process.

3.2.3.3 Data Analysis

Critical Appraisal of Studies

Given that there were no limits applied based on study design in selecting eligible studies for inclusion, the search strategy led to different research types emerging. To ensure a standardised approach and universal rigour in assessing the quality of publications included in the review (Aveyard, 2007), the author resorted to critical appraisal tools specific to the study design developed by the Critical Appraisal Skills Programme (CASP, 2018).

Data Extraction

Data extraction involves isolating and documenting important items from each individual study (Mathes *et al.*, 2017). To ensure that comparable information will be extracted from the relevant studies as identified, the author devised a data extraction tabulation form that highlighted the key points to be recorded.

3.2.3.4 Data Synthesis

As it is expected that relevant studies will be methodologically heterogenous, narrative synthesis (CRD, 2009) was undertaken to interpret and analyse relationships of findings within and between included studies. By doing so, the author was guided by

the four elements of the narrative framework developed by the Economic, Social and Research Council (ESRC) (Popay *et al.*, 2006).

3.2.3.5 Ethical Considerations

As the data is being collected from primary studies, a scoping review of studies already published does not warrant ethical approval. Notwithstanding this, reviewers do have a responsibility to ethically consider the quality and relevance of the evidence reported in primary research reports with respect to the review purpose and there is an onus on researchers to report on the same accurately (Major and Savin-Baden, 2010).

3.2.3.6 Limitations

As with all research, the value of a scoping review depends on what was done, what was found, and the clarity of its reporting. As with other publications, the reporting quality of scoping reviews can vary, limiting readers' ability to assess the strengths and weaknesses of those reviews (Moher *et al.*, 2009). Despite the robustness associated with scoping reviews there are certain inherent flaws associated with them, such as the location and selection of studies, heterogeneity, loss of information on important outcomes, inappropriate subgroup analyses, conflict with data, and duplication of publication (Gopalakrishnan and Ganeshkumar, 2013). In order to achieve objectivity, inclusion and exclusion criteria are used to screen potentially relevant studies. While ideally, a scoping review is carried out by a team of researchers to ensure that the data extraction is as unbiased as possible (CRD, 2009; Kysh, 2013; JBI, 2014), this can introduce inevitable subjectivity in the screening process particularly as when there are several researchers are involved each member of the research team interprets inclusion criteria slightly differently. To minimise this the process was audited throughout to ensure rigour and robustness.

It is important to note that due to a lack of resources and other associated constraints, the author did not engage in 'grey literature searching' and limited the review to only include peer-reviewed published journal articles as outlined above. Grey literature may reduce publication bias, increase reviews' comprehensiveness and timeliness and foster a balanced picture of available evidence as it can include data not found within commercially published literature (Pappas and Williams, 2011; Lawrence *et al.*, 2014),

providing an important forum for disseminating studies with null or negative results that might not otherwise be disseminated (Paez, 2017) and thus the author acknowledges this as a limitation of this review.

3.2.4 Summary

This chapter outlines the author’s systemised approach for searching, analysing, and synthesising relevant literature to provide answers to predefined research questions as discussed. The author intends to disseminate conclusive findings through the conducting of this review to bridge the gap in knowledge in relation to the influence of social factors on the ageing experience of centenarians.

3.3 Presentation and Analysis of Research Findings

3.3.1 Introduction

This section presents the process and the results of the data collection process. It reflects how the author systematically accessed and selected the relevant studies for the review. In this chapter the author aims to: (1) identify studies for inclusion in this review and (2) analyse the included studies through data extraction process.

3.3.2 Conducting the Data Collection

3.3.2.1 Search Strategy

i) Literature Databases

Data collection for this review was done using electronic databases and was conducted from July 2020 to October 2020. Four electronic databases were searched to identify peer reviewed publications (Table 3.2):

Table 3.2: Databases Searched for Scoping Literature Review

PubMed
Scopus
SocIndex with full text (EBSCO)
CINAHL (EBSCO)

To generate a list of search terms, the author: (1) decided on specific concepts from “PCC” and (2) carried out an initial database search in July 2020. Key concepts

identified using “PCC” were then combined with synonymous terms and other keywords identified from the initial database search (see Table 3.3):

Table 3.3: Social Factors and Associated Synonymous Terms Searched

Keyword/Topic	Synonymous Terms Used
Social Economic Status (SES)	Socioeconomic Status, Economic Occupation, Career, Income, Workforce, Wealth
Education	Education
Family/Relationships	Marital Status, Relationship, Family, Children, Offspring
Environment	Environment, Physical Environment, Geographic Location, Housing
Religion	Religion, Religious, Religiousness, Religions, Religiosity, Spiritual, Spirituality, Faith
Gender	Gender

ii) Search Limits

The search strategy was restricted according to the inclusion and exclusion criteria (see Table 3.4):

Table 3.4: Inclusion and Exclusion Criteria for Scoping Review

Inclusion Criteria	Exclusion Criteria
1) studies directly related to the population, phenomena of interest and context of the research topic.	1) studies not relating to the social factors under investigation.
2) peer-reviewed, full-text journal articles.	2) studies published in languages other than English.
3) studies published in English due to lack of resources and facilities for translation.	

iii) Database Search Record

The author maintained a search record to keep track of database searches and to keep transparency of study selection for review. Databases search records reflects the following: (1) database searched and the date of the search, (2) search terms used, (3) initial results yielded, (4) studies possibly included after database filter applied and (5) studies possibly relevant were filtered manually based on title containing search terms.

iv) Hand Searching

Once the database search was conducted, the author continued literature searching by next hand searching the reference lists of the studies that were deemed relevant for inclusion to ascertain if there were any suitable studies housed on these reference lists.

3.3.3 Search Outcome

3.3.3.1 Identified Literature

After the initial search terms were applied, a total of one thousand, two hundred and thirty-five studies were returned (see Table 3.5).

Table 3.5: Initial Search Studies Returned

Keywords Searched	Database
"centenarian" and "gender" (n=241)	PubMed
and "education" (n=121), "centenarian" and	Scopus
"marital status" or "relationship" or "family" or	SocIndex with full text (EBSCO)
"children" or "offspring" (n=594), "centenarian"	CINAHL (EBSCO)
and "environment" or "physical environment" or	
"geographic location" or "housing" (n=188),	
"centenarian" and "religion" or "religious" or	
"religiousness" or "religions" or "religiosity" or	
"spiritual" or "spirituality" or "faith" (n=35) and	
"socioeconomic status" or "economic occupation"	
or "career" or "income" or "workforce" or "wealth"	
(n=56), (total n=1235).	

A large proportion of these papers focussed on the centenarian and the role of relationships, family and social connectedness and the influence of such on the attainment of longevity. Scopus generated the highest volume of articles sourced with all disciplines being recognised but most notably, social sciences and healthcare being strongly represented, however, additional literature and key reference texts from the fields of education, sociology, psychology, and gerontology were also sourced. In line with the development and maturation of studies once in their infancy, there has been an increase in empirical data since in the 1980s. After mapping studies, dominance in quantitative methodologies is evident although qualitative methodologies abounded

the more recent publication and were recognised as recurring when exploring the role of religion and spirituality in terms of centenarian longevity. Overall, the types of evidence came from various genres representing empirical studies and theoretical papers with qualitative, quantitative, and mixed methodological empirical studies sourced.

3.3.3.2 Study Selection for Review

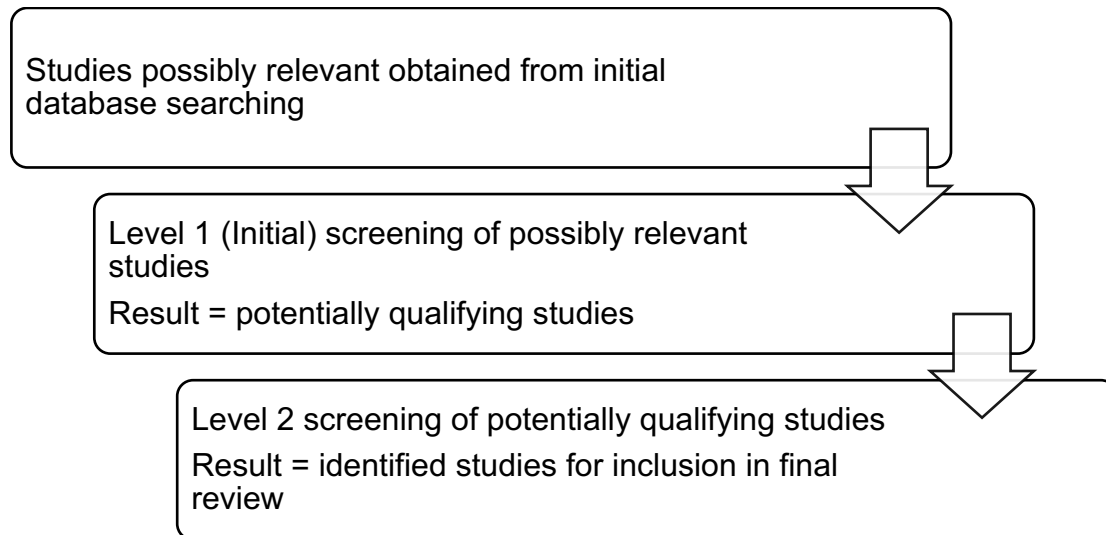


Figure 3.1: Study selection process to screen and select studies for inclusion.

i) Criteria for Selection

Selection criteria is dependent on both the predefined inclusion and exclusion criteria established for the review (see Table 3.3) and the social factors influencing the attainment of longevity in centenarian populations.

ii) Level One Screening of Possibly Relevant Studies

Articles possibly relevant for the review were screened to determine eligibility for inclusion. As aforementioned the initial databases search yielded 1235 articles deemed possibly relevant as seen in Table 3.6:

Table 3.6: Records Identified through Database Searching

Theme	Databases			Total
	PubMed	EBSCO	Scopus	
SES	13	9	34	56
Education	27	8	86	121
Relationships	50	30	514	594
Environment	12	7	169	188
Religion	3	4	28	35
Gender	28	8	205	241
Total (n)	133	66	1036	1235

Due to the high volume of articles, a preliminary screening of these articles was conducted based on their title and/or the abstract containing the search terms and meeting the inclusion/exclusion criteria, which resulted in 933 studies being removed due to not fitting the predetermined criteria which left a total of 302 articles remaining for inclusion in this review (see Table 3.7):

Table 3.7: Records Post Title Review

Theme	Databases			
	PubMed	EBSCO	Scopus	Total
SES	7	4	9	20
Education	13	3	20	36
Relationships	25	17	87	129
Environment	7	5	37	49
Religion	1	3	12	16
Gender	11	4	37	52
Total (n)	64	36	202	302

To facilitate the removal of duplicates within themes across the databases, articles were grouped (n=302) thematically as shown in Table 3.8 below:

Table 3.8: Themes Combined Post Title Review

Theme	Results (Journal Articles)
SES	20
Education	36
Relationships	129
Environment	49
Religion	16
Gender	52
Total (n)	302

Duplicates within each theme (n=69) were then removed resulting in a total of 233 articles deemed possibly relevant in this review (see Table 3.9):

Table 3.9: Exclusion of Duplicates

Theme	Duplicates Excluded	Results Remaining
SES	2	18
Education	8	28
Relationships	36	93
Environment	12	37
Religion	2	14
Gender	9	43
Total (n)	69	233

Following on from this, level 1 screening was conducted and carried out by: (1) screening the abstract, (2) assessment of full text article if abstract did not provide sufficient details to be included or excluded. Two hundred and thirty-three articles were screened manually during this stage to determine their relevance to the review which resulted in the exclusion of 133 articles in total (including 30 additional duplicates that were excluded across themes), leaving 100 articles to be screened at the next step (Level 2 screening) (Table 3.10):

Table 3.10: Abstract Review for Level 2 Screening

Theme	Records Excluded	Results Remaining	Remaining Duplicates excluded across themes	Results Remaining
SES	8	10	4	5
Education	12	16	3	13
Relationships	42	51	16	35
Environment	21	16	3	12
Religion	2	12	0	12
Gender	18	25	4	21
Total (n)	103	130	30	100

ii) Level 2 Screening of Possibly Included Studies

A total of 100 peer reviewed studies for possible inclusion in the review were then further screened. This screening was guided by the questions set out in the Critical Appraisal Skills Programme 2018 (CASP, 2018) to ensure an equal approach in assessing the remaining studies was carried out. Eighty-three studies were excluded from the review during level 2 screening which left seventeen studies deemed as eligible for inclusion in the final review. Figure 3.2 contains the results of Level 2 screening of peer-reviewed studies and highlights the number of articles excluded and their reasons for exclusion:

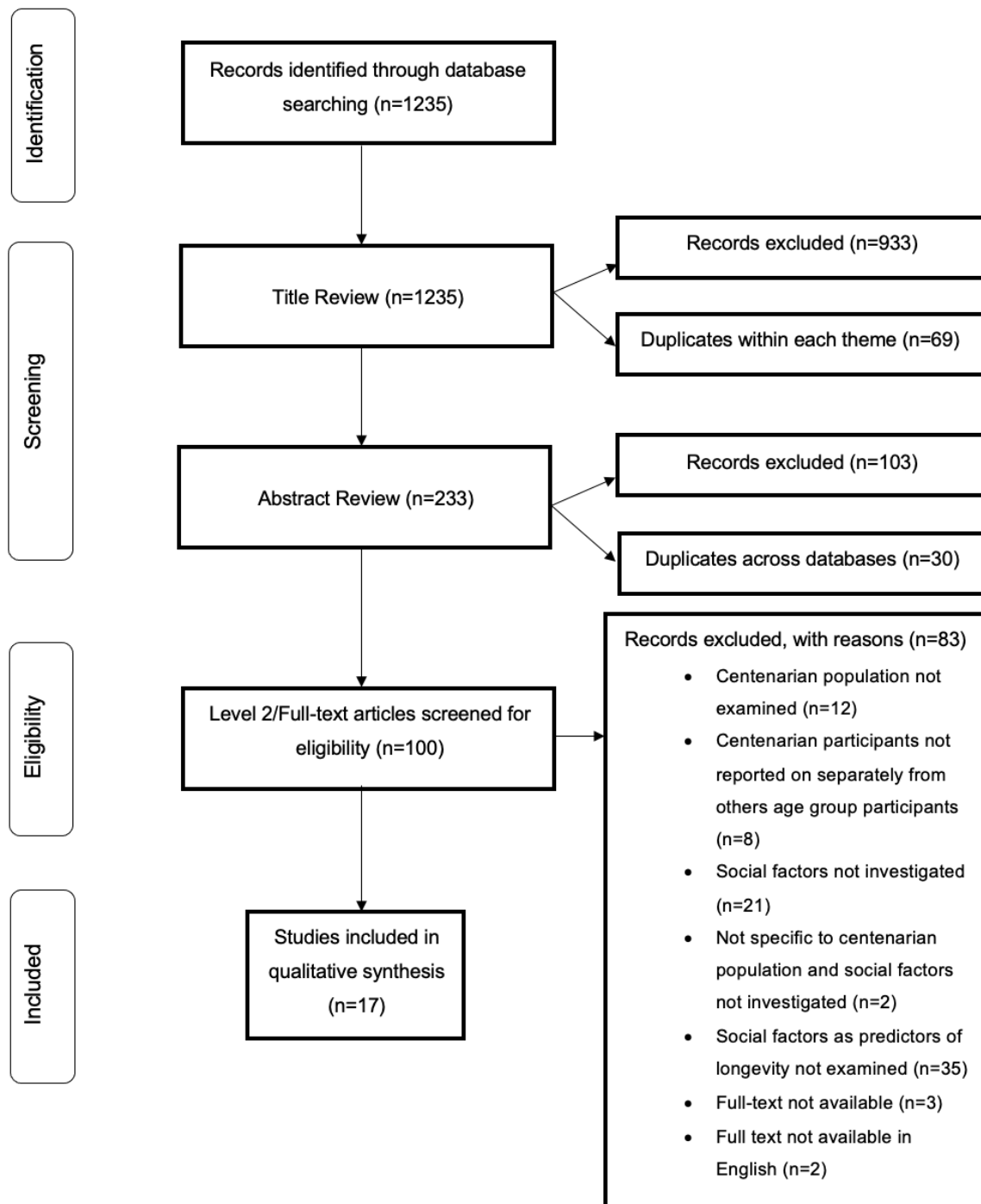


Figure 3.2: Study Selection Flowchart adopted from PRISMA Flow Diagram

3.3.4 Analysis of Included Studies

Identified studies were analysed through the process of data extraction for each study. The author tabulated key information from the included studies. Table 3.11 presents the data extracted from the final seventeen publications included in this review.

Table 3.11: Data Extraction from Peer Reviewed Publications

<i>Study</i>	<i>Country</i>	<i>Aim</i>	<i>Sample</i>	<i>Study Type</i>	<i>Study Design</i>	<i>Findings</i>	<i>Themes</i>
<i>Holston and Callen, (2021)</i>	United States	Capture the lived experience of centenarians reflecting on resilience and its' role in their attainment of longevity.	Appalachian centenarians (n=21)	Qualitative	A qualitative descriptive design was used for this study of secondary data.	There were three major themes and several subthemes identified in this study with the following relating to social factors specifically in the attainment of longevity: (i) working hard for the family, (ii) gender and race, (iii) isolation, (iv) family and community support, and (v) spirituality. The social factors that emerged from the study collectively enabled the centenarians to overcome and grow from the challenges they faced throughout life and enabled them to become resilient. This stood to them throughout life and was evidenced as being a potential contributing factor for longevity.	Relationships Environment Religion
<i>Opsahl et al., (2021)</i>	Denmark	Ascertain the religious beliefs and practices of Danish centenarians.	Centenarians (n=364) and a comparison group aged between 18-95 years (n=1507).	Quantitative	Cross-sectional comparative study using structured questionnaires. Descriptive statistics on the centenarians self-reported belief, frequency of prayer and attendance at service were examined.	Centenarians were found to be more religious (safeguarding beliefs and engaging in practice) compared to all other age groups however this significance diminished when compared to the older adult age groups.	Religion
<i>Ratan and De Vries, (2020)</i>	New Zealand	Gain an understanding of the lived experience of centenarians and the factors they attribute to their longevity.	Centenarians aged between 100 and 106 years (n=10).	Qualitative	Phenomenological study using a biographical narrative interpretive approach through face-to-face interviews.	Although several psycho-social themes emerged from this research but specific to the social factors being investigated, the following were identified by the centenarians as contributing to their longevity: (a) the environment in which the centenarians grew up, (b) being nurtured and well supported in childhood and (c)	Relationships Education Environment

						education and opportunities available to them.	
Mackowicz and Wnek-Gozdek, (2018)	Poland	Identify factors that centenarians perceived as offering protection against loneliness.	Centenarians (n=17).	Qualitative	Collective case study approach using in-depth interviews with centenarians who have not experienced loneliness.	Participants involved were diverse with respect to their past experiences, social and economic status, health condition, and family status but the common aspect was their lifetime activity and their high level of optimism. This lifelong activity curated the building of social relationships both intra- and intergenerationally across the lifespan which contributed to protection against loneliness and promoted quality of life as they aged.	Relationships Education
Holston and Callen (2017)	United States	Characterise the role of a farming childhood by exploring the viewpoints of community-dwelling centenarians who grew up on farms in south central Appalachia.	A sample of community dwelling centenarians (n=16).	Qualitative	Qualitative research with a descriptive design using semi-structured interviews with open-ended questions. Interviews were transcribed and analysed with the Neuendorf method of content analysis	Main themes that emerged were the farm, the family, and the environment. High emphasis was placed on the farm by the centenarian participants in recalling their childhood experience thus authors concluded that the farm proved pivotal in their lives and defined the familial, social, environmental, and cultural norms for them. They also surmised that it was apparent that the centenarians farm upbringing was foundational in their emotional strength and psychological tenacity, which enhanced their capacity for exceptional longevity	Relationships Environment
Mackowicz and Wnek-Gozdek, (2017)	Poland	Explore the self-perceptions of old age in Polish centenarians.	Centenarians (n=15) living in Krakow.	Qualitative	A collective case study (multi-case study) was employed in the research together with an in-depth interview.	The most important aspects of life for the respondents that emerged and what they felt contributed to their attainment of longevity were the positive social relationships they fostered in their closest environment, their deep and authentic faith (religion and	Relationships Religion

						spirituality), and an optimistic attitude towards life generally.	
Teixeira et al., (2017)	Europe	This paper reported the numbers of centenarians (total, and ratio relative to total population) in 32 European countries and their key characteristics: gender distribution, level of education, and type of residence.	The total number of centenarians was 89156 (n=89156).	Quantitative	Population Based Study using National Census data collected in 2011 for individuals aged 100 and over living in 32 European countries.	This study highlighted how the likelihood of becoming a centenarian varied significantly, however residing in a Mediterranean country supported the attainment of longevity. Gender also proved significant as descriptively there was a much higher ratio of females versus males reaching 100 years of age.	Gender Environment
Araújo et al., (2016)	Portugal	Explore the role of existential beliefs in mediating the influence of health on centenarians' well-being.	Centenarians (n=80) with no/minor cognitive impairments.	Quantitative	Quantitative, descriptive research using face to face interviews over one to two sequential sessions. Descriptive analyses of each independent and dependent variable used were conducted.	The research suggests that existential resources, including aspects relating to meaning, purpose in life, religious, and spiritual beliefs, may have a unique contribution on adaptive capacity among centenarians which can provide a sense of stability when challenges arise throughout the lifetime. The facilitation of such positively contributed to QoL and the centenarians experience of ageing thus impacted on the attainment of longevity.	Religion
Poulain and Herm (2016)	Belgium	Identify how marital history and living arrangements of centenarians influence the attainment of advanced age.	Belgian centenarians (n=3000) born between the years 1893 and 1903.	Quantitative	Comparative study using original longitudinal register-based data to reconstruct the marital history and living arrangements of a sample of centenarians during their later life (from age 60 to 100).	Both gender and relationships proved significant in this study. In terms of gender, women were more likely to reach 100 when compared to their male peers. Single and married persons, both men and women, had a significantly higher probability of becoming centenarians than widowed and divorced individuals. There was a slight though non-significant advantage for married men compared with single men	Gender Relationships

Gavrilov and, Gavrilova (2015)	United States	Investigate the influence of parental characteristics as well as early-life conditions and midlife environment in survival to advanced ages.	Records for confirmed centenarians (n=765) and records for controls (n=783) were used.	Quantitative	Comparative study of centenarians born in the United States in 1890–1891 with peers born in the same years who died at age 65 using computerized family histories which were linked to census data from 1900 and 1930.	and for single women compared with married women. Analysis with multivariate logistic regression found the existence of both general and gender-specific predictors of human longevity. Gender-specific predictors of male longevity are occupation as a farmer at age 40, North-eastern region of birth in the United States, and birth in the second half of year. A gender-specific predictor of female longevity is the availability of radio in the household according to the 1930 U.S. census. Although parental longevity appeared to be the strongest predictor of longevity, one possible nongenetic explanation of the observed phenomenon may come from family traditions. In the past, men often continued to live in the place of their childhood while women more often left the parental household after marriage. Authors concluded that favourable living conditions and/or lifestyle of male centenarians could be argued as positively influencing their longevity.	Gender Environment
Wong et al., (2014)	Hong Kong	Examine the potential correlates of "living well" among near-centenarians and centenarians in Hong Kong.	Six cognitively, physically, and psychologically well community-dwelling centenarians participated (n=6).	Qualitative	Qualitative research that adopted a narrative approach and used semi-structured interviews. The interview transcripts were then analysed using Braun and Clarke's method of thematic analysis.	Four major themes relating to longevity emerged from the responses of the participants, one of which related to the social factors under investigated namely, "positive relations with others". This research highlighted that having good interpersonal relationships is considered as important to well-being by long-lived adults in Hong Kong in both	Relationships

						maintaining QoL and the attainment of longevity.	
Freeman et al., (2013)	Not specified	Identify the characteristics perceived by centenarians as important to their attainment of advanced longevity	Nineteen centenarians with an age range of 100 to 115 years participated (n=19).	Qualitative	Qualitative research with a hermeneutic phenomenological approach. This study was a secondary data analysis using primary data obtained from the internet.	Four themes were identified and described: (a) lifestyle choices, (b) community and environment, (c) goal setting and attainment, and (d) attitude towards life. Centenarians credited tangible, easily understood personal lifestyle choices for their attainment of advanced longevity. No consensus was found between the current analysis and major themes identified in a literature review from quantitative studies.	Relationships Environment Religion
Manning et al., (2012)	United States	Theorise the relationship between spirituality and ageing among centenarians.	Sample population of sixteen centenarians from the Midwest (n=16).	Qualitative	Qualitative study that adopted a grounded theory approach and used semi-structured interviews to collect the data from participants.	Results highlighted the importance of spirituality for centenarians. Findings were indicative of spirituality being a key factor of support, an important resource in late life, and essential in maintaining continuity over the life course for the centenarians and was noted as positively contributing to the centenarians successful ageing. Findings support the need for more consideration to be given in accounting for the importance of spirituality in late life, particularly for those in their last decades.	Religion
Koch et al., (2010)	United Kingdom	Present centenarians' self-perceptions of their positive ageing.	Sixteen healthy centenarians were interviewed in their place of residence (n=16).	Qualitative	Qualitative research with a narrative, storytelling approach using semi-structured interviews to produce a story draft for each participant.	In addition to detailing their autonomous living centenarians elected to talk about their ongoing close relationships which were forged at a young age. The development of maintenance of close relationships throughout the life course were important for centenarians who felt they contributed to their attainment of advanced age.	Relationships

Archer et al., (2005)	Barbados	Investigate the factors associated with longevity in centenarians in Barbados.	A sample of 25 cognitively sound centenarians (n=25).	Qualitative	Qualitative research with a grounded theory approach using in depth interviews with open ended questions according to an interview topic guide.	Findings suggest that religion and spirituality were an integral part of the lives of the centenarian participants throughout their lives. High levels of religiosity were positively related to successful adaptation and coping and high levels of life satisfaction in the lives of these centenarians which may have contributed to their attainment of longevity.	Religion
Motta L. (1997)	Italy	To capture the epidemiological and socioeconomic aspects of Italian centenarians.	A subsample of 382 randomly selected centenarians from a total 1162 centenarian subjects (928 females and 234 males) recorded by a census carried out on 31 December 1993.	Quantitative	Descriptive study with a cross-sectional design. Data collected using census questionnaire. Statistical analysis was performed using descriptive statistics method as well as categorical and chi-square analyses.	The research suggested that persons with a low level of education had a better chance of becoming a centenarian as most participants had occupations that did not require many years of schooling. Centenarians were noted instead as having joined the workforce at a young age and remained in employment for long periods. Distribution of centenarians according to their place of residence did not seem related to either their income or to their marital status. Analysis of the environment revealed that 54.48% of centenarians had always lived in towns. It is significant to note that there was a high number of centenarians residing in urban areas despite such environments not being considered as typically healthy which may underline that longevity is linked prevalently to genetic factors which can only be partly influenced by other outside influences such as environment and lifestyle.	Education Environment
Pascucci M.A., Loving G.L. (1997)	United States	To gain an understanding of centenarians' meanings of longevity	Twelve centenarians ages 100-109 (n=12).	Qualitative	Qualitative exploration using semi-structured interviews conducted with the centenarians in their	This study revealed several insights from centenarians self-reporting of their longevity. Specific to the social factors	Relationships Religion

and their perceptions of the factors that may have contributed to their long lives, health, and functioning.

place of residence. Taped interviews were transcribed verbatim, and Colizzi's method of thematic analysis was adopted.

examined, both relationships and the role of religion proved to be of importance. Centenarians' religious beliefs were instilled early in life and carried with them. Religion offered a sense of direction and guidance for the centenarians and brought them great peace. Participants also recognised socialisation as being pivotal and noted the necessity of being socially engaged to prevent isolation. Centenarians also spoke fondly of their childhood experiences and how these shaped their lives.

3.4 Results

3.4.1 Relationships (n=10)

Ten studies (Pascucci and Loving, 1997; Koch *et al.*, 2010; Freeman *et al.*, 2013; Wong *et al.*, 2014; Poulain and Herm, 2016; Holston and Callen, 2017; 2021; Mackowicz and Wnek-Gozdek, 2017; 2018; Ratan and De Vries, 2020) examined relationships and social connectedness and their roles as predictors of longevity in centenarians. Of these ten studies, nine were qualitative studies and one study utilised quantitative research methods (Poulain and Herm, 2016). These studies were conducted across several locations globally including Belgium (Poulain and Herm, 2016), New Zealand (Ratan and De Vries, 2020), the United States (Manning *et al.*, 2012; Holston and Callen, 2017; 2021), Poland (Mackowicz and Wnek-Gozdek, 2017; 2018), Hong Kong (Wong *et al.*, 2014) and the United Kingdom (Koch *et al.*, 2010). One study involved secondary analysis of centenarian interviews obtained online and the location for this study was not disclosed (Freeman *et al.*, 2013).

3.4.1.1 Qualitative Research

Centenarians identified the role of relationships and social connectedness across the life course as an important factor in their longevity. Several qualitative studies identified the relationships centenarians had with their families during childhood as being significant in their attainment of longevity (Pascucci and Loving, 1997; Koch *et al.*, 2010; Holston and Callen, 2017; Mackowicz and Wnek-Gozdek, 2017; 2021, Ratan and De Vries, 2020). A study of New Zealand centenarians (Ratan and De Vries, 2020) described the strong relationships that the centenarians had with their parents during childhood and made special mention of their closeness to their mothers and the influence that this relationship had on their lives. These sentiments were shared by the centenarian participants of a Polish study wherein participants also attested to the unique bond they shared with their mothers (Mackowicz and Wnek-Gozdek, 2017). In addition to their parents, centenarians also perceived the family unit as positively influencing their longevity. A study of centenarians in the United States by Pascucci and Loving (1997) revealed that centenarians positively recalled childhood experiences and spoke fondly of this time in their lives throughout their interviews. This continued throughout their life course and the centenarians spoke of

the importance of their relationships with others, particularly their own families as they themselves became adults.

The influence of family was noticeably to the fore in another American study involving Appalachian centenarians (Holston and Callen, 2017), wherein one of the main themes that emerged from the research was that of family which included the subthemes of the influence of family roles, family structure and dynamics, and community relations. The interviews revealed that the lives of these centenarian participants were dominated by their agricultural backgrounds, and that growing up on a farm in the early 1900s was labour intensive and required a staunch commitment to the maintenance of their livelihoods. From this, the theme of family was evident and encapsulated what was foundational to the farm's existence and the family's survival. This way of life defined the familial, social, environmental, and cultural viewpoints of everyone, particularly the children. The authors surmised that, the agrarian upbringing of participants was fundamental in their emotional fortitude and psychological tenacity and is what may have enhanced their capacity for exceptional longevity. Participants also stressed the importance of knowing their neighbours and being friendly with other families around them and through the subtheme of community relations expressed how growing up on farms in the 1900s generated a sense of community support, which they strove to pursue and maintain throughout life because community relations reduced the sense of isolation in the environment (Holston and Callen, 2017).

However, Holston and Callen's study (2017) was not the only one to recognise the significance of community and its importance for participants and it was noted across several other qualitative studies (Freeman *et al.*, 2013; Mackowicz and Wnek-Gozdek, 2017; Holston and Callen, 2021). Freeman *et al.*, (2013) identified community and environment as being a key theme in their study which aimed to identify characteristics perceived by centenarians as important and central to their attainment of advanced longevity. They found that all centenarian participants emphasized the importance of being connected to their community throughout their lifetime. One's community however did not explicitly refer to the relationships that the centenarians held with their immediate or extended families but also included their wider network of friends who were deemed as being important in their lives. Similarly, in a study of Polish centenarians (Mackowicz and Wnek-Gozdek, 2017), the authors recognised the

significance of interpersonal relationships that centenarians had both inside of and outside of the home including those that were developed in their professional work lives and those that arose from their hobbies and other social commitments. As previously found by Holston and Callen (2017), Mackowicz and Wnek-Gozdek (2017) went on to conclude that the relationships developed and maintained over the life course by centenarian participants offered protective benefits against loneliness and were what the centenarians felt contributed to their attainment of longevity. Pascucci and Loving (1997) also made similar deductions in their study noting that participants recognised the value of socialisation and the necessity of being socially engaged to prevent isolation. While the establishment of good relationships with others proved significant in the first instance, the maintenance of these relationships was noted as being equally important and several of the included studies referred to the centenarians ongoing close relationships (Pascucci and Loving, 1997; Koch *et al.*, 2010; Wong *et al.*, 2014; Mackowicz and Wnek-Gozdek, 2017; 2018). Wong *et al.*, (2014) in their study of centenarians in Hong Kong, observed that having good interpersonal relationships throughout the life course is considered as important to well-being by long-lived adults in Hong Kong in both maintaining quality of life and the attainment of longevity. Comparably, in a study of centenarians in the United Kingdom (Koch *et al.*, 2010), centenarians elected to talk at length about their ongoing close relationships. The maintenance of close relationships throughout the life course were significant for these centenarians who felt that their social connectedness contributed strongly to their attainment of advanced age.

3.4.1.2 Quantitative Research

Of the included studies, one study examined relationships as being a predictor of longevity in centenarians (Poulain and Herm, 2016). Poulain and Herm in their comparative study which utilised original longitudinal register-based data ascertained that both single and married persons, irrespective of gender, had a significantly higher probability of becoming a centenarian than widowed and divorced individuals. Within the advantageous group of single and married persons they did note that there was a slight advantage for married men compared with single men and for single women compared with married women though this proved non-significant in the overall findings.

3.4.2 Religion (n=8)

A total of eight studies (Pascucci and Loving, 1997; Archer *et al.*, 2005; Manning *et al.*, 2012; Freeman *et al.*, 2013; Araújo *et al.*, 2016; Holston and Callen, 2017; 2021; Opsahl *et al.*, 2021) examined religion as a predictor of longevity in centenarians. Of these eight, six were qualitative studies (Pascucci and Loving, 1997; Archer *et al.*, 2005; Manning *et al.*, 2012; Freeman *et al.*, 2013; Mackowicz and Wnek-Gozdek, 2017; Holston and Callen, 2021) and two were quantitative studies (Araújo *et al.*, 2016; Opsahl *et al.*, 2021). These studies were conducted in various countries worldwide, including Denmark (Opsahl *et al.*, 2021) Portugal (Araújo *et al.*, 2016), the United States (Pascucci and Loving, 1997; Manning *et al.*, 2012; Holston and Callen, 2021), Poland (Mackowicz and Wnek-Gozdek, 2017) and Barbados (Archer *et al.*, 2005). One study (Freeman *et al.*, 2013) was conducted using secondary analysis of centenarian interviews obtained online and the location for this study was not disclosed.

3.4.2.1 Qualitative Research

While it was evident that the centenarian participants themselves perceived religion as having contributed to their attainment of longevity, it is important to acknowledge that religion was frequently coupled with spirituality and these concepts were discussed in tandem in several of the included studies (Archer *et al.*, 2005; Freeman *et al.*, 2013; Mackowicz and Wnek-Gozdek, 2017). Thus, within the qualitative studies in this review there was consensus that religion and spirituality together played a significant role in the centenarians' lives. One study that did examine religion in isolation was Pascucci and Loving's study (Pascucci and Loving, 1997). Religion was found to be an overriding theme within the research with a belief in God being repeated by participants in the interviews conducted. It was observed that centenarian participants' religious beliefs were instilled in them early in life and subsequently maintained across their lifetimes. Religion was seen to offer a sense of direction and guidance for the centenarians which they felt positively influenced their longevity (Pascucci and Loving, 1997).

As aforementioned, several studies identified both religion and spirituality as being important perceived predictors of centenarians' longevity. This was seen in a study of

Barbadian centenarians (Archer *et al.*, 2005) where authors concluded that religion and spirituality proved to be an integral part of the lives of the centenarian participants. Authors concluded that the high levels of religiosity seen among participants contributed to their successful adaptation and coping in the face of life's adversities and influenced their high levels of life satisfaction which may have attributed to their attainment of longevity. Equally, Mackowicz and Wnek-Gozdek (2017) found that among other social factors centenarians credited religion and spirituality for their longevity. All participants of this research study were Catholics and all expressed feelings of joy and thankfulness to God for letting them live so long. The centenarian's strong faith was also identified as being the driving force that gave them strength during the difficult times in their lives. The authors surmised that the centenarians deep and authentic faith was closely related to their optimistic attitude towards life generally, which was expressed by all interviewed in this study. Freeman *et al.*'s (2013) secondary analysis of centenarian interviews also found spirituality, faith, and devotion to have been discussed to varying degrees by the centenarian participants. However, although some centenarians regarded spirituality with feelings of happiness and contentment, others were more serious about the unknown reasoning of God. Notwithstanding this, a sense of gratitude to God was expressed and participants reported being brought comfort by their beliefs and attributed these beliefs to their longevity.

The concept of spirituality, independent of religion was explored in two studies, both of which were conducted in the United States (Manning *et al.*, 2012; Holston and Callen, 2021). In this qualitative study of Appalachian centenarians (Holston and Callen (2021), one subtheme related specifically to spirituality. In discussing their beliefs, many centenarian participants disclosed that they relied on a 'higher power' for the strength to accept life's events. Holston and Callen (2021) concluded that this theme alongside others perpetuated the participants resilient natures which in turn positively influenced their longevity. Comparably, in Manning *et al.*'s study (2012), the findings highlighted the importance of spirituality for centenarians. These were indicative of spirituality being a key factor of support, an important resource in late life, and essential in maintaining continuity over the life course for the centenarians and was noted as having positively contributed to the centenarians' long lives.

3.4.2.2 Quantitative Research

Religion as a predictor of longevity was also examined quantitatively. In a cross-sectional study of Danish centenarians (Opsahl *et al.*, 2021), religious beliefs and practices were observed to be more prevalent in the sample of centenarians compared to those in the samples of younger age groups. Generally, centenarians were found to be more religious in terms of safeguarding their beliefs and engaging in practice when compared to all other age groups however this diminished when compared to the older age groups (*i.e.*, those aged 76-95 years) (Opsahl *et al.*, 2021). This study also found that religious beliefs appeared to offer protection against adversity and life's challenges which the participants reported as having positively contributed to their successful ageing. It is important to note that women constituted 82% of the sample of centenarians compared to less than 51% across all other age groups examined as previous studies of the Danish population have found women to be more religious than men this may have confounded the findings of this study. Notwithstanding, similar results were noted in a study by Araújo *et al.*, (2016) wherein religion and spirituality were seen to offer protection and support for centenarians. They observed that existential resources, including aspects relating to religious, and spiritual beliefs, may uniquely contribute to adaptive capacity among centenarians which provides a sense of stability when challenges arise throughout the lifetime and in turn positively influences centenarians successful ageing.

3.4.3 Environment (n=8)

Eight studies (Motta, 1997; Freeman *et al.*, 2013; Gavrilov and Gavrilova, 2015a; Holston and Callen, 2017; 2021; Teixeira *et al.* 2017; Mackowicz and Wnek-Gozdek, 2018; Ratan and De Vries, 2020) examined environment as a predictor of longevity in centenarian persons. Five of these were qualitative studies (Freeman *et al.*, 2013; Holston and Callen, 2017; 2021; Mackowicz and Wnek-Gozdek, 2018; Ratan and De Vries, 2020) and three were quantitative studies (Motta, 1997; Gavrilov and Gavrilova, 2015a; Teixeira *et al.* 2017). These studies were conducted across several locations globally and included research from the United States (Gavrilov and Gavrilova, 2015a; Holston and Callen, 2017; 2021), Italy (Motta, 1997), Poland (Mackowicz and Wnek-Gozdek, 2018) and Europe as a whole (Teixeira *et al.*, 2017) One study did not

disclose its location as it was done using secondary analysis of interviews obtained online (Freeman *et al.*, 2013).

3.4.3.1 Qualitative Research

The environment as a predictor of longevity was very apparent in the qualitative research studies included. In particular, the environments (either physically or socially) in which the centenarians were raised were perceived by them as being significant in their successful survivorship. The role of the environment was observed clearly in both studies by Holston and Callen (2017; 2021) and their research acknowledged that for the centenarians growing up in Appalachia, their existence was defined by the farms on which they grew up and the challenging conditions under which they lived. Several of the centenarian participants repeatedly referred to the farm and acknowledged its influence on their longevity. Centenarian participants felt strongly that the resilience they developed was as a direct result of the poor environment in which they were brought up and believed that the development of coping skills contributed to their attainment of longevity (Holston and Callen, 2021). Furthermore, the centenarians reported a sense of community and generosity of spirit as commonalities shared amongst people in their locality and this supported them to thrive in childhood despite the adversity faced, another feat that they perceived as influencing their longevity. Similarly, in their earlier study, Holston and Callen (2017) identified the main themes that emerged as the farm, family, and environment. High emphasis was placed on the farm *i.e.*, the physical environment, by the centenarian participants in recalling their childhood experience. The farm was pivotal in their lives and defined the familial, social, environmental, and cultural norms for all. It was apparent that the centenarians farm upbringing was foundational in their emotional strength and tenacity, which enhanced their capacity for exceptional longevity (Holston and Callen, 2017). Ratan and De Vries (2020), in their New Zealand study demonstrated comparable findings from the perspective of the social environment in which the centenarians were raised.

Centenarian participants made several references to their growing up in a 'privileged environment' and in these instances were referring to the supportive environments that were curated by their families and in which they were brought up. Participants acknowledged the 'very happy' childhoods that were afforded to them which

contributed to shaping their personalities and how they approached life generally (Ratan and De Vries, 2020). In their study of Polish centenarians, Mackowicz and Wnek-Gozdek (2018), also identified the influence of the social environment in which the centenarians were raised as a perceived predictor of centenarian longevity. Participants of this study commented on the emphasis placed by their parents on their learning and contribution to the household from their early childhood, for example, performing household duties and chores. Centenarian participants felt that this fostered the development of their hard work ethic which they reported as strengthening their body and spirit and contributing overall to their successful ageing and longevity (Mackowicz and Wnek-Gozdek, 2018). Freeman *et al.*'s (2013) study also recognised the importance of the social environment in which the centenarians were raised and lived, and authors of this study stressed how being well connected to the community positively influenced the centenarian's longevity. Centenarian participants themselves commented on the importance of surrounding oneself with a positive atmosphere and linked the environment in which they lived as being essential for longevity attainment (Freeman *et al.*, 2013).

3.4.3.2 Quantitative Research

The environment was also examined as a predictor of longevity in centenarians quantitatively; however, the emphasis was placed on the physical environment as opposed to the social environment. In their population-based study which used national census data from centenarians living in 32 European countries Teixeira *et al.*, (2017) found that that residing in a Mediterranean country supported the attainment of longevity.

The influence of the physical environment and its influence on longevity was also examined in Gavrilov and Gavrilova's study (2015a), based on centenarians living in a North-eastern region of the United States of America. While Gavrilov and Gavrilova (2015a) identified parental longevity as being the strongest predictor of longevity, they acknowledged possible nongenetic explanations and proposed that centenarian longevity may be influenced by family traditions that relate to the centenarian's environment. Interestingly they found that males were more likely to become centenarians and it was proposed that this may be attributed to men often continuing

to live in the place of their childhood while women more often left the parental household after marriage and that this ageing in place may support successful survivorship. They concluded that favourable living conditions through the lifestyle of male centenarians could be argued as positively influencing their longevity.

3.4.4 Gender (n=3)

Three studies included examined gender as a predictor of longevity in centenarians (Motta, 1997; Gavrilov and Gavrilova, 2015a; Teixeira *et al.*, 2017). All three studies utilised quantitative research methods and were conducted across several locations that included Europe (Motta, 1997; Teixeira *et al.*, 2017) and the United States (Gavrilov and Gavrilova, 2015a).

The high average proportion of centenarian women (83.8%) identified by Teixeira *et al.*, (2017) in their quantitative study that utilised census data for 32 European countries parallels the general sex breakdown of global centenarian studies and the feminisation of old age. Male centenarians represented just 16.5% of the total European centenarian population. However, this was not seen in each of the countries examined in this study and a higher proportion of men was observed in Hungary, Bulgaria, Romania, and Lithuania wherein the percentages of male centenarians were all above 30% (37%, 33.6%, 32.7% and 31.6% respectively). While there was no clear geographical pattern, it was observed that men were highly concentrated in Eastern European countries compared to that of Western Europe which Teixeira *et al.* (2017) proposed may be suggestive of a selective survival phenomenon, but authors did not examine this hypothesis further in this study. Interestingly, in Sardinia where there is a known exceptional high centenarian prevalence, the gender ratio in age-validated cases is balanced reinforcing the need for more research on gender differences in exceptional longevity that not only accounts for the role of genetics but lends consideration to socio-psychological variables. Motta's (1997) study of Italian centenarians seen sex distributions akin to Teixeira *et al.*'s (2017) study wherein there were fewer males (21%) than females (79%). This would appear to support the evidence that generally females live longer than males and that longevity is more prevalent amongst females as echoed in other centenarian work conducted (Marais *et al.*, 2018; Crimmins *et al.*, 2019).

Consonant findings could not be derived from the third study (Gavrilov and Gavrilova, 2015a) that examined gender as a predictor of longevity. Gavrilov and Gavrilova (2015a) in acknowledging the small sample sizes of male centenarians in centenarian research and longevity studies purposively oversampled males in their study population to have a sample with an equal gender balance and thus the results are not reflective of the actual gender distributions of centenarians in the United States. Their study of American centenarians identified the existence of both general and gender specific predictors of longevity. Gender specific predictors of male longevity were occupation as a farmer at age 40, North-eastern region of birth in the United States and birth in the second half of the year. A gender specific predictor of female longevity identified was the availability of a radio in the household according to the 1930 census.

3.4.5 Education (n=2)

Education being a predictor of longevity in centenarians could be considered somewhat subjective as the definition of education appeared ambiguous within the included studies. Two studies (Motta, 1997, Ratan and De Vries, 2020) examined education as a predictor of longevity in centenarians. One of these studies utilised qualitative research methods (Ratan and De Vries, 2020) and one used quantitative research methods (Motta, 1997). One of these studies was conducted in Italy (Motta, 1997) with the other study having been done in New Zealand (Ratan and De Vries, 2020).

3.4.5.1 Qualitative Research

In their study of New Zealand centenarians, Ratan and De Vries (2020) identified education and opportunities afforded to centenarian participants as an emerging theme in this research. All ten centenarian participants reported having been supported and encouraged to take up education of some type by their parents and grandparents. They also described having had privileged upbringings that afford them better educational prospects than many of their peers in their early life including the opportunity to study in a private school during an era when the Great Depression burdened many other families. Education was noted as being significant to the centenarians' parents, with one participated recalling how they were sent to New

Zealand (from South Africa) due to the better educational prospects. Centenarian participants indicated that their parents' own views on education enhanced their opportunities throughout life and was related to their successful ageing as a result.

3.4.5.2 Quantitative Research

Quantitatively, education was also examined as a predictor of centenarian longevity in Motta's (1997) study of Italian centenarians. This study reported the preliminary data from the Italian Multicentric Study on centenarians with a specific focus on the epidemiological and socioeconomic findings. Analysis of the centenarian participants socioeconomic status revealed that the centenarian participants had low levels of education which authors perceived as increasing their chances of reaching 100 years of age. They ascertained this from the fact that most of participants had occupations that did not require many years of schooling and that they joined the workforce at a young age and remained working for more than 45 years on average. Despite drawing this conclusion authors did not provide additional information to explain or to support of this finding. They did however acknowledge that the low level of schooling in Italy a century ago greatly influenced their datum.

3.4.6 Socioeconomic Status (n=0)

None of the studies included in the final review examined socioeconomic status (SES) as being a predictive factor for longevity. While several of the included studies provided some demographic information on the centenarians' occupations or economic status and how it may enhance quality of life, no correlations investigated identified SES as a predictor for the attainment of longevity in centenarians.

3.5 Discussion

The aim of this review was to ascertain the predictive influence (if any) that social factors have on the attainment of longevity in centenarians and although the review noted the positive affect of some of the factors investigated, this is caveated by the subjective nature of the review's findings given most of the studies included adopted qualitative research methods. While qualitative research is important in addressing the "how" and "why" research questions to enable deeper understanding of experiences,

phenomena, and context, more quantitative research is needed to support these findings explicitly.

The literature on relationships, *i.e.*, social support and connectedness and its influence on health can be traced back to Maslow (1943; 1954; 1962; 1970; 1971) and his theory of human needs and motivations as well as to the writings of Bowlby and his theory of attachment (Stump *et al.*, 2009). More than half of the included studies acknowledged the pivotal role of relationships in the attainment of longevity and the centenarians' relationships with others, both friends and families alike were frequently discussed in the included literature as a key ingredient in the recipe for successful ageing and long-term survivorship (Pascucci and Loving, 1997; Koch, 2010; Holston and Callen, 2017; Holston and Callen, 2021; Ratan and De Vries, 2020). Other research support this (Thomas, 2011; Zhou *et al.*, 2018b), noting how individuals that have engaged more fully with society have better physical and psychological functioning and are more likely to thrive in later life versus those who were socially isolated. A lack of social relationships is thought to have similar negative connotations on health as established risk factors such as physical activity, obesity, smoking and hypertension (O Donoghue *et al.*, 2016). The possession of a 'richness of social attachments and friends' is thought to protect against mortality (House, 1988). Familial ties are regarded as a defining factor in the promotion and conservation of health in centenarians (Bhattacharyya and Molinari, 2021; Milevsky, 2021). Care giving and attachment towards children are key elements of parental love that are essential not only for survival during infancy and childhood but also for physical and psychological well-being throughout life and several authors noted the perceived significance of the family at childhood in supporting the attainment of longevity (Koch, 2010; Wong *et al.*, 2014; Mackowicz and Wnek-Gozdek, 2018). The importance of the wider social network was also acknowledged with Freeman *et al.*, (2013) drawing attention to the importance of being connected to others and highlighting communication and strong family and friend relationships as being wholly necessary in the creation of community. The importance of creating and maintaining meaningful contacts through a supportive social network were very much to the fore in the attainment of advanced age through their contribution to the maintenance of both physical and cognitive vigour by supporting engagement with life and this emerged as a fundamental factor of centenarian longevity across several centenarian studies included.

Existential beliefs including religion and spirituality were recognised as a critical support component in the everyday lives of centenarians (Archer, 2005; Koch, 2010; Mackowicz and Wnek-Gozdek, 2018) and several studies examined the potential benefits of religion and spirituality for health, well-being, and quality of life for older adults. Religion and spirituality represent key priorities for many centenarians as they allow for structure, meaning and understanding to be applied easily to everyday life, in addition to supporting them through sometimes difficult life challenges (Manning, 2012). Spirituality can be heavily relied on and provides a framework that guides some (though not all) throughout life whether it is in times of celebration or in times of sadness and so for the older person it may provide comfort or solace in times of adaptation as they age (Manning, 2012; Holston and Callen, 2021). According to Archer *et al.* (2005) religiosity is an integral part of centenarians' lives. A major theme identified in their research into Barbadian centenarians echoed the importance of religiosity in adaptation and coping in everyday life as aforementioned. Freeman *et al.*, (2013) also supported this finding in their study which focused on centenarians' self-perceptions of factors responsible for extended health and longevity. However, it is significant to note that the role of religiosity in successful ageing is not a new phenomenon as religion and spirituality has long been discussed in the included literature on centenarians (Pascucci and Loving, 1997) as well as within the gerontological research agenda overall (Koeing *et al.*, 1988; Crowther *et al.*, 2002; Larson *et al.*, 2002).

A high level of education has been proven to have a direct impact upon longevity with higher education leading to improved health as it is argued that better educated persons are more equipped to make better informed, health related decisions for themselves and their families (Sanders *et al.*, 2009; Bravemen *et al.*, 2011; OECD, 2017). In general population research education has been shown to be a reliable predictor of longevity (Michalos, 2017) and the causative relationship between education and longevity has been discussed by several authors (Jencks and Riesman, 1968; Taubman and Wales, 1975; Cutler and Lleras-Muney, 2006). According to Ross and Mirowsky (2010) education creates most of the association between higher socioeconomic status and better health as education is a root cause of good health. Educational attainment influences several aspects within an individual's life notably health related behaviours, cognitive functioning, and the development of social and

psychological resources (Hummer and Hernandez, 2015). However, education as a factor influencing longevity in centenarians was only discussed in two studies included in the final review. The educational opportunities afforded to centenarians was directly related to their family's financial situation with only those able to afford tuition being in receipt of same (Ratan and De Vries, 2020). In addition to education being acknowledged as a factor that determines longevity and successful ageing, the influence of career is a closely related concept as according to Shankar *et al.*, (2013) higher education shapes employment opportunities and impacts directly on economic and financial resources for the individual. Interestingly, the converse was presented by Motta's (1997) study included in the review involving Italian centenarians which concluded that the centenarian participants with low levels of education were more likely to reach 100 years of age.

Several authors across the literature have discussed the concepts of self-sufficiency and self-reliance amongst rural dwellers that may underwrite both positive and negative health outcomes. Rabiner *et al.* (1997) acknowledged a stronger sense of independence and resilience among rural residents versus those that live in metropolitan areas. Rural women are less likely to acknowledge health problems (due to a tendency towards resilience) to lessen the potential dependence on medical services (Shenk, 1998; Davis and Magilvy, 2000; Keating, 2008). Along with this, lower levels and standards of education attainment, health literacy and health knowledge can also impact the diagnosing and reporting of health status amid rural populations (Davis and Magilvy, 2000). A study by Layte *et al.*, (1999) theorised that rural residency contributed to social isolation because of poor transport links and due to lower housing density and geographical location a rural dweller was less likely to interact with neighbours or friends regularly. However, in both of Holston's and Callen's (2017; 2021) studies included in this review, the rural environments in which the centenarians grew up were perceived by the centenarians as being pivotal in their attainment of longevity. In these studies of Appalachian centenarians, the emphasis was placed on both the physical environment and on the social environment that was created by the people around them. The importance of the social environment was also stressed by the centenarians in the Ratan and De Vries (2020) study of New Zealand centenarians where participants credited the community as being a positive contributor to their longevity.

'Ageing in place' is a popular term in current ageing policy and is defined by the Centers of Disease Control and Prevention (CDC) (2009) as "the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level". Ageing in place enables older persons to maintain independence, autonomy and greater connection to social support including friends and family (Lawler, 2001; Frank, 2002; Ball *et al.*, 2004; Pynoos *et al.*, 2009). Additionally, research has demonstrated how ageing in place supports the upkeep of social relationships (Keeling, 1999; Lawler, 2001; Frank, 2002). Remaining at home operates on much more than just a physical level but also is strongly related to an older person's sense of attachment to place and gives meaning and security in old age. This attachment was shown to contribute positively to ageing and wellbeing later in life in Gavrilov and Gavrilova's (2015a) study, wherein male centenarians' longevity was in part attributed to them often continuing to live in the place of their childhood which supported successful survivorship.

Female gender has consistently been associated with greater longevity. Men comprise only about 15% of the total population of centenarians, because male mortality is significantly higher at younger ages (Poon and Perls, 2007). Even among centenarians, females tend to live longer (Poon *et al.*, 2000). Although female gender is related to greater longevity, older women may experience greater challenges in their later years than men of the same age (Austad, 2006). Although the correlation between gender and longevity attainment is well documented in ageing literature generally, gender as a predictive factor of longevity in centenarians was discussed briefly in just three of the final studies included in this review with only one study, Gavrilov and Gavrilova's (2015a) study furthering the discussion beyond gender breakdown noting several gender specific predictive factors of longevity including, location at birth and occupation in midlife being significant for men.

Despite socioeconomic status being known to effect how well and how long one lives it did not appear to be of high importance in relation to centenarian persons as in this review as none of the included studies highlighting the centenarian's socioeconomic status as having influenced their attainment of longevity. However, that is not to say that socioeconomic status doesn't influence longevity in centenarians but instead highlights a dearth in the available literature that warrants much greater attention given

its significance. It is well recognised that (Friel and Marmot, 2011; Marmot, 2015) health and longevity are completely unevenly distributed between individuals of different socioeconomic status, and these health gaps seem to be increasing over time, reinforcing current inequalities, and given the projected increase in the incidence centenarians globally, this area needs further examination.

3.6 Conclusion

A strength of this review is the adherence to a stringent scoping review protocol and clearly defined inclusion and exclusion criteria. A broad search strategy was employed to capture all relevant articles. A further strength is the high inter-rater reliability between reviewers during the screening process, reflecting transparent selection methodology. The past century has witnessed a rapidly ageing world population and the 21st century will be remembered as the century of ageing. There is an increasing need to address the knowledge gap that exists in relation to social factors attributable to the attainment of longevity among centenarians. This review offers a unique contribution as it is the first study to synthesise the literature specifically pertaining to social factors and their influence the attainment of longevity in centenarians. The important finding in in this review is that while there is strong suggestive qualitative evidence to support the influential role of social factors on ageing, ultimately, further empirical quantitative research that examines social factors is needed to validate their significance.

Considerable methodological differences between studies may explain the heterogeneity of findings highlighted in this review. While methodological differences in the measurement of social factors being investigated were also observed, this was expected as social factors are rarely investigated independent of other factors with most research coupling psychological and sociological factors together when it comes to centenarian research. Additionally, sampling strategies also varied significantly, which may have contributed to the diverse results that emerged from the literature.

It is important to recognise that studies that only sample community dwelling centenarians are more likely to have involved healthier participants which may not be an accurate representation of the overall centenarian population. Studies also differed in their method of data collection as some relied on self-report questionnaires while

others utilised proxy ratings. Although self-report measurement tools are the most common method to assess subjective well-being, centenarians present a unique challenge, especially in the context of cognitive impairment. While obtaining data through proxy ratings is more pragmatic, their reliability and validity are questionable due to the influence of personal biases (Cummins, 2002). The most ideal methodology is to collate data from both participants and informants to improve inter-rater reliability, as was performed by several of the included authors. Cross-cultural differences may also explain the paradoxical findings reported in this review. Studies were included in a single analysis regardless of country or world region, but we acknowledge that cultural, economic, and demographic factors may point to a need for country-specific research.

Finally, lack of data precluded examination of cohort effects. A significant limitation of the literature is the dearth of a cogent theoretical model for the social determinants of health specific to older persons. This lack of an empirical framework may explain the variety of measurement tools in the literature. This problem is heightened by the fact that some studies did not clearly define the social factors under investigation, and it is recommended that all future research should explicitly operationalise the sociological construct that is being measured. This review also identified many inherent limitations of centenarian research: age validation issues, correlational associations that do not confer causality, existence of the healthy volunteer bias and lack of longitudinal studies. These flaws pose significant challenges for researchers and may explain the small number of studies in this area. Future research could be directed towards broader concepts such as quality of life in centenarians, which not only encompasses physical and cognitive health but also their social wellbeing. This review indicates that the creation of a clearer framework for researchers to study the role of sociological factors in the attainment of longevity in centenarians can promote further research and harmonise current conflicting data. Furthermore, with several global cohort studies currently underway following adults aged fifty plus, more valuable information should be available pertaining to centenarians in the not-too-distant future. The development and maturation of these studies will also allow for more robust analysis that explores the interplay between biological and social as well as other related factors. What will also be interesting is if centenarians' perceptions as examined in the qualitative work is reflected in longitudinal cohort studies.

Chapter Four

A Quantitative Exploration of the Social Factors and Key Characteristics of Irish Centenarians

4.0 Abstract

Introduction:

Despite increasing longevity leading to the oldest old to becoming one of the fastest growing cohorts of the population, centenarians still represent an unstudied and underserved population. Available studies mostly concentrate on biological or physiological predictors of exceptional longevity, but little is known about what contributes to experiencing a quality life in very old age. This study aims at providing a comprehensive picture of the influence of social factors on the ageing experience of Irish centenarians.

Methods:

This observational, cross-sectional study was conducted using a non-probability, purposive sample. A questionnaire was administered to centenarian participants to capture their sociodemographic information and other key characteristic data including their living conditions, social relationships, community involvement, self-rated health, and personal habits.

Results:

Descriptive statistics were used to report means and percentages for each of the domains described for the whole sample and was also stratified by sex in some instances. A total of forty-nine centenarians (n=49) living in both private community-based residences and institutional care facilities participated in this study. Of these, thirty-seven participants identified as being female (n=37, 75.5%) and twelve identified as being male (n=12, 24.5%). Participants were aged between 100 and 106 years with a mean age of 100.96 ± 1.44 years.

Conclusion:

This study is among the first to independently collect and report primary data on Irish centenarians and highlights several key areas for consideration, most notably the importance of social connectedness and support for the older person. Its main contribution is to the development of a body of knowledge on Irish centenarians and it presents valuable information on their sociodemographic characteristics as well as exploring the influence of several social factors, providing insight into the oldest old in

Irish society and emphasising the importance of promoting health from a biopsychosocial standpoint.

4.1 Introduction

As global populations continue to age, year on year more people are reaching advanced age and celebrating the milestone birthday of being one hundred years of age. Therefore, centenarians who were once considered rare in societies are now becoming more commonplace. Centenarians accounted for almost half a million people in society worldwide in 2015 and this number is expected to rise to around 3.7 million by 2050 (Stepler, 2016). It has been debated that this ageing phenomenon and the associated prolongation of life is largely the result of advances in medical, social, political, economic, and indeed cultural domains in modern societies (Beltrán-Sánchez *et al.*, 2015; Martin *et al.*, 2015; Beard *et al.*, 2016; Fried, 2016). With such notable increases in life expectancies several key societal issues are raised as a result of this observed delay in mortality.

Given their advanced survivorship centenarian populations challenge researchers and health professionals to understand the life stages that are unique to survival to this advanced age. The identification of centenarians' characteristics has been an interest expressed by many in the literature to date (Depp and Jeste, 2006), however, several gaps in knowledge persist regarding the demographic, environmental, and social factors that may contribute to becoming a centenarian. Most research has focused on unveiling the biological, genetic, and clinical characteristics of these long-lived individuals yet the survival probability of becoming a centenarian has been shown to be multi-faceted. While numerous studies have shown that longevity is likely to be a polygenic trait, ageing has been attributed as being 10–35% heritable (Ruby *et al.*, 2018; Van den Berg *et al.*, 2019; Sathyan *et al.*, 2020). Given the heterogeneity of the centenarian phenotype one must consider the factors beyond those that are strictly genetic or biologic and how they influence ones' ageing. Epidemiological studies have highlighted several associations between social and environmental factors, such as high educational attainment and socioeconomic status in securing successful longevity (Pinquart and Sorensen, 2000; Yang *et al.*, 2020). Healthy ageing, as defined by the World Health Organisation is “the process of developing and maintaining the

functional ability that enables wellbeing in older age” has been shown to be an important determinant of becoming a centenarian (Yoshida *et al.*, 2022). Factors such as socioeconomic status, proper sanitation, access to healthcare, public health expenditures, as well as a plethora of others all contribute to healthy ageing (Kim, 2014). Studies have found that variables such as being female, being married, living in urban areas, possessing a higher educational status, lower perceived bias against oneself, social participation, amongst others tend to be associated with later mortality (Franceschi and Bonafe, 2003; Silva *et al.*, 2014). As centenarians themselves are an understudied population in the Irish context, there exists limited information on this cohort in general. Furthermore, and within the wider centenarian research agenda, there is limited information pertaining to the role of social factors including, education, social networks, employment and working conditions (Greimel *et al.*, 2016) and their influence on the lives of centenarian persons. Therefore, the aim of this study was to address these gaps by exploring the sociodemographic characteristics of a sample of Irish centenarians and to capture data relating to these social factors specifically.

4.2 Methods

4.2.1 Study Design

This study was observational and cross-sectional by design. As a result of their descriptive nature, cross-sectional studies enable researchers to characterise and assess the prevalence and distribution of one or many outcomes in a defined population. Additionally, they can assess how frequently, widely, or severely a specific variable occurs throughout a specific demographic. One advantage of adopting such design is that it allows researchers to explore numerous characteristics including age, gender, education level within one study. As Irish centenarians represent an understudied population, the information gathered from this study, as in many cross-sectional studies, will allow researchers to conduct further data analyses to explore any causal relationships in greater depth in the future.

4.2.2 Recruitment

A lack of an accessible national registry of centenarians in the Republic of Ireland (or any other similar records) and the difficulty of gaining access to comparable existing registries such as voting registries prompted the researcher to employ a non-

probability, purposive sampling technique to identify suitable participants for the study. Researchers widely use such sampling methods in exploratory research, as was the case in this study. Additionally, purposive sampling is often used to indicate if a particular trait or characteristic exists in a population and so this sampling technique was appropriate given the aims of this study. Notwithstanding this, the researcher was aware that in adopting such techniques, the study could not generate results that would be generalisable to the entire centenarian population. Given the nature of the study, the following exclusion criteria was applied to ensure that the study sample consisted of relatively healthy and functional centenarians: (a) the respondents should be able to self-consent to participation in the study and (b) respondents should be cognitively capable of completing the questionnaire. With this sampling technique, it was anticipated that the lead researcher would employ a variety of methods including word of mouth, searching newspaper archives, online records, and social networks to identify centenarians or persons who either were related to or knew centenarians personally. This technique was proven effective and led to the creation of a non-representative and non-random community-based participant sample of centenarians. Prior to the questionnaire being sent to those agreeable to participation, the researcher spoke with the centenarian participant and/or their significant person and explained the aims of the study and what was involved. Once permitted by the centenarian person, a pack containing an information letter detailing the aims of the study, the questionnaire for completion, a consent form for respondents to complete and a prepaid envelope for the return of the research material was sent to the address provided by the participant. The pack also included contact information (phone number and email address) for the lead researcher should participants have had any questions or concerns pertaining to the study (Appendix III).

4.2.3 Ethical Considerations

Ethical approval was obtained from Athlone Institute of Technology's Ethics Committee (now known as the Technological University of the Shannon) and this research was conducted in compliance with their standards and regulations. All participants were made aware of the study's purpose and their participation in the study was strictly voluntary. Participants gave informal oral or written consent via telephone or email prior to the research pack being sent to them and subsequently

provided written consent to their participation which was returned to the lead researcher alongside their questionnaires once completed in full. Data was pseudo anonymised to protect participants identity and maintain their confidentiality. Participants names and addresses (participants were asked their electoral area in lieu of this) were not included on questionnaires with each centenarian being assigned a unique code. Returned questionnaires were stored in a locked cabinet within a secure room that had restricted access as per data protection guidelines. Participant lists and other identifiable information was kept separate to this also with security measures in place and access to these records was also restricted.

4.2.4 Data Collection

The data was collected using a self-administered questionnaire that was delivered via 'An Post' to the address provided by participants. The questionnaire adopted for use was adapted from the self-completed questionnaire (Waves 1-5) developed by The Irish Longitudinal Study on Ageing (TILDA). The modified questionnaire used (Appendix III) ensured that the focus remained specific to the aims of this study and social factors under investigation. The questionnaire was adapted so that it could be answered quickly and easily by the centenarian participants. In considering user accessibility and to maximise the return of completed questionnaires, most questions were tick-the-box style or used Likert or numerical type scales with minimal open-ended questions. To ensure both readability and suitability of the questionnaire, it was tested with a small sample of Irish older adults before being sent out to centenarian participants. A sample of older adults were used to test the questionnaire as opposed to a sample of centenarians due to the size of the overall centenarian population in the Republic of Ireland and the difficulty in accessing this vulnerable group.

Questions 1-12 captured information relating to participant's sociodemographic profile. Questions 13-25 related to participants childhood and Questions 26-30 introduced elements of their social relationships. Education was examined in Questions 31-34. Education was a multichotomous variable defined by highest level of education achieved across ten levels ranging from no school attendance to university level of education. Subsequent questions related to their satisfaction with their educational attainment and whether they would have pursued further education had it been made

available to them. Following on from this, participants were asked in relation to both their employment and retirement (Questions 35-41). Participants social engagement was looked at in Questions 42-45 and among these questions was open-ended question wherein were asked to provide further information on their hobbies and interests. This open-end style question was not part of the TILDA SCQ's but was included in this study order to keep the questionnaire concise and promote user accessibility without sacrificing the data returned. Several questions were asked in relation to participants religion and spirituality (Questions 46-50). Akin to the TILDA SCQ, attendance at religious services was measured by asking participants the frequency of their attendance at religious services. However, in this study, attendance was split into two questions as opposed to one (TILDA) so as to differentiate between the frequency of attendance prior to the Covid-19 pandemic and during the Covid-19 outbreak. Furthermore, a question was added to capture participants religious engagement outside of physical mass attendance through their frequency of listening to radio or televised broadcasts of religious services. This was added to capture organisational forms of religiousness in centenarians, whom due to the restrictions that arose from the pandemic could no longer attend organised religious services or may have been too physically frail generally thus attending services in person was no longer feasible for them. Information was also collected on participants housing status (Questions 51-55) and included questions on their type of residence, both past and present, who (if anyone) they lived with and their satisfaction with their living arrangements. Information on access to healthcare services (Questions 56-59) and participants self-rated health (Questions 60-61) was also captured. The prevalence of the Covid-19 virus at the time of launching this study presented the researcher with a unique opportunity to ask questions to ascertain the impact of the pandemic on participants lives. The questions based on Covid-19 in this questionnaire were adopted from TILDA's Covid-19 Study Questionnaire and included an additional open-ended question so that participants could explain specifically (should they wish to) the impact of the Covid-19 pandemic on their lives (Questions 62-64). Finally, participants were given the opportunity to provide any other information that they deemed relevant in an open-ended question to complete the questionnaire.

4.2.5 Data Analysis

Descriptive statistics were used to report means and percentages for each of the domains described for the whole sample and was also stratified by sex in some instances. All statistical analyses were performed using IBM SPSS Version 27.

4.3 Results

4.3.1 Participant Sample

While a total of seventy-eight centenarians were identified from the recruitment drive for this study, the final sample included forty-nine (n=49) community dwelling, generally healthy centenarians who were alive during the period of February 1st, 2021, to May 31st, 2022. As of March 2021, contact information was available online for three hundred and eighty-seven nursing homes in Ireland encompassing the twenty-six counties in the Republic via the Nursing Homes Ireland website (www.nhi.ie). Contact was made with all three hundred and eighty-seven facilities with three hundred and sixty-one being contacted via email and the remaining twenty-six for whom email information was not available, being contacted via phone by the researcher. As a result of this drive sixteen centenarians were identified with eleven of these centenarians being included in the final sample. Of the five nursing home dwelling centenarians not included in the final sample, two were deemed unsuitable due to advanced cognitive impairment thus were excluded, one declined to participate once the questionnaire had been received, one passed away prior to their completion of the questionnaire and one was unreturned without reason. It is important to note that only seventy-one nursing homes made return contact with the researcher following initial contact having been made. Given the anticipated high religiosity of this cohort, the diocesan offices for all twenty-six Catholic dioceses in Ireland were contacted via email so that an information bulletin detailing the study could be circulated to their parishioners. One participant was identified because of this action. Fifty-seven centenarians were identified via newspaper and media publications. Of this fifty-seven, twenty centenarians (and/or their significant other) did not respond to the initial contact made by the lead researcher. One centenarian requested further information and later declined to participate in the study. Two participants who had agreed to participate passed away prior to completion/return of their questionnaires. Finally, four

participants were identified via word of mouth thus completing the sample of forty-nine participants.

4.3.2 Sociodemographic Data

In total, forty-nine centenarians (n=49) participated in this study. Of these, thirty-seven participants identified as being female (n=37, 75.5%) and twelve identified as being male (n=12, 24.5%). Participants were aged between 100 and 106 years with a mean age of 100.96 years as highlighted in Table 4.1 below:

Table 4.1: Participants sociodemographic profile

		Male n=12 (24.5%)	Female n=37 (75.5%)	Total n=49 (100%)
Age (in years)	Mean (+SD)	100.91 ± 1.66	100.97 ± 1.39	100.96 ± 1.44
	Median	100.3	100.47	100.46
	Range (min/max)	100-105.5	100-106.7	100-106.70
Location of Birth	Home	11 (91.7%)	33 (89.2%)	44 (89.8%)
	Hospital	0	3 (8.1%)	3 (6.1%)
	Other	1 (8.3%)	1 (2.7%)	2 (4.1%)
Ever Married	Yes	12 (100%)	24 (64.9%)	36 (73.5%)
	No	0	13 (35.1%)	13 (26.5%)
Widowed	Yes	11 (91.7%)	24 (64.9%)	35 (71.4%)
	No	1 (8.3%)	0	1 (2%)
	Not Applicable	-	13 (35.1%)	13 (26.5%)
Children	Yes	12 (100%)	23 (62.2%)	35 (71.4%)
	No	0	14 (37.8%)	14 (28.6%)

Overall, 89.8% of participants had been born at home, 6.1% of participants were born in hospital and the remaining 4.1% stated 'other' when asked the location of their birth. Overall, there was good representation geographically in the study with participants having been born in twenty-one out of the twenty-six counties in Ireland. Counties in the West of Ireland accounted for the highest number of participants per county as Galway and Mayo each had 12.2% of the total study population reporting being residents there at the time of their birth. A full breakdown of the study population by their county of residence at the time of their birth can be seen in Appendix IV. Participants were also asked about their county of residence in childhood. In

comparison to that of their birth, there appeared to be little mobility for most participants (Appendix V).

Of the forty-nine participants, thirty-six had married (73.5%) of which twelve were male and twenty-four were female. Thirty-five of the thirty-six that had married were now widowed with only one male participant still married at the time of participation. As seen in Figure 4.1, the number of years widowed varied amongst participants:

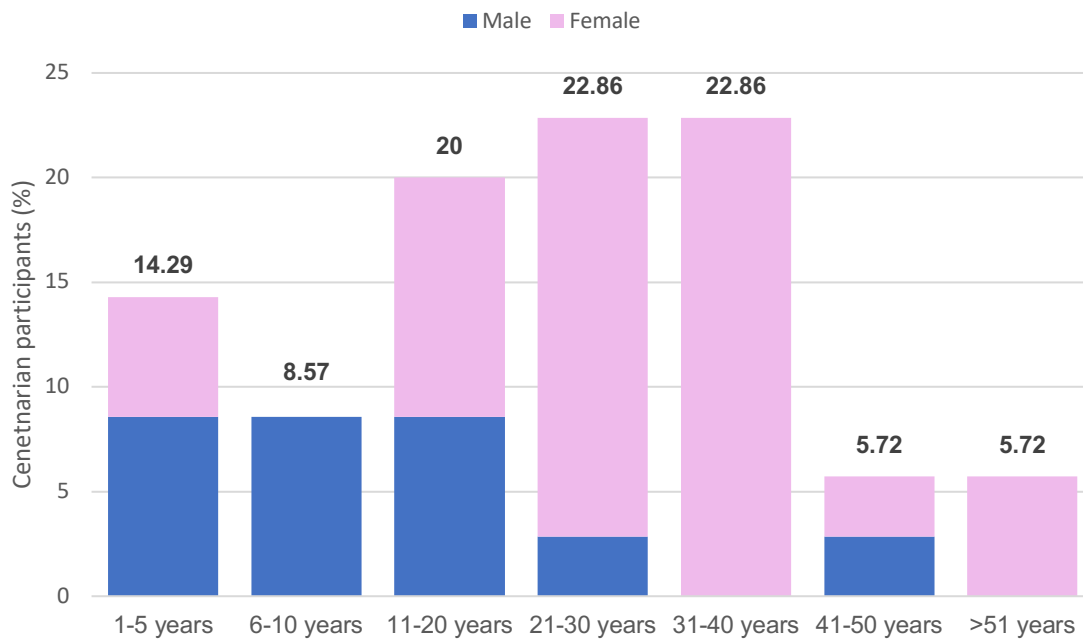


Figure 4.1: Number of years spent widowed by centenarian participants by gender

No participants had been separated or divorced in their lifetime. One participant stated they had a significant other whom they had never married, and this significant person was now deceased. Thirty-five participants had children (71.4%), and this ranged from having 1 child to having 11 children with the mean number of children being 4.83. Six centenarians (12.2%) had experienced the death of a child with 8.2% of these offspring deaths having occurred in infancy, 2% having happened during their child’s childhood and the remaining 2% occurring when their child was an adult. To capture the significance of other family members outside of the nuclear family, 89.8% of participants (n=44) agreed that they had other family members who were significant to them whilst 10.2% (n=5) said they hadn’t. Of these family members 12.2% (n=6) had also lived to see their hundredth birthday. Siblings of the centenarian participants comprised of most of these family members (n=4, 8.2%) with extended family

members (n=1, 2%) and grandparents (n=1, 2%) accounting for the rest. Interestingly, none of the participants parents had lived to see their hundredth birthday.

4.3.3 Socioeconomic Status in Childhood

In relation to their parent’s occupational status, when participants were asked if their parents worked, most participants (n=45, 91.8%) answered positively. Participants were then asked whether this work was outside of the home and according to participants, of their parents collectively, 51% did not work outside of the home. This is likely due to the high number of centenarian’s mothers who were identified as being housewives (65.2%) as seen in Table 5.2 and similarly, the high incidence of centenarian’s fathers being farmers (n=24, 49%) as seen in Table 4.3 thus resulting in them being predominantly around the homeplace:

Table 4.2: Occupation of the centenarian’s mother

	n=49	%
Housewife	32	65.2
Retail/Shop Worker	6	12.2
Not Specified	3	6.1
Draper/Dressmaker	2	4.1
Teacher	2	4.1
Hotelier	1	2.0
Cook	1	2.0
Farmer	1	2.0
Can't Remember	1	2.0

Table 4.3: Occupation of the centenarian's father

	n=49	%
Farmer	24	49.0
Tradesperson	5	10.2
Hospitality/Retail Worker	4	8.2
Defence/Armed Forces	4	8.2
Hospitality/Retail/Business Manager	4	8.2
Financial Industry	2	4.1
Railway Worker	2	4.1
Civil Servant	1	2.0
Hospital Porter	1	2.0
Tailor	1	2.0
Teacher/Headmaster	1	2.0

Interestingly, although twenty-four participants had fathers with an occupation of farmer when asked about their upbringing, 61.2% (n=30) of the total study population reported having been brought up on a farm. Of the thirty participants who reported having had a farm upbringing, twenty-nine participants (59.2%) had parents who owned their land whilst one (2%) participants' parent's farmed land that was rented. Although overall the size of the farms owned by participants' parents varied, it was noted that farms between 11-30 acres were the most common (Table 4.4):

Table 4.4: Size of parents' farm (in acres)

	n=30	%
1-5 Acres	5	16.7
6-10 Acres	4	13.3
11-30 Acres	6	20
31-55 Acres	3	10
56-75 Acres	2	6.7
100+ Acres	1	3.3
Can't Remember	9	30

In further exploring their economic position in childhood, participants were asked whether or not they could recall any worries or concerns regarding finances that they were aware of growing up. Interestingly, despite the well documented conditions of poverty in Ireland at that time, 65.3% (n=32) answered 'no' to this question.

4.3.4 Relationships and Social Connectedness

Participants were asked several questions in relation to the significant relationships in their lives. The first number of questions related specifically to their siblings, and included questions which asked them to specify where they came in order with their siblings, whether or not their siblings were still alive today and the gender of their surviving siblings. The number of siblings ranged from zero to thirteen for participants with almost half of the participants having between four and six siblings as seen in Figure 4.2:

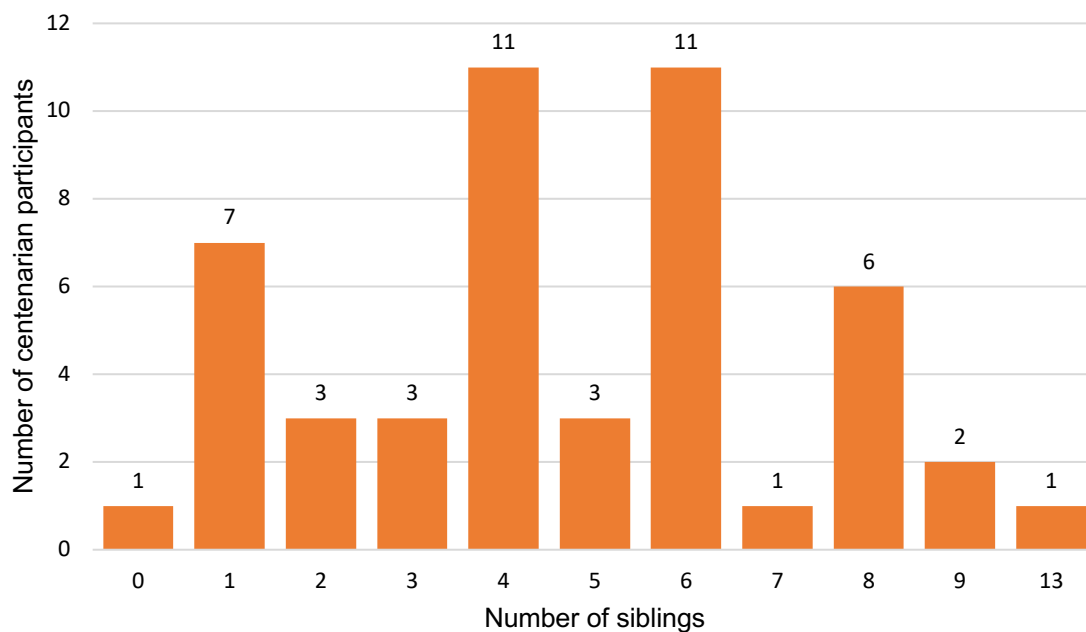


Figure 4.2: Number of siblings had by centenarian participants

As seen in Table 4.5, almost an equal number of centenarians were either among the oldest (n=23, 46.9%) or the youngest children (n=22, 44.9%) in their households with only one participant (n=1, 2.0%) being positioned in the middle:

Table 4.5: Position of centenarian in family amongst their siblings

	n=49	%
Oldest	23	46.9
Middle	1	2.0
Youngest	22	44.9
Only Child/Twin Sibling	2	4.1
Not Specified	1	2.0

Of those who had siblings (n=48) most participants had outlived their siblings with 73.5% (n=36) of centenarians having no surviving siblings at the time of completing the questionnaire. Of the remaining 24.5% (n=12) that did have siblings still alive, all participants except one were older than their surviving siblings. It is interesting to note that when split by gender, 41.7% (n=5) of males had siblings still alive at the time of participation in comparison to 18.9% (n=7) females as seen in Table 4.6:

Table 4.6: Sex breakdown of centenarians with surviving siblings

	Male n=12 (%)	Female n=36 (%)	Total n=48 (%)
Yes	5 (41.7%)	7 (19.4%)	12 (25%)
No	7 (58.3%)	29 (80.6%)	36 (75%)

To evaluate their social relationships centenarians were asked by the researcher whether they felt that they had good friend(s) throughout their lives, most participants answered favourably with 61.2% (n=30) answering strongly agree to the statement as seen in Figure 4.3:

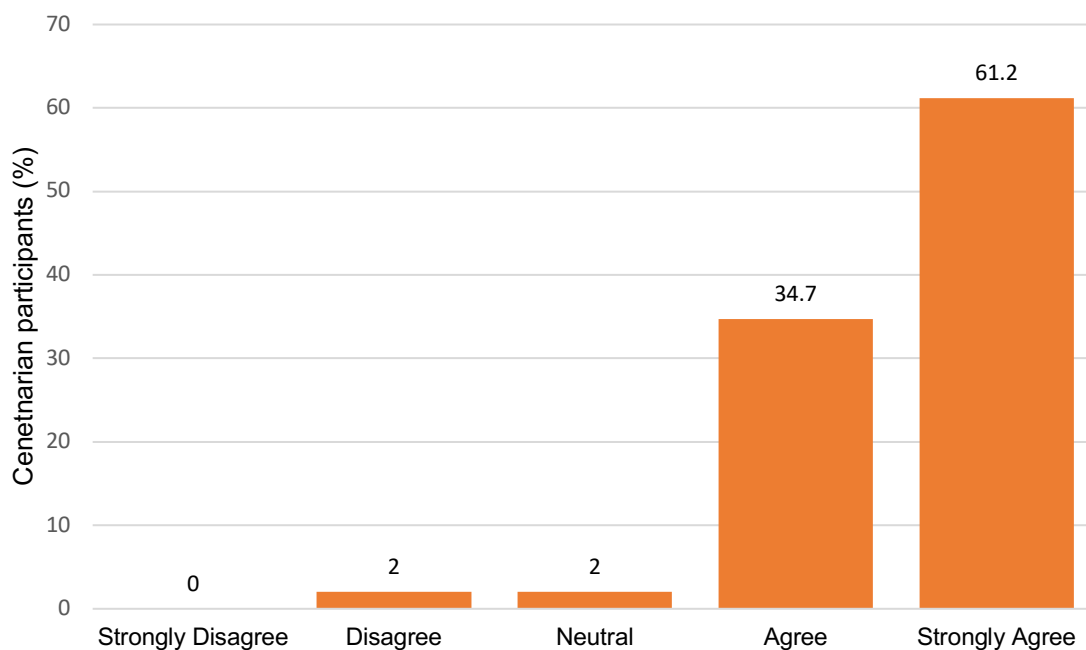


Figure 4.3: Centenarian participants ratings of whether or not that they felt like they had good friend(s) throughout life

Similarly, participants were asked whether these friend(s) had been important in their lives and again most participants agreed with the statement (Table 4.7):

Table 4.7: Centenarian participants ratings of the importance of friendships to the centenarian throughout their life

	n=49	%
Strongly Disagree	0	0
Disagree	0	0
Neutral	3	6.1
Agree	20	40.8
Strongly Agree	26	53.1

When asked if they felt that they had family/friends or other persons to whom they could turn to or rely on throughout their life. As seen in Table 4.8, there was a strong response from both genders to this question with 51% (n=25) strongly agreeing and 46.9% (n=23) agreeing overall:

Table 4.8: Centenarian participants rating of whether or not they had family/friends or other persons to whom they could turn to or rely on throughout their life

	Male n=12 (24.5%)	Female n=37 (75.5%)	Total n=49 (100%)
Strongly Disagree	0 (0%)	1 (2.7%)	1 (2%)
Disagree	0 (0%)	0 (0%)	0 (0%)
Neutral	0 (0%)	0 (0%)	0 (0%)
Agree	8 (66.7%)	15 (40.5%)	23 (46.9%)
Strongly Agree	4 (33.3%)	21 (56.8%)	25 (51%)

Participants were also asked if they had often felt lonely at times throughout their lives. As seen in Table 4.9, over 60% of participants denied having felt often lonely throughout their lives as most participants either strongly disagreed (n=14, 28.6%) or disagreed (n=17, 34.7%) with this statement:

Table 4.9: Centenarian participants reporting of feelings of loneliness

	Male n=12 (24.5%)	Female n=37 (75.5%)	Total n=49 (100%)
Strongly Disagree	2 (16.7%)	12 (32.4%)	14 (28.6%)
Disagree	7 (58.3%)	10 (27%)	17 (34.7%)
Neutral	2 (16.7%)	5 (13.5%)	7 (14.3%)
Agree	1 (8.3%)	7 (18.9%)	8 (16.3%)
Strongly Agree	0 (0%)	3 (8.1%)	3 (6.1%)

When asked if they felt connected to those around them, most participants (83.7%) answered positively (Figure 4.4):

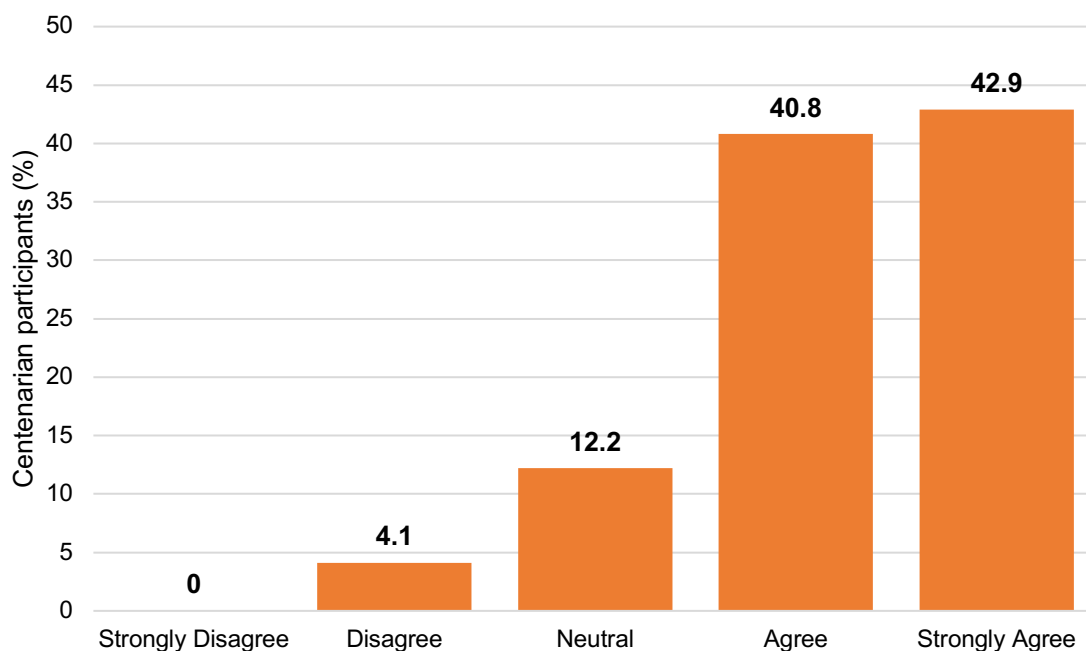


Figure 4.4: Centenarian's feelings of connectedness to those around them

4.3.5 Education

A number of questions were asked in relation to the domain of education including what age the centenarian was on leaving formal education. As seen in Table 4.10 below, most participants indicated that they left school between the ages of 17 to 19 years (n=17, 34.7%):

Table 4.10: Age at which centenarian participants reported leaving formal education

	Male n=12 (24.5%)	Female n=37 (75.5%)	Total n=49 (100%)
<10 Years	0 (0%)	1 (2.7%)	1 (2.0%)
11-13 Years	4 (33.3%)	4 (10.8%)	8 (16.3%)
14-16 Years	2 (16.7%)	11 (29.7%)	13 (26.5%)
17-19 Years	3 (25.0%)	14 (37.8%)	17 (34.7%)
20-22 Years	0 (0%)	5 (13.5%)	5 (10.2%)
23-25 Years	1 (8.3%)	1 (2.7%)	2 (4.1%)
26+ Years	2 (16.7%)	0 (0%)	2 (4.1%)
Not Specified	0 (0%)	1 (2.7%)	1 (2.0%)

Participants were also asked what was the highest level of education that they achieved and as shown in Table 4.11, their educational attainment varied:

Table 4.11: Educational attainment of the centenarian

	Male n=12 (24.5%)	Female n=37 (75.5%)	Total n=49 (100%)
Primary School (did not receive Primary School Certificate)	3 (25.0%)	5 (13.5%)	8 (16.3%)
Primary School (received Primary School Certificate)	3 (25.0%)	7 (18.9%)	10 (20.4%)
Secondary School to Intercert	0 (0%)	4 (10.8%)	4 (8.2%)
Secondary School to Leaving Certificate	1 (8.3%)	4 (10.8%)	5 (10.2%)
Technical College	0 (0%)	4 (10.8%)	4 (8.2%)
Nursing Qualification	0 (0%)	5 (13.5%)	5 (10.2%)
Apprenticeship/Trade	2 (16.7%)	0 (0%)	2 (4.1%)
University	2 (16.7%)	3 (8.1%)	5 (10.2%)
Other	1 (8.3%)	5 (13.5%)	6 (12.2%)

Of the six (12.2%) who specified other, one completed G.C.S.E's, four participants attended secretarial school/college and one attended agricultural college to study home economics. When asked if they would have liked to have obtained a higher level of education most participants (n=34, 69.4%) answered no indicating they were content with their educational attainment. Almost half (46.7%) of participants who would have liked to have achieved a greater level of education cited lack of finances

as being the primary reason for them not having pursued education further (Table 4.12):

Table 4.12: Reasons given by the centenarian participants as to why they did not pursue education further

	n=15	%
Lack of money	7	46.7
Farm responsibilities	2	13.3
Wasn't given the option	2	13.3
Not Specified	2	13.3
Assumed caregiver duties	1	6.7
Lack of confidence	1	6.7

4.3.6 Work Life in Adulthood and Economic Status

Almost all participants (n=47, 95.9%) engaged in some form of work immediately after completion of their education. The occupational categories held by participants varied widely as seen in Table 4.13. Due to the diverse nature of their employment, centenarian participants' occupations were categorised according to SOLAS Employment by Occupation Groupings (SOLAS, 2022) (Appendix VI):

Table 4.13: Occupation categories of the centenarian on completion of formal education

	Male n=12 (24.5%)	Female n=37 (75.5%)	Total n=49 (100%)
Professionals	4 (33.3%)	7 (18.9%)	11 (22.4%)
Associate Professionals	0 (0%)	2 (5.4%)	2 (4.1%)
Administrative and Secretarial	0 (0%)	7 (18.9%)	7 (14.3%)
Skilled Trades	8 (66.7%)	3 (8.1%)	11 (22.4%)
Caring, Leisure and Other Services	0 (0%)	5 (13.5%)	5 (10.2%)
Sales and Customer Services Operations	0 (0%)	3 (8.1%)	3 (6.1%)
Elementary Occupation	0 (0%)	9 (24.3%)	9 (18.4%)
Not Specified	0 (0%)	1 (2.7%)	1 (2.0%)

Appendix VII provides a more in-depth list of the specific occupations held by each of the centenarian participants. According to the SOLAS Employment by Occupation Groupings, the occupation of farmer is categorised amongst skilled trades. Given the high incidence of farm upbringing and centenarians father's occupations as farmers, it was interesting to note that just two participants went on to become farmers themselves in adulthood. This is likely explained by the intergenerational tradition in Ireland of family farms being passed on to males (usually the eldest son) and the high number of female participants in this study.

If participants were a stay-at-home parent/homemaker was another question asked in relation to work life in adulthood. Eighteen participants answered yes (36.7%) and thirty-one answered no (63.3%) to this question. When asked if they would have liked to have had a different job or career, 33 participants (67.3%) answered no while the remaining 16 (32.7%) answered yes. Participants were also asked if they enjoyed their work. The majority of participants appeared content with their work, answering either strongly agree (n=25, 51%) or agree (n=20, 40.8%), with the remaining (n=4, 8.2%) stating that they were neutral to this statement. Participants were also asked in relation to their retirement and at what age they retired. Figure 3.5 provides a breakdown of participants retirement age for both the whole sample and stratified by sex. While most participants retired at 62 years plus with 28.6% (n=14) having retired between 62 and 67 years and a further 28.6% (n=14) having retired at an age older than 67 years, considerable sex differences were observed. All participants that retired before 62 years were female, however this was to be expected given the custom and practice of that time for women having to leave the workforce once married. Two female participants both of whom were housewives, despite their advanced age, stated that they had yet to retire (Figure 4.5):

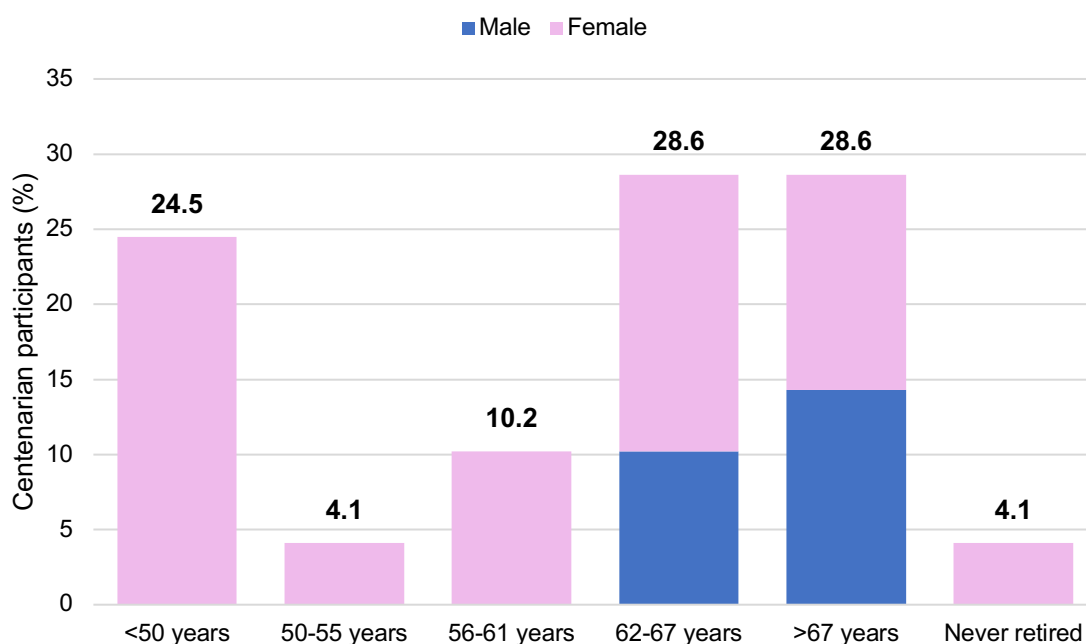


Figure 4.5: Retirement age groupings of centenarian participants by gender

4.3.7 Continued Engagement with Life

Following on from questions asked in relation to their retirement, participants were asked if on retiring they had engaged in any or all of several listed activities. All participants answered this question with most (n=42) reporting having engaged in more than one of the activities listed (Table 4.14):

Table 4.14: Activities engaged in on retirement by centenarian participants

	n	%
Engaged in existing hobbies	30	61.2
Travel (in Ireland)	30	61.2
Took up new hobbies	25	51.0
Travel (abroad)	24	49.0
Family duties	21	42.9
Social organisations	20	40.8
Volunteering	15	30.6
Sports	7	14.3
Other	7	14.3
Other employment	4	8.2

A number of activities constituted 'other' for participants with them specifying activities such as bird watching (n=1), hill walking (n=1), pursuing further education (n=1),

involvement in church/religious groups (n=2) and taking up marathon running (n=1). Participants were then asked if throughout their lives they had been engaged in organisations, clubs, or societies in their communities. Most participants appeared to have been well connected within their communities as 81.6% (n=40) answered yes. However, when asked if they were still members of such organisations, those that said yes were in the minority (n=10, 20.4%) as most (n=39, 79.6%) stated that they were no longer involved. Participants were also asked if throughout their lives they considered themselves as having had many hobbies or interests outside of their own homes. Thirty-three participants (67.3%) agreed that they had whilst sixteen (32.7%) admitted to not having possessed such hobbies or interests in their lifetimes.

4.3.8 Importance of Religion and Spirituality

When asked whether or not they identified as being religious or spiritual, 49% (n=24) reported identifying as religious, 40.8% (n=24) identified as both religious and spiritual, 6.1% (n=3) identified as spiritual and 4.1% (n=2) identified as being neither. Figure 4.6 offers an overview of centenarian participants religious and or spiritual identities:

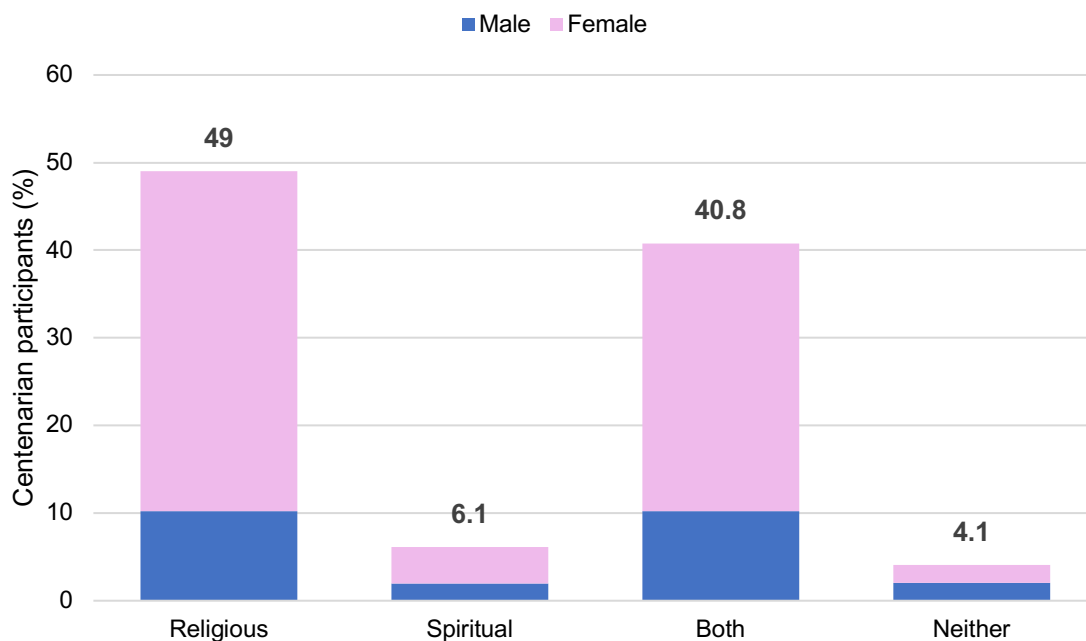


Figure 4.6: Religious/spiritual identity of the centenarian

Participants were then asked if they felt that their religion/spirituality played a very important role in their lives. As seen in Table 4.15 the majority of participants felt that religion/spirituality did indeed play a significant role in their lives:

Table 4.15: Importance of religion/spirituality for centenarians in their lives

	Total n=49 (100%)	Male n=12 (24.5%)	Female n=37, (75.5%)
Strongly Disagree	1 (2.0%)	1 (8.3%)	0 (0%)
Disagree	1 (2.0%)	0 (0%)	1 (2.7%)
Neutral	3 (6.1%)	1 (8.3%)	2 (5.4%)
Agree	12 (24.5%)	5 (41.7%)	7 (18.9%)
Strongly Agree	32 (65.3%)	5 (41.7%)	27 (73.0%)

Religious participation through frequency of attendance at religious services was also measured amongst participants. Table 4.16 depicts participants attendance at religious services/places of worship both during their adulthoods generally and their attendance immediately prior to the Covid-19 outbreak:

Table 4.16: Centenarian’s attendance at religious services/places of worship

	Throughout Adulthood n=49 (100%)	Prior to Covid-19 n=49 (100%)
Daily	9 (18.4%)	5 (10.2%)
4-6 days a week	4 (8.2%)	2 (4.1%)
2-3 days a week	9 (18.4%)	4 (8.2%)
Once a week	6 (12.2%)	13 (26.5%)
On Sundays only	15 (30.6%)	11 (22.4%)
2-3 times per month	3 (6.1%)	3 (6.1%)
Once per month	3 (6.1%)	5 (10.2%)
Never	0 (0%)	6 (12.2%)

Participants engagement with religion outside of their physical attendance was also captured through asking whether or not they participated with mass and religious services broadcast either on the radio, television, or both. Overall, there was high engagement in this domain with 30.6% of participants reporting that they did both, 26.5% reporting watching mass/religious services on television only, 24.5% reporting

listening to mass/religious services on the radio and 18.4% reporting that they don't engage in either.

4.3.9 Housing Status

In relation to housing status, participants were first asked in relation to what dwelling type they lived in growing up. The vast majority of participants (n=42, 85.7%) reported having lived in property that was owned by their parents followed by a number of participants who lived in property rented by their parents (n=6, 12.2%). One participant (2%) reported having lived in property owned by their grandparents. When asked what type of property they lived in at their time of participation, over half of participants (53.1%) reported that they lived in their own homes, 38.8% of participants lived in long term residential care, 4.1% lived in property owned by family and another 4.1% lived in religious convents.

The question of who (if anyone) participants were residing with was also asked. At the time of participation 53.1% of participants said that they were living with another person(s). When asked in relation to who they were living with, 24.5% specified that they were living with other residents within their care facilities, 16.3% were living with one of their children, 4.1% were living with a sibling, 2% were living with their spouse, 2% were living with members of a religious order and 2% were living with a live-in carer. Participants were then asked if they were happy with where they were currently living. As per Figure 4.7, the majority of participants (n=28, 57.1%) strongly agreed with being happy with their current residential status, however, 6.1% (n=3) either disagreed or strongly disagreed with this statement:

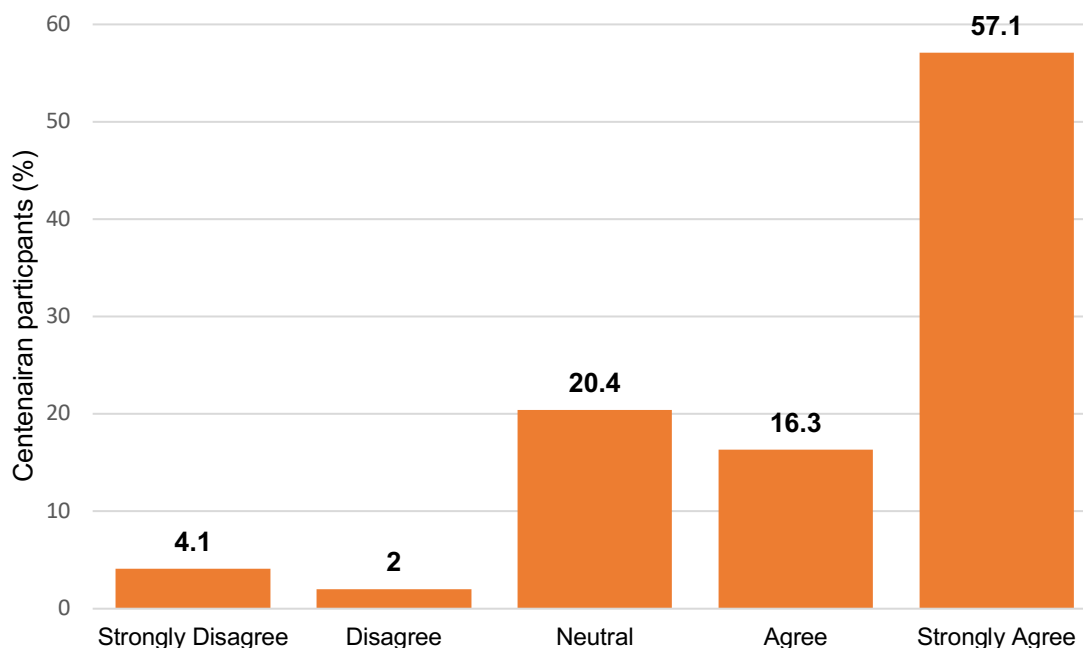


Figure 4.7: Centenarian’s feelings about their happiness with current residence

4.3.10 Self-rated Health and the Covid-19 pandemic

Participants were asked if they were in receipt of a care service from the Health Service Executive (HSE) or another home care provider with 59.2% (n=29) answering no and the remaining 40.8% (n=20) confirming that they were in receipt of such services. Participants were then asked in relation to what type of healthcare access they had. Most participants reported having public access (n=39, 79.6%) while 10 participants (20.4%) reported having private healthcare at the time of participation. The question of whether participants always this type of healthcare was also asked, and the majority of participants answered yes (n=43, 87.8%) while only 6 (12.2%) participants answered no. Participants were also asked whether they agreed that they had had good access to healthcare throughout their lives. As seen in Table 4.17, over half of participants (n=26, 53.1%) agreed with this statement:

Table 4.17: Did centenarians feel they had good access to healthcare throughout life

	n=49	%
Strongly Disagree	1	2.0
Disagree	1	2.0
Neutral	4	8.2
Agree	26	53.1
Strongly Agree	17	34.7

Self-rated health (SRH) is an inclusive measure of health that reflects a cognitive process that intertwines like with like comparison among peers, expectations, experiences, and cultural health norms, as well as several other factors (Jylha, 2009). The attractiveness of this measure is based upon its straightforwardness as usually it is asked through a single question about one’s own perception of their health rated on a four or five-point scale and as well as its ability to predict well-being and mortality across all ages. Participants were asked how they would rate their health throughout their lives. Of the study sample, 30.6% rated their health as being excellent, 46.9% perceived their health as being very good, 20.4% deemed it as good and 2% deemed their health as being fair. No participants rated their health as being poor throughout their lifetime. Following on from this, participants were asked to rate their health in the present day (at the time of participation). As seen in Table 4.18, most participants perceived their health favourably:

Table 4.18: Centenarian participants self-rated health at aged 100+ years

	n=49	%
Excellent	2	4.1
Very Good	17	34.7
Good	12	24.5
Fair	14	28.6
Poor	4	8.2

Given the prevalence of the Covid-19 pandemic during the time of data collection for this study, this topic was explored briefly. Participants were first asked to rate on a scale of one to ten how concerned they were about the pandemic with one being least worried and ten being most worried. As seen in Figure 4.8 while there were mixed responses given by participants:

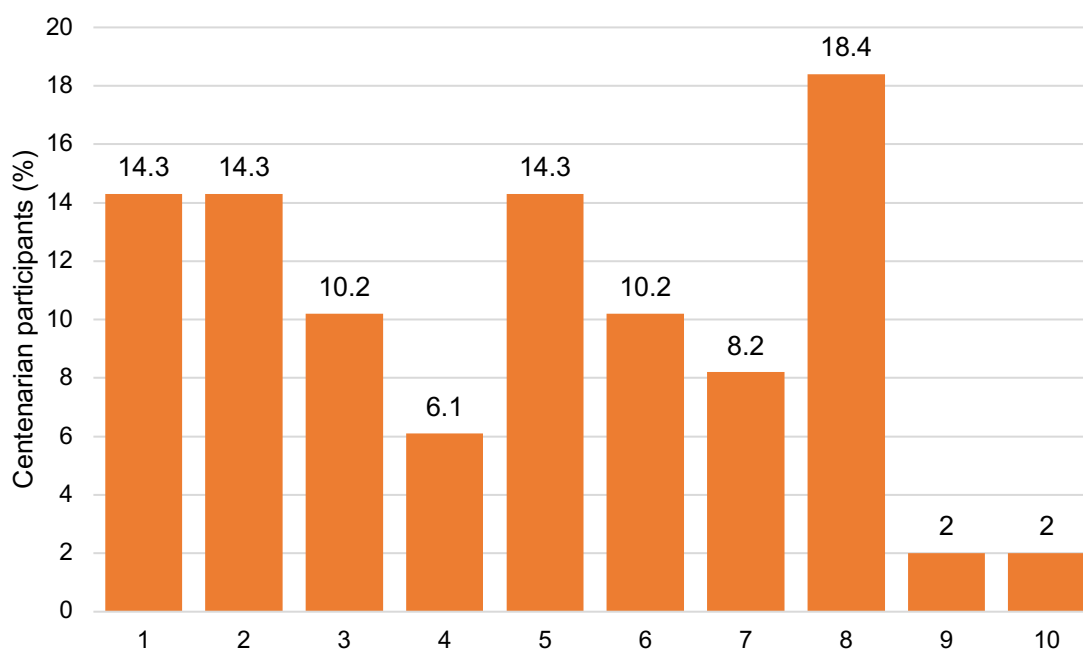


Figure 4.8: Rating of concerns on a scale of one to ten regarding the Covid-19 pandemic (one being least concerned, ten being most concerned).

Participants were also asked if they felt that the Covid-19 pandemic had had an impact on their lives. Most participants (34.7%) agreed that the pandemic had had an effect on their lives, 26.5% strongly agreed with this statement while 22.4% were neutral on this matter. A small number of participants either disagreed (10.2%) or strongly disagreed (6.1%) that the outbreak had influenced their lives in any way. Finally in relation to Covid-19, participants were also given the opportunity to further explain the specific impact that the pandemic had on them through an open-ended question. Of the total participants (n=49), 45 participants opted to answer this question. A number of these participants (n=4) stated that they didn't feel that the Covid-19 pandemic had had an impact on their lives. For a smaller number of participants (n=2) while they did express having been worried about the pandemic, they also commented how they considered themselves to have been lucky in that they had been living with their families. The remaining participants (n=37) highlighted several of the negative impacts experiences as a result of the pandemic. The majority of these related to decreased opportunities for socialisation and engagement and are highlighted in Table 4.19:

Table 4.19: The impact of Covid-19 on the lives of the centenarian participants as reported by the centenarians

	n	%
Missed family and friends	26	70.3
Unable to go out and having to cocoon	11	29.7
Increased worry (about self-and/or others)	7	18.9
No visitors	6	16.2
Unable to engage with religion in person	6	16.2
Feelings of loneliness increased	4	10.8
Impact on homecare visits	4	10.8
Unable to attend day-care services	3	8.1
Window visits were terrible	3	8.1
Fear and lack of understanding	3	8.1
Feeling frustrated	2	5.4
Impact on own health	2	5.4
Lack of freedom	2	5.4
No one called to the house	2	5.4
Uncomfortable with masks	2	5.4
Disruption to healthcare services	1	2.7
Missed celebrating milestone birthday	1	2.7

4.3.11 Qualitative Reflections

A final open-ended question was asked to complete the questionnaire. For this the participants were asked if there was anything else they would like to share at this time. A total of nineteen participants took the opportunity to share their thoughts. The answers to this question were analysed qualitatively using Braun and Clarke's (2022) method of reflexive thematic analysis. In total three themes were developed from the answers provided, namely, (1) Having lived a good life, (2) Being thankful for family, and (3) Grief and loss.

Lived a good life

Many participants that engaged with this question spoke about their contentment with their lives lived and expressed feelings of appreciation and enjoyment in their journey to one hundred as seen in the examples given in Table 4.20:

Table 4.20: Centenarian accounts of being thankful for the lives they have lived

"I feel like I've been very privileged and lived a good life. I feel God has been very good to me... Being a biochemist I would have an appreciation of life in general" (C5, 106 years)

"I would like to say that I have enjoyed my life in my own little way..." (C9, 100 years)

"I had a great life" (C12, 100 years)

"I am very lucky to have enjoyed such a great long life and living here with my son and daughter in law and two grandchildren and an excellent carer. I am comfortable and looked after so well it's a blessing at the end of my days" (C13, 105 years)

"I feel wonderful reaching 100, I gave up the cigs, but I would like to get on them again. I feel marvellous, feel like I've outlived the lot of you and able to keep all my own hair and have my own teeth" (C18, 100 years)

"I am happy with how I lived" (C23, 100 years)

I have lived a good life..." (C42, 105 years)

Being thankful for family

A number of participants also highlighted their gratitude and thanks for their family in answering this question. The love held by participants for their families was a sentiment shared by many and this selection of participants commented on how they were lucky to have such close people in their lives (Table 4.21):

Table 4.21: Centenarian participants expressions of thanks for their families

"... I am blessed with a very supportive family" (C10, 100 years)

"I am happy and love my family. I love my grandchildren" (C14, 102 years)

"I am lucky to have such a big family and to be involved in their lives" (C37, 100 years)

"I have had a good life... I have a good family and that is some comfort" (C47, 100 years)

Grief and loss

Coping with grief and loss was also a topic introduced by participants in sharing their parting thoughts with a number of them reflecting on their experiences of bereavement in life as almost all have outlived parents, siblings, spouses, friends, and other significant persons in their lifetimes as seen in Table 4.22:

Table 4.22: Centenarians sharing their feelings of grief and loss

“All my sisters and husband have passed away and I miss them every day” (C10, 100 years)

“The only loss was my wife’s death when she was 59 years old” (C13, 105 years)

“I am happy to have reached this age, but I wish that my husband was still alive. Losing him is definitely the hardest thing about getting older...” (C37, 100 years)

“I miss my wife every day. If it was not for her, I don’t think I would still be alive. She was a very special person and I owe everything to her love and devotion” (C46, 100 years)

“It was not always easy in Ireland in the 1950s but (husband) and I made the best of it. We were married for almost 67 years until he died in 2019 at 98 years of age but that was too soon for me. I will always miss him” (C47, 100 years)

4.4 Discussion

As aforementioned, there exists a dearth in knowledge relating to the Irish centenarian population in their entirety. In acknowledging this, this study aimed to contribute to the knowledge base on Irish centenarians by advancing scholarship in Irish centenarian research with a specific lens on social factors and how they may contribute to the attainment of longevity for the Irish centenarian population. Additionally, this study is important in establishing areas for consideration in future gerontological research in the Republic of Ireland and in planning for the future generations of Irish older people to come. This is the first primary study conducted on Irish centenarians and provides valuable information on both their sociodemographic characteristics and the influence of social factors in their lives.

With regard to the sociodemographic profile of this group, women outnumbered men and the female to male ratio was approximately 3:1 (37 women/12 men). Women represented 75.5% of the centenarian participants which is broadly reflective of the feminisation of the oldest old in Europe. It is significant to note that this sex ratio is also reflective of centenarian populations generally and parallels that of other centenarian studies (Tigani *et al.*, 2012; Teixeira *et al.*, 2017) as well as that of the overall Irish centenarian population wherein 81.6% of centenarians are female (n=372) and 18.4% (n=84) are male (Central Statistics Office, 2016). From a geographical perspective while overall there was good representation in this study with participants having been born in twenty-one out of the twenty-six counties of in Ireland, it was noted

that counties in the West of Ireland accounted for the highest number of participants per county with Galway and Mayo each reporting 12.2% of the total study population being residents there at the time of their birth. A full breakdown of the study population by their county of residence at the time of their birth can be seen in Appendix IV. However, these results should not be taken as being reflective of the overall county by county prevalence of centenarians in Ireland but instead as a snapshot into the participant sample. In terms of residence what was interesting to note was the limited residential mobility of the participant sample throughout life given that research has highlighted how residential mobility can disrupt social networks, emotional ties, family routines, and schooling, all of which have been attributable to longevity (Mollborn *et al.*, 2018; Oishi and Tsang, 2022). Another noteworthy observation was the difference in the number of participants whose fathers were farmers (n=24) when compared with the number of those reporting having been brought up on a farm (n=30). This is likely explained by the rurality of the participants upbringing and the custom and practice of self-sufficiency of many rural dwellers of that time. It is assumed that the farm on which these participants grew up was sized only to meet their own family's needs and as such their father did not earn an income from his farm and so held other employment.

As expected, and in keeping with the literature, maintaining meaningful social contacts with others, and having a supportive social network proved to be of significance for centenarians in the Republic of Ireland. Previous research has highlighted the paramount importance of these factors in sustaining quality of life for older persons (Bishop *et al.*, 2006). Contact with family, neighbours, friends, and other significant people is essential in positively supporting one's longevity (Becker *et al.*, 2019; Wang *et al.*, 2020). The argument can be made in favour of this for Irish centenarians' as it was reported both quantitatively and qualitatively in this study. When asked if they had had good friends throughout their lives 86% of participants answered favourably. These sentiments were repeated by participants when asked if they felt these friends were important in their lives as 94% agreed with this statement. In a similar way, qualitatively, a select number of participants expressed gratitude towards their families. International centenarian research has shown that having children can also be important for this cohort: centenarians' children were the primary source of support for participants of the Heidelberg Centenarian study (Boerner *et al.*, 2016; 2019); the absence of children's support was also associated with loneliness and social isolation

in several early studies of the oldest-old (Wegner *et al.*, 1996). In addition, how near centenarians lived to their children and how often they were visited by them were associated with decreasing feelings of loneliness among Chinese oldest-old (Liu *et al.*, 2012).

Research has shown how social isolation and loneliness can have severe adverse effects on both health and quality of life for older people (Courtin and Knapp, 2017). The need for an awareness of both the concept of social isolation and loneliness becomes increasingly important as one ages and given the ongoing increases seen in life expectancies, the significance of these concepts cannot be underestimated. The degree to which social isolation and loneliness impact mortality risk is comparable to that of other well-established risk factors, such as smoking or obesity (Beland *et al.*, 2005; Boden-Albala *et al.*, 2005; Holt-Lunstad *et al.*, 2010; Steptoe *et al.*, 2013). According to Dykstra (2009), loneliness is more prevalent in the oldest-old than it is in the younger-old (Dykstra, 2009), and the risk for social isolation tends to be exacerbated with increasing age (Cudjoe and Kotwal, 2020; Cudjoe *et al.*, 2020). This was confirmed within the Irish content in a study by Ward *et al.*, (2019) as part of the Irish Longitudinal Study on Ageing (TILDA) wherein they found that both emotional loneliness and social isolation were associated with poorer physical and psychological wellbeing, as well as quality of life in older Irish adults.

It was interesting to note that most centenarian participants when asked if they had people to whom they could turn to or rely on throughout their lives, almost all participants (97.9%) answered favourably. Similarly, when asked if they had felt lonely at times throughout their lives the greater majority (63.3%) denied such feelings and furthermore 84% of centenarian participants reported feeling well connected to those around them. These findings somewhat contradict the findings of TILDA researchers wherein almost one third of adults aged 50+ in Ireland experienced emotional loneliness. They also found that loneliness did not increase linearly with age but decreased from 50 years to 67 before increasing in older age with those aged 75 years and older were more likely than younger participants to report being moderately lonely (Ward *et al.*, 2019). Contrastingly however, in another TILDA study that was limited to older adults that were 70+ years, 71% of participants hardly ever or never feel lonely;

less than a quarter (24.0%) reported feeling lonely some of the time; and just 5% said they often feel lonely which is comparable to this study's results.

It is not surprising then that for this centenarian sample, when asked in relation to the impact of the Covid-19 pandemic on their lives, the most frequently voiced concerns related to the changes to their socialisation. Research continues to highlight the way by which the Covid-19 pandemic including society's response has had indirect effects on people's lives – sometimes referred to in terms of collateral damage (Dahlberg, 2021). Akin to much research concerning the older person (Berg-Wegner and Morley, 2020; Hwang *et al.*, 2020; Rodney *et al.*, 2021; Wister *et al.*, 2023), centenarian participants concerns included, missing their family and friends (70.6%), disliking having to cocoon (29.7%) and experiencing feelings of increased loneliness (10.8%). Such findings are in line however with data on the Covid-19 pandemic and the negative social implications it had for older people (Callow *et al.*, 2020; Van der Roest *et al.*, 2020).

Loss and widowhood have garnered significant attention in research concerning potential determinants of loneliness in older person populations (Savikko, *et al.*, 2005; Coll-Planas *et al.*, 2021; Noone and Yang, 2022). It is common for older persons to experience bereavement and loss of those closest to them, including spouses, close family members and friends (Donovan and Blazer, 2020) and one must recognise that with increased longevity attainment comes the potential for increased loss and oftentimes centenarians will outlive most of the significant people in their lives (Zaccaria *et al.*, 2022). In the Newcastle 85+ study widowhood was proven to be a strong predictor of increased loneliness (Brittain *et al.*, 2017). However, in considering the rate of widowhood amongst this sample and their perceptions of non-loneliness, our study supports findings of a more recent study of older adults in China by Yang and Gu., (2021) which highlighted that although widowhood was significantly correlated with loneliness in Chinese older adults, the effects of widowhood on loneliness decreased with age. Thus, it could be argued that placing emphasis on developing and maintaining relationships with others throughout life may offers protective factors as one gets older. Ultimately however, while grief and loss through bereavement did emerge through the qualitative reflections shared by a small number of participants, the impact of such loss on the at this stage in late adulthood cannot be

generalised and further research would need to be done in an Irish context to explore any linkage further.

In terms of educational attainment, all participants (n=49) had attended formal schooling, albeit for various time periods. Such variance is not restricted to Ireland however, as in a study conducted by Teixeira *et al.*, (2017) that examined centenarian populations in Europe, considerable differences in educational status among centenarian populations generally can be seen. On average, 13.6% of centenarians in Europe had received no formal education (Teixeira *et al.*, 2017). In Europe, Southern countries such as Portugal, Spain and Greece presented the lowest education levels while Northern countries namely Finland, the United Kingdom and Iceland presented the highest education levels. Over half of centenarians in Southern countries listed had no formal education attainment (Portugal: 61.6%; Spain: 55.7%, Greece: 52.7%) and about one third to one fourth had only primary level education (Portugal: 31.3%; Greece: 30.4%; Spain: 26.6%) (Teixeira *et al.*, 2017). What is significant to note, is that amongst our sample of Irish centenarians, when compared to these Southern countries, a higher number of Irish centenarians reported having only achieved primary level education (36.7%). In the countries where educational attainment was at its peak (Finland, the United Kingdom, Iceland), it was noted that all centenarians had at least lower secondary education (78.5%, 78.7% and 82.6%, respectively). Interestingly, while the number of centenarians who achieved only primary education in Ireland exceeded that of the countries with the lowest education status in Europe, it was observed that among the remaining Irish centenarians (63.3%), all had obtained at least lower-level secondary education thus situating Ireland among the countries with median education levels.

Given the various types and means of employment for participants, the idea of retirement was of particular interest among this centenarian sample. One of the concerns of an increasing older persons population and a higher incidence of centenarians is the realistic sustainability of current pension commitments and indeed retirement age (Cox and Beland, 2013; Nagarajen *et al.*, 2016). Retirement is associated with considerable adjustments to financial, physical, and mental wellbeing, daily activities, and health-related behaviours of individuals (Ward, 2019). According to TILDA data, in 2009, 50% of their participants aged 50 to 67 years remained in

employment while 18% had retired. Of the remaining persons who were no longer in paid employment, 14% reported having to care for family/home and 17% listed other reasons. Comparatively, among this study's sample of centenarians it was observed that 32.9% had retired between the ages of 50 to 67 years. Furthermore, 14% of TILDA older adults who retired between the ages of 61 and 67 years continued to work after their retirement (Ward, 2019) versus 8.2% of centenarian participants. While this may appear to highlight centenarian persons as having a higher incidence of earlier retirement when compared to the TILDA participants, it is worth noting that a large percentage of the remaining centenarian participants retired later than the official retirement age of that time. The variance between samples may be attributable in part to the small sample size of this study, the high number of female centenarian participants and the related custom for women of their generation having to leave the workforce upon marrying as well as retirement potentially being easier for people during different decades.

Notably, all participants of this study engaged in at least one form of activity on retirement. In a TILDA study exploring Irish adults transition into retirement, participation in weekly active and social leisure activities were seen to increase after retirement with 75% of older adults participating in at least one activity each week while employed and 83% doing so in retirement. Broadly, this can be compared against the 61.2% of centenarians who continued to engage in existing hobbies upon retiring and the 51.0% who took up new hobbies with this comparison indicative of improved rates of social participation among Irish older adults on retirement when compared to our centenarian sample. Similarly, intergenerational care also appeared of some significance on retirement. Grandchild care is very common in older population generally, and according to TILDA, 42% of older adults report to regularly take on this role (Ward, 2019). This data somewhat comparable to that of the centenarian sample of whom 42% took on additional family care duties including (but not limited to) grandchild care on retiring from their formal occupations. However, it is important that in analysing these results, that they take cognisance of the generational differences between this centenarian cohort, most of whom retired between 30 and 40 years ago when compared with current generations of TILDA research participants.

As Ireland is a historically religious society, it was no surprise then that high engagement with religious beliefs and practices was observed in this sample of centenarians with 89.8% confirming the importance of religion in their lives. These findings corroborate the findings of other studies of centenarians which highlight the importance and significance of religious beliefs and practices for those aged 100 years plus (Courtenay *et al.* 1992; Buono *et al.* 1998; Bondevik and Skogstad 2000; Archer *et al.* 2005; Manning *et al.* 2012; Opsahl *et al.*, 2021). Using cross-national, longitudinal data to characterise religious beliefs and practices in a large sample of Danish centenarians (n=364), Opsahl and colleagues (2021) found that religious beliefs and practices were generally more prevalent in their sample of centenarians compared to those in the samples of younger age. Additionally, they found that age (being younger) and gender (being male) were two predictors associated with lower odds for both religious beliefs and practices. Their results are broadly comparable to that of TILDA wherein participants reporting of religious importance declined amongst younger age cohorts and was also seen to be more significant for women when compared to their male peers as of those aged fifty plus, 86% women and 76% men reported its importance, respectively (Orr *et al.*, 2019).

Religious participation has been outlined in many studies as a possible protective factor in maintaining general health and wellbeing particularly psychologically (Smith *et al.*, 2002; Cheadle and Dunkel-Schetter, 2017). Early research suggests that perceived mental health of older persons is positively influenced both by the importance attributed to religion (Kim-Prieto and Diener, 2009; Fastame *et al.*, 2017). Moreover, there is growing evidence suggesting that religious attendance is the most consistent predictor of positive mental health (Balbuena *et al.*, 2013; Fenelon and Danielsen, 2016; Li *et al.*, 2016; Manning and Miles, 2017). Several studies from the United States have found associations between mental health and religiosity, whereas European studies have been less conclusive (Koenig *et al.*, 2012; Leurent *et al.*, 2013). Other research has emphasised the social support and social capital that comes with participation in organised religion (Orr *et al.*, 2019). This support can be intangible, such as companionship, friendship, or advice, and tangible, such as practical help with tasks of everyday living or financial help (Krause, 2002; Koenig *et al.*, 2012). Beyond the social and psychological protection offered by religious engagement, there is also the potential for positive impacts on lifestyle. According to Ahrenfeld *et al.*, (2018),

religious persons are more likely to have healthier lifestyles which in turn may influence both their physical and mental health. Adding to this, research has shown that in groups of increasing age, religiousness becomes more prevalent as they appear to better derive sense of meaning from religion, which can affect one's ability to cope with stress (Park, 2007; Nilsson *et al.*, 2010). Similarly, findings from centenarian research are suggestive of religiosity having played an intrinsic role in their lives as the majority of this cohort have likely held lifelong associations with their religion (Archer *et al.*, 2005; Opsahl *et al.*, 2021). Research has indicated that older adults for whom religion is important demonstrate resilience in their narratives about life and the meaning they attribute to living long lives (McFadden, 2005; MacKinlay, 2006).

Although the Republic of Ireland is still a predominantly Catholic country, the 2016 Irish census showed that the percentage of Catholics fell between 2011 and 2016 from 84.2% to 78.3% of the population self-identifying as Catholic (Central Statistics Office, 2017). These declines may be explained by the recent shift to a more secular society, increased variance in religious denominations in the Irish Republic as a result of immigration or indeed be attributable to the changing status of the Catholic Church in Ireland and the scrutiny it has come under in recent times. However, the current generations of older Irish individuals, who have lived with the certainty of the status of the Church their entire lives, although they may find their views of their own roles within society challenged in this changing context are unlikely to make moves away (Central Statistics Office, 2017; Inglis, 2017) thus the potential negative implications (if any) that such changes may have on the future generations experience of ageing and longevity will likely not be seen for some time.

One of the main issues from a policy perspective of population ageing is how resources will be allocated concerning age-related spending on pensions, long-term healthcare, and healthcare services generally. Many governments are promoting increased self-reliance in respect to income and pension commitment later in life and are also stressing the need for greater family responsibility when it comes to care provision (Cheung, 2019; Perry-Jenkins and Gerstel, 2020). As a result, living arrangements and caregiving become of significant importance in planning for older persons. While most centenarian participants were living in their own homes, 46.9% were living alone at the time of participation. Comparatively, according to data from

the last census in Ireland (CSO, 2016), the percentage of people living alone was seen to have increased with 26.7% of those aged 65 and over and 44.9% of those aged 85 and over falling into this category. Thus, while the number of centenarians living alone reflects that of the general population of older persons in the Republic of Ireland (McLoughlin and Scarlett, 2016, p.65), research has shown how those living alone are more likely to need outside assistance in the case of illness or disability, and are at greater risk of social isolation which comes with an array of negative health implications as aforementioned (Park *et al.*, 2020; Qin *et al.*, 2020).

Despite self-rated health (SRH) being one of the most frequently used public health measures, its exact definition and nature remains ambiguous (Tigani *et al.*, 2012). According to Smith *et al.*, (2002), SRH is an accepted indicator of successful ageing and represents the adaptability of the individual to changing health status. Notwithstanding this, research has highlighted significant variance in SRH values across the older age spectrum with values fluctuating as one gets older (Dening *et al.*, 1998, Orfila *et al.*, 2000, Liang *et al.*, 2010, Perruccio *et al.*, 2010). It has been shown that while SRH is generally stable up until the 50s, it declines at some point in the 60s up until the late 80s after which slight improvements can be seen again in the approach to late old age (Liang *et al.*, 2005, Ishizaki *et al.*, 2009, Perruccio *et al.*, 2010). This recovery in SRH can be explained however by an increased tendency among older adults to compare their own health with that of their same age contemporaries as opposed to those younger than them (Andersen *et al.*, 2007; Li *et al.*, 2011). When asked how they would rate their health throughout their lifetimes, excellent, very good, good, fair, and poor SRH was reported by 30.6%, 46.9%, 20.4%, 2% and 0% of this study's centenarian participants, respectively. A disimprovement was noted however when participants were asked the same question but as it pertained to their SRH in the present day as excellent, very good, good, fair, and poor SRH was reported by 4.1%, 34.7%, 24.5%, 28.6% and 8.2% amongst Irish centenarians, respectively.

According to TILDA, among other older adults in Ireland, 75% of those aged 50 and older rate their health as being excellent (14%), very good (28%) or good (33%) and 25% rate their health as fair (19%) or poor (6%). SRH was seen to decline with age irrespective of gender and older Irish adults were less likely to report health as excellent, very good or good (66% in those aged 75 and over versus 79% of those

aged between 50-64) (Cronin *et al.*, 2011). Cronin and colleagues (2011), also revealed in their research that in all age groups, higher education was associated with better SRH as 83% of adults aged 75 years and over, with third level education rated their health as excellent, very good or good compared to 61% of those with primary or no education. Similarly, for all ages, better SRH was associated with greater wealth and better economic status, and it was observed that 37% of older adults in the lowest wealth quartile report fair or poor self-rated health compared to 12% in the highest wealth quartile (Cronin *et al.*, 2011). In comparison with international centenarian studies, the results of this study of Irish centenarians' mirrors those of a study conducted by Tigani *et al.*, (2012) with Greek centenarians (n=400) who when asked how they would generally describe their health right now, reported excellent, very good, good, fair, and poor SRH 13%, 23.8%, 30%, 26.8% and 6.4%, respectively. Widowhood, low socioeconomic status, limited health literacy, greater dependence both socially and on health services, decreased functionality as well as decline in general health are among the determinants of poor SRH identified in older age populations (Sudore *et al.*, 2006; Bennett *et al.*, 2009; Amstadter *et al.*, 2010) and may explain the observed results in our study.

4.5 Conclusion

The substantial increase in the incidence of centenarian populations globally highlights the urgent need to gain more information on the oldest old to develop and to establish the necessary structures and supports to best provide for our future generations of older people. These presented findings offer a glimpse into the characteristics and indeed complexities of Irish centenarians. Despite the influence of social factors being among the domains that are less studied in centenarian populations, their significance cannot be overlooked.

This study highlights several key areas for consideration including the value and importance of social connectedness for centenarians and indeed older persons generally. Strong social ties may protect individuals from emotional distress, cognitive decline, and physical disability (Bourassa *et al.*, 2017) and in the same way, loneliness and social isolation can be detrimental to one's physical and psychological wellbeing (Burholt and Scharf, 2014; Beller and Wagner, 2018; Mund and Neyer, 2019). Thus,

findings are indicative of the crucial role of good relationships in promoting health and wellbeing at 100 years.

Although educational attainment was seen to vary considerably for our sample, research has highlighted how possessing a lower level of formal education has been proven as being correlated with worse general cognition, frailty and functional disability thus low levels of education can represent a risk for future vulnerability of older adults (Hooegendijk *et al.*, 2019). Having high levels of education may promote better health and wellbeing and indeed sustain better life satisfaction thus higher education may be key in determining good health in old age (Brigola *et al.*, 2019). Retirement marks a time of change for individuals and therefore provides opportunities as well as challenges to many aspects of people's lives (Haslam *et al.*, 2019; Ward, 2019) Previous research has documented a negative association between retirement and sense of purpose in life, suggesting that retirement could lead people to feel aimless (Yemiscigil *et al.*, 2021). Continuing to engage in activities on retirement is one potential way older persons can promote positive health and wellbeing as they age and several centenarian studies to date including our study of Irish centenarians support this ideology (Hutnik *et al.*, 2012; Freeman *et al.*, 2013; Kim, 2013; Heinz *et al.*, 2017; Milevsky, 2021).

The fact that religion proved to be of importance in the lives of Irish centenarians is not surprising as the significance of religion in the lives of older adults and specifically centenarians is well documented in the literature (Koenig *et al.*, 1988; Poon *et al.*, 1992; Krause, 2003; Manning *et al.*, 2012; Uhl, 2017). Research has suggested that not only do centenarians derive meaning in life from religion but that it also serves as coping mechanism for some as they age (Nelson-Becker, 2003, Ardelt *et al.*, 2008). Furthermore, research has highlighted the potential for increased social interaction that religious engagement can offer. Nonetheless, the perceived benefits associated with religion may not transcend to future generations given modern participation (or lack thereof) in organised religion.

In conclusion, the researcher acknowledges several limitations. Firstly, it is important to note that this sample was positively selected thus when evaluating the results, one must be aware that the findings cannot be generalised to the wider Irish centenarian

population. Secondly, as the questionnaire relied on participants self-reporting, the likelihood of information and recall bias is increased. Finally, this study is limited by the observational and cross-sectional nature of its design thus future longitudinal studies focussing on understanding the role of social factors in the attainment of longevity in centenarians is warranted to explore this area in greater depth and expand on this knowledge more specifically. However, there are also several strengths to this piece of research. This study is among the first to collect and report primary data on Irish centenarians. Its main contribution is to the development of a body of knowledge on Irish centenarians and it presents valuable information on their sociodemographic characteristics as well as exploring the influence of several social factors as they apply to them, providing insight into the oldest old in our society and emphasising their importance in promoting health from a biopsychosocial standpoint.

Chapter Five

A Quantitative Exploration of the Social Factors and Characteristics of the Offspring of Irish Centenarians

5.0 Abstract

Introduction:

Over the past number of decades centenarians have played an important role in ageing research and have subsequently been benchmarked as models for successful ageing throughout the literature. While the importance of genetics in longevity requires no explanation, its true significance towards survivorship depends on its interaction with several other factors and its influence is heightened if such interactions occur early in life. In considering the changes in ageing demography globally and the advances in life expectancies, one must ask if being the child of a long-lived parent offer any advantages outside the realm of genetic predisposition? With a specific focus on the role of social factors, this study sought to explore this concept further by exploring the social factors of the offspring of Irish centenarians and drawing parallels between them, their parents, and their peers to ascertain the position of the offspring.

Methods:

This study was a cross-sectional study that utilised a purposive, convenience sample of centenarian offspring. All offspring of the centenarians who participated in the previous study were invited to participate in this study.

Results:

A total of twenty-nine (n=29) offspring of the potential thirty-five centenarians with children from the previous study opted to participate. Seventeen offspring participants identified as being female (n=17, 58.6%) and twelve identified as being male (n=12, 41.4%). Participants were aged between 49.7 and 71.0 years with a mean age of 63.40 ± 5.55 years. Although this research offered some interesting insights into a sample of centenarian offspring, ultimately it couldn't determine any social factor advantage by virtue of being the child of a long-lived parent.

Conclusion

Whether being the child of a centenarian is beneficial in terms of one's social factors is yet to be proven. Nonetheless, this study has its value in that it provides researchers with suggestions for further research and draws attention to the need to understand not only the lives of centenarians but also the future generations coming behind them

in considering 'inheritance of longevity'. As genetics continue to be diluted and people continue to live longer, understanding longevity inheritance from a social perspective calls for more advanced exploration.

5.1 Introduction

The increase in the number of people reaching 100 years has grown considerably (Bredberg and Bredberg, 2021). The extraordinary rise in the older persons populations worldwide, highlights the importance of studies on ageing and longevity. In tandem with life expectancies continuing to climb, interest in research exploring the determinants of ageing and successful ageing has increased significantly (Longo *et al.*, 2015). The World Health Organisation defines successful ageing as the process of developing and maintaining the functional ability that enables well-being in older age (Wykle *et al.*, 2005). However, given the lack of consensus on its definition (Montross *et al.*, 2006; McCann Mortimer *et al.*, 2008; Annele *et al.*, 2019) additional criteria was established to better describe successful ageing and included three key components, namely, low probability to develop diseases and disease-related disabilities, high cognitive and physical functional capacity, and active engagement with life. Thus, successful ageing can be considered beyond merely being the absence of disease or the maintenance of functional capacities owing to these additional components (Bülow and Söderqvist, 2014). However, despite marked improvements in life expectancy, there is uncertainty on whether the increase in years of healthy life expectancy has kept pace or if the rises in longevity are being accompanied by rising morbidity as well as widespread comorbidity (Aburto *et al.*, 2020; Head *et al.*, 2021; Vaupel *et al.*, 2021) thus whether how future generations will age 'successfully' is yet to be determined.

With younger people now expected to live significantly longer than their parents and grandparents (Barroso *et al.*, 2020; Fingerman *et al.*, 2020), it begs the question as to what this means for the offspring of centenarians given their parents advanced longevity. Research has shown that centenarians and, in general, long-living individuals have a greater possibility of having offspring who live longer than the offspring of non-long-living persons (Capri *et al.*, 2014; Aiello *et al.*, 2016; 2019). Centenarian offspring share a familial trait principally influenced by genetic factors and

environmental conditions (Balistreri *et al.*, 2014). To date, much research on centenarian offspring has focused on the genetic advantages of having a centenarian parent. Centenarian offspring, like their parents show a very healthy status, protective genetic background, cardiovascular and immunological profile (Balistreri *et al.*, 2014; Aiello *et al.*, 2019; Rubino *et al.*, 2019). However, considering the heterogeneity of the centenarian phenotype, it is important to acknowledge the factors beyond genetics and explore the potential social influences of mortality, life expectancy and age-at-death. From a sociological perspective the influence of occupation and education on successive generations in creating continuity in social advantage (or disadvantage) across generations is well documented (Sharkey, 2008; Mare, 2011; MacDonald *et al.*, 2020; Burger and Mortimer, 2021). As education, occupation and income all predict health and survival rate, one should then expect such characteristics and traits of the parental generation to contribute to the next generation's health prospects, resulting in the 'inheritance of longevity' (Vagero *et al.*, 2018; Kok, 2022).

The concept of longevity inheritance has been discussed at length in the literature, yet its exact nature remains elusive (Vaupel *et al.*, 1998, Christensen *et al.*, 2006, Pal and Tyler, 2016, Piraino *et al.*, 2014). Gudmundsson *et al.* (2000), in examining the Icelandic population, concluded that there was a clear familial component in longevity. That could result from either a genetic component or environmental factors shared by family members. Hjelmberg *et al.* (2006), looking at twin data, concluded that genetic influences on the lifespan were minimal before age sixty, however, after this age their influence was more notable. On the other hand, a Swedish study of men born in 1913, found that a number of social and behavioural factors measured at age fifty, but not their parents' survival better predicted longevity (Wilhelmsen *et al.*, 2011). Consistent with this view, Kowald and Kirkwood (2016), rejected mortality in old age as being genetically programmed. Given the somewhat contradictory results from the research in this regard, the aim of this study was to explore the social factors of the offspring of Irish centenarians and draw parallels between them, their parents, and their peers to identify if any potential social factor advantages exist amongst this cohort by virtue of being the child of a long-lived parent.

5.2 Literature Review

5.2.1 Introduction

With the prolongation of life and advanced longevity, research over the past several decades has shown that centenarians represent a valuable resource for the study of characteristics of extreme ageing, including the genetic, psychosocial, and environmental factors of longevity (Franceschi *et al.*, 2002; 2017). Several studies have shown that the offspring of long-lived individuals seem to inherit this survival advantage off their parents and so parental longevity is recognised as an important predictor of offspring survival (Atzmon *et al.*, 2004; Terry *et al.*, 2004; Willcox *et al.*, 2006b; Christensen *et al.*, 2008; Gjonça and Zaninotto, 2008; Terry *et al.*, 2008; Westendorp *et al.*, 2009; Newman *et al.*, 2011; Dutta *et al.*, 2013; Dutta *et al.*, 2014; Van den Berg *et al.*, 2018). While the role of genetics in one's predisposition towards survivorship is irrefutable (Sebastiani *et al.*, 2015; Van den Berg *et al.*, 2018), a number of other factors have proven associations with longevity attainment, including, education, occupation and income, social class, and health behaviours (Kerber *et al.*, 2001; Robine *et al.*, 2003; Tabatabaie *et al.*, 2011; Temby and Smith, 2014; Gavrilov and Gavrilova, 2015a; Sun *et al.*, 2015). The correlation of these traits and the increased likelihood of one reaching advanced old age arises from them being among an array of commonalities shared between parents and their children (You *et al.*, 2010; Temby and Smith, 2014; Gavrilov and Gavrilova, 2015a; Montesanto *et al.*, 2017). Therefore, the aim of this narrative literature review was to examine the published work available on centenarian offspring and their longevity to ascertain if being the child of a centenarian parent proved to be anyway beneficial biopsychosocially with a specific focus on the influence of social factors.

5.2.2 Literature Search

A literature review was conducted to explore the current published works relating to centenarian offspring, their biopsychosocial factors and any such advantages that may be associated with being a child of a long-lived parent. A variety of keywords were considered for use and included, 'centenarian offspring', 'centenarian child/children', 'long-lived', 'intergenerational health', 'intergenerational longevity', 'longevity advantages', 'successful aging/ageing', 'social factors'. Results obtained from the

databases were screened according to several predetermined conditions namely the inclusion and exclusion criteria as highlighted in Table 5.1 below:

Table 5.1: Inclusion and Exclusion Criteria for Offspring Literature Search

Inclusion Criteria	Exclusion Criteria
<ol style="list-style-type: none"> 1) studies directly related to the population, phenomena of interest and context of the research topic. 2) peer-reviewed, full-text journal articles. 3) studies published in English due to lack of resources and facilities for translation. 	<ol style="list-style-type: none"> 1) studies published in languages other than English.

In the first instance, the literature search was restricted to include only peer-reviewed journal articles published in the English language. Following this, the search was controlled based on date of publication with a view to capture only literature published within the last five years (2017 to 2022) and as such, deemed current (Lobiondo-Wood and Haber, 2014). However, due to a paucity of research, the author removed this control so as to expand the search and facilitate a more all-encompassing review. The search was then restricted geographically to allow for exploration of research conducted solely with the children of Irish centenarians, but this returned no results as this population had yet to be explored in an Irish context. Subsequently, the author widened the search to examine research carried out on this population in the United Kingdom and Europe, both of which produced a notable dearth thus this restriction was also removed. As a result, this narrative review considers a range of international research as available to date.

5.2.3 Tenants of the Literature

Research into centenarian offspring was dominated by studies that focussed genetics, disease profiles and pathologies and the advantages in this regard that arose from having a centenarian parent. Studies exploring psychosocial advantages specifically proved scarce with this research area appearing to still be largely unexplored.

5.2.3.1 Long-lived parents and genetic predisposition

Research to date has shown a substantial familial and genetic component being associated with survival to advanced age (Perls *et al.*, 2002, De Benedictis and Franceschi, 2006; Hjelmborg *et al.*, 2006; Franceschi *et al.*, 2007; Sebastiani *et al.*, 2016). Several international epidemiological studies confirm the presence of strong familial and genetic associations for human longevity and suggest that the close relatives (siblings and offspring) of long-lived individuals have a significant survival advantage and are furthermore at a lower risk of succumbing to major age related diseases including vascular disease, diabetes and cancer in comparison to peers of non-long-lived parents (Terry *et al.*, 2003; 2004a; 2004b; Karasik, 2004; Willcox *et al.*, 2006b; Schoenmaker *et al.*, 2006; Perls *et al.*, 2007). These findings have been repeated in more recent studies of centenarian offspring who themselves have displayed a comparable healthy ageing pattern to that of their centenarian parent(s) (Adams *et al.*, 2008; Gentilini *et al.*, 2013; Giuliani *et al.*, 2014, Bucci *et al.*, 2016). Not only do the centenarian offspring exhibit delayed onset of several disease pathologies including cardiovascular and cerebrovascular diseases (Perls *et al.*, 2002; Atzmon *et al.*, 2004; Adams *et al.*, 2008) they also present with overall lower mortality to same age peers of their birth cohort (Terry *et al.*, 2003; Terry *et al.*, 2004a; Terry *et al.*, 2004b; Adams *et al.*, 2008).

A more recent study by Bucci and colleagues (2016) explored centenarian offspring in Italy as being models for healthy ageing and found that Italian offspring have a better functional and cognitive fitness owing to shared commonalities be it genetics, culture or environments thus confirming findings of earlier studies of centenarian offspring of different ethnicity (Atzmon *et al.*, 2004) and country of residence (Terry *et al.*, 2003). It is significant to note however that while the protective effects of parental longevity on disease and illness have been demonstrated in observational studies to date (Rosengran, 2002; Terry *et al.*, 2003; 2004a), the causality between these and to what extent parental longevity may affect morbidity remains to be determined and further longitudinal research is necessary to make any concrete correlations (Bucci *et al.*, 2016; Hu *et al.*, 2022).

5.2.3.2 Psychological factors and offspring longevity

Although psychological well-being is well documented as being an important component of successful ageing in general populations (Lara *et al.*, 2017; Domènech-Abella *et al.*, 2017; Kahana and Kahana, 2018; Blanco-Molino *et al.*, 2019), to date there has been limited exploration examining these factors in centenarian offspring. In one study by Givens *et al.*, (2009) it was reported that personality traits such as lower neuroticism and higher extraversion were observed among centenarian offspring when compared with a control group of their peers. These findings were later extended to the offspring generation of a study of families which demonstrated clustering for exceptional survival (Sebastiani *et al.*, 2013). Given the lack of research in this domain it does remain to be seen however, whether other potentially inherited genetic or indeed learned behaviours from a psychological perspective play a role in the ability of the centenarian offspring to delay the onset of age-associated illnesses, functional decline, and mortality (Marone *et al.*, 2020). Given the dearth of available literature concerning these factors further research is warranted in order for any causality to be determined.

5.2.3.3 Social factors and their influence on centenarian offspring

No studies were returned concerning the influence of social factors and their influence on centenarian offspring. Furthermore, of the scarce research that has been done, studies have found little evidence that social factors affected the association between parental longevity and offspring survival (You *et al.*, 2010; Gavrilov and Gavrilova, 2015a). However, in general population research, the importance of familial resources and their role in determining offspring survival is well documented (Mourtis, 2017). According to Ellis *et al.*, (2013) and supported by Smith *et al.*, (2014), the loss of a parent in childhood, or having high mortality among siblings early in life can negatively affect one's survival because of the disruptions such events cause to one's social resources. Evidence from research is also suggestive of how having a healthy mother or growing up in a good' socioeconomic environment as determined by one's parents' socioeconomic status, education level and occupation can be beneficial not only in early life but throughout an individual's lifetime (Barker, 1990; Elo and Preston, 1992). Interestingly, it was observed that individual factors associated with longevity including occupation and income (Tabatabaie *et al.*, 2011), social class (Temby and Smith,

2014; Gavrilov and Gavrilova, 2015a; 2015b), and adverse lifestyle behaviours including excessive smoking and alcohol consumption (Kerber *et al.*, 2001; Temby and Smith, 2014; Sun *et al.*, 2015) are commonly passed from one generation to the next. This can be akin to parental longevity, as these resources can cluster within families and be transferred to future generations (Morris *et al.*, 2011; Knigge, 2016; Broström *et al.*, 2018; Sommerseth, 2018).

As parents' socioeconomic status can often determine the environments in which children grow up (Tucker *et al.*, 2011; Roos *et al.*, 2016), the relationship between parental socioeconomic status during childhood and mortality later in life also proved to be of importance in the literature on social factors and longevity attainment in the children of long-lived parents. Among many aspects of childhood environment that can affect the maintenance of a healthy ageing phenotype, physical activity and healthy dietary habits are the most important modifiable factors (Wickramasinghe *et al.*, 2020; Zhou *et al.*, 2021; Lorenzo *et al.*, 2022). Reaffirming the correlation between healthy lifestyle and environments comes also from the observation of places, called "Blue Zones", wherein the population shares a common lifestyle and environment, and whose exceptional longevity is superior to that of the rest of the country to which they belong (Mishra, 2009; Buettner, 2017). Numerous studies have highlighted the survival advantage of both farmers' and upper-class children in comparison to children of other parents as a result of their childhood environments with emphasis placed on physical activity, diet, and better access to fresh food produce (Edvinsson *et al.*, 2005; Van Poppel *et al.*, 2005; Breschi *et al.*, 2011; Schumacher and Oris, 2011; Janssens and Pelzer, 2012). Furthermore, there is evidence to suggest that such differences in survival remain present for the duration of the life course (Van den Berg *et al.*, 2006; Breschi *et al.*, 2011; Schenk and van Poppel, 2011; Gavrilov and Gavrilova, 2015a; Hin *et al.*, 2016).

5.2.4 Conclusion

Overall, the exact relationship between biological and behavioural heterogeneity of centenarian offspring remains vastly underexamined. While there is literature that explores the genetic predisposition to longevity and advantageous morbidity status amongst this cohort, ultimately, it is limited and further research in this domain is

necessary. Similarly, research exploring the psychosocial traits of centenarian offspring is scarce and so this research area warrants significantly more attention given the heterogeneity of the offspring phenotype. As aforementioned, there is a dearth of literature pertaining to social factors and their influence on the centenarian offspring. However, in research that examines the children of long-lived parents, aside from the inarguable hereditary component responsible for survivorship, an argument does exist that longevity attainment is at least in part attributable to extrinsic influences including social factors such as the social and physical environments associated with one's upbringing and their how they may interact with one's genes. These factors can be subdivided and include but are not limited to, familial associations, health-promoting behaviours, and economic resources of one's parents in their upbringing (Moore *et al.*, 2015).

Therefore, while there will always be those who are naturally disposed to achieving advanced survivorship, the argument still exists whether genetics can override the impact of other factors to claim sole responsibility for longevity attainment or if both can work in tandem in determining longevity. In considering the increasing prevalence rate of centenarians worldwide, much more research is needed to advance this area and develop this understudied but much needed knowledge base. However, this topic is complex and multi-faceted and as such would require a unique approach to explore biopsychosocial factors effectively amongst this cohort so any such inferences (if existing) could be definitively made.

5.3 Methods

5.3.1 Study Design

The design for this study of centenarian offspring was observational and cross-sectional. The descriptive nature of this study allowed for the sample to be assessed at one point in time without the need for inferences or causal statements. One advantage of descriptive studies is that they not only contribute towards the development of a body of knowledge on a given topic, but they also allow the identification of areas for further research which was important in considering the dearth of research in this topic area.

5.3.2 Sampling and Recruitment

Purposive, convenience sampling was used to identify suitable study participants. Recruitment for this study was carried out simultaneous to that of the recruitment for Study III. One child of all centenarian participants (as applicable) was invited to partake in this study. The lead researcher employed numerous methods to identify suitable centenarian participants for Study III including word of mouth, searching newspaper archives, online records, and social networks to identify centenarians or persons who either were related to or knew centenarians personally. Once a centenarian person was successfully identified and contact was made, if their offspring wasn't the first point of initial contact, they were also contacted due to the concurrent nature of recruitment. This snowball technique proved effective and led to the creation of a non-representative and non-random community-based participant sample. Prior to the questionnaire being sent to those agreeable to participation, the researcher spoke with the offspring participant and explained the aims of the study and what was involved. Once permitted by the centenarian offspring, a pack containing an information letter detailing the aims of the study, the questionnaire for completion, a consent form for respondents to complete and a prepaid envelope for the return of the research material was sent to the address provided by the participant. The pack also included contact information (phone number and email address) for the lead researcher should participants have had any questions or concerns pertaining to the study (Appendix VII).

5.3.3 Ethical Considerations

Ethical approval was obtained from Athlone Institute of Technology's Ethics Committee (now known as the Technological University of the Shannon) and this research was conducted in compliance with their standards and regulations. All participants were made aware of the study's purpose and their participation in the study was entirely altruistic. Participants gave informal oral or written consent via telephone or email prior to the research pack being sent to them and subsequently provided written consent to their participation which was returned to the researcher alongside their questionnaires once completed in full. Data was pseudo anonymised to protect participants identity and maintain their confidentiality. Participants names and addresses (participants were asked their electoral area in lieu of this) were not

included on questionnaires with each centenarian offspring being assigned a unique code. Returned questionnaires were stored in a locked cabinet within a secure room that had restricted access as per data protection guidelines. Participant lists and other identifiable information was kept separate to this also with security measures in place and access to these records was also restricted.

5.3.4 Data Collection

The data was collected within the Republic of Ireland using a self-administered questionnaire which was delivered via 'An Post' (Irish national postal service) to the address provided by participants. The questionnaire used was adapted from both the main questionnaire (CAPI) and the self-completed questionnaire (SCQ) (Waves 1-5) developed by The Irish Longitudinal Study on Ageing (TILDA). Given the uniqueness of the of the Irish centenarian and their offspring, the questionnaire was adapted to ensure that the focus remained specific to the aims of this study and its exploratory nature. In considering user accessibility and to maximise the return of completed questionnaires, most questions were 'tick the box' style or used Likert or numerical type scales with few open-ended questions asked.

To introduce the questionnaire sociodemographic data was captured and included participants gender, date of birth, information on their centenarian parents and the electoral area in which they lived growing up. Following on from this, several questions explored factors relating to their childhood including their socioeconomic status, living conditions, education and opportunities afforded to them during this time in their lives. Participants were also asked to rate themselves in comparison to their peers across a number of the domains examined. Additionally, participants perception of their centenarian parents' perspective on a range of items was also gathered. Questions exploring the centenarian offspring's employment and occupation in adulthood were included in the questionnaire.

Several questions explored participants social connectedness and engagement within their own communities and whether they felt that this was influenced by their centenarian parent. Religion as a social factor was also explored and included questions relating to the role of religion and spirituality in participant's lives. The

measure of frequency of their attendance at religious services was worded to capture attendance prior to the Covid-19 outbreak, so that a true measure of attendance could be obtained as for many their normal habits would have been disrupted due to the pandemic. Questions relating to participants health were posed and included their healthcare access both whilst growing up and at the time of participation in the study. Participants self-rated health was also captured, and they were also asked to rate their health in comparison to their centenarian parent at the same age. Participants were asked if they themselves would like to live to see their hundredth birthday and subsequently asked to elaborate on their answer to this question. Finally, to complete the questionnaire, participants were given the opportunity to provide any other information they deemed relevant to the study.

5.3.5 Data Analysis

Study participants were aged between 49.7 and 71.0 years with a mean age of 63.4 years. In the general population aged 50 and over in the Republic of Ireland, 52% are women and 48% are men. Most of those aged 50 and over in Ireland (58%) fall into the 50-64 age group (McGlinchey *et al.*, 2018) and so are broadly comparable to our sample of centenarian offspring. Descriptive statistics were used to report means and percentages for each of the domains described for the whole sample and was also stratified by sex in some instances. All statistical analyses were performed using IBM SPSS Version 27.

5.4 Results

5.4.1 Sociodemographic Information

Data collection was carried out between 1st February 2021, and 31st May 2022, and was obtained via self-administered questionnaires that were delivered via 'An Post' (Irish national postal service). A total of twenty-nine (n=29) offspring of the thirty-five centenarians with children from Study III opted to participate in this study. Of the six centenarians with offspring not included, four offspring declined to participate for personal reasons. The remaining two offspring despite initially agreeing to participate, failed to return their questionnaires, and later opted out of the study. Seventeen offspring participants identified as being female (n=17, 58.6%) and twelve identified as being male (n=12, 41.4%). The greater number of females to male participants was

representative of a ratio of approximately 1.4 to 1. As highlighted in Table 5.2, participants were aged between 49.7 and 71.0 years with a mean age of 63.4 years:

Table 5.2: Centenarian offspring age and sex

		Male (n=12, 41.4%)	Female (n=17, 58.6%)	Total (n=29)
Age (in years)	Mean (+SD)	63.77 ± 5.99	63.13 ± 5.39	63.40 ± 5.55
	Median	64.13	63.35	63.50
	Range (min/max)	51.66-71.00	49.65-69.60	49.65-71

It was observed that of the twenty-nine offspring who participated in this study, for 65.5% (n=19) it was their mother who lived to be 100 years and for 34.5% (n=10) their centenarian parent was their father. Table 4.3 provides a breakdown of participants long-lived parent by sex:

Table 5.3: Sex of centenarian parent

	Male (n=12, 41.4%)	Female (n=17, 58.6%)	Total (n=29)
Mother	7 (58.3)	12 (70.6)	19 (65.1)
Father	5 (41.7)	5 (29.4)	10 (34.9)

Age of participants centenarian parent at the time of participation was also collected. While the age range for the centenarian parent went from 100 years to 106 years, the majority of participants had parents that were aged 100 years (n=21, 72.4%) as seen in Table 5.4:

Table 5.4: Age of centenarian parent at time of offspring participation

	Male (n=12, 41.4%)	Female (n=17, 58.6%)	Total (n=29)
100.0	8 (66.7)	13 (76.5)	21 (72.4)
100.5	0 (0)	1 (5.9)	1 (3.4)
101.0	1 (8.3)	1 (5.9)	2 (6.9)
102.0	0 (0)	2 (11.8)	2 (6.9)
103.0	1 (8.3)	0 (0)	1 (3.4)
105.0	1 (8.3)	0 (0)	1 (3.4)
106.0	1 (8.3)	0 (0)	1 (3.4)

Geographical variance in terms of the county wherein participants were raised was noted with sixteen of the twenty-six counties in Ireland being represented (Appendix VIII).

5.4.2 Comparison Data

5.4.2.1 Education and Employment

All twenty-nine offspring participants (100%) reported having had attended school with the youngest age on leaving being 16 years (n=3, 10.3%) and the oldest age being 22 years (n=3, 10.3%). Comparatively, 44.9% (n=22) of the centenarian participants of Study III had left school by 16 years of age. Table 5.5 provides an overview of the offspring sample and their age on leaving formal education:

Table 5.5: Centenarian offspring age on leaving school.

Age (present)	Gender	Age (leaving school)	n	%
50-64 years	Male	16	1	16.7
		17	1	16.7
		18	2	33.3
		20	1	16.7
		22	1	16.7
	Female	16	1	9.1
		17	3	27.3
		18	5	45.5
		21	2	18.2
		22	1	9.1
65-74 years	Male	17	2	33.3
		18	3	50.0
		22	1	16.7
	Female	16	1	16.7
		18	2	33.3
		21	2	33.3
		22	1	16.7

In terms of the level of education achieved, it was noted that all offspring participants had achieved a minimum of lower secondary level education (equivalent to completion of junior cycle education). This is similar to TILDA research wherein most Irish older persons (62%) were seen to have achieved at least secondary level education. When TILDA examined education across age groups it was noted that in both sexes that

younger cohorts possessed a higher level of educational attainment. It was observed that 23% of male participants aged between 50-64 years possessed a third level degree compared to 15% of men aged between 65-74 years and 11% of men aged 75 years and older. Additionally, it was reported that the proportion of those who had achieved only primary education increased with age. Some sex differences were also observed in TILDA data as more women than men achieved at least secondary education in both the 50-64 and 65-74 age group. Table 5.6 provides an overview of educational attainment for the centenarian offspring sample:

Table 5.6: Centenarian offspring educational attainment by age and sex

Age	Gender		n	%
50-64 years	Male	Primary	0	0
		Secondary	3	50
		Third level/higher	3	50
		Other	0	0
	Female	Primary	0	0
		Secondary	1	9.1
		Third level/higher	9	81.8
		Other	1	9.1
65-74 years	Male	Primary	0	0
		Secondary	2	33.3
		Third level/higher	4	66.7
		Other	0	0
	Female	Primary	0	0
		Secondary	3	50
		Third level/higher	3	50
		Other	0	0

All participants (n=29, 100%) reported joining the workforce on leaving school and a diverse range of employment categories was observed in the offspring sample. Employment categories were based on SOLAS Employment by Occupation Groupings (SOLAS, 2022) (Appendix VI). Table 5.7 provides an overview of the offspring participants occupation and that of the centenarian parent cohort:

Table 5.7: Centenarian offspring and centenarian occupations on completion of formal education

	Offspring n=29 (%)	Centenarian n=49 (%)
Professionals	12 (41.2)	11 (22.4)
Skilled Trades	5 (17.1)	11 (22.4)
Administrative and Secretarial	4 (13.7)	7 (14.3)
Associate Professionals	2 (6.9)	2 (4.1)
Caring, Leisure and Other Services	2 (6.9)	5 (10.2)
Managers, Directors, Senior Officials	2 (6.9)	0 (0)
Process, Plant and Machine Operatives	1 (3.4)	0 (0)
Sales and Customer Services	1 (3.4)	3 (6.1)
Elementary Occupation	0 (0)	9 (18.4)
Not Specified	0 (0)	1 (2)

In relation to their employment on exiting formal education, most offspring participants (n=26, 89.7%) reported that they were content with the career choices they made. Of the remaining offspring, 3.4% (n=1) reported being neutral to this statement and 6.9% (n=2) strongly disagreed with being happy with their choices. A similar strong positive result to this question was seen amongst the parent cohort of centenarians wherein 91.8% agreed that they were happy with their occupation in adulthood. The remaining 8.2% (n=4) centenarians reported being neutral to this statement. Of the twenty-nine offspring participants, 58.6% (n=17) were no longer working at time of their participation. Table 5.8 provides a comparison of retirement ages between the centenarian offspring and that of their TILDA older adult peers:

Table 5.8: Centenarian offspring participants retirement age

Gender	Age Groupings		Offspring	TILDA
			%	%
Male	50-64 years	Employed	66.7	62.0
		Retired	33.3	14.0
	65-74 years	Employed	66.7	16.0
		Retired	33.3	82.0
Female	50-64 years	Employed	36.4	46.0
		Retired	63.6	11.0
	65-74 years	Employed	0.0	8.0
		Retired	100.0	52.0

5.4.2.2 Social Connectedness and Engagement

As seen in Figure 5.1 a strong positive response was seen amongst the offspring sample when asked if they had many hobbies or pastimes throughout their lives as most participants either strongly agreed (n=8, 27.6%) or agreed (n=18, 62.1%) with this statement:

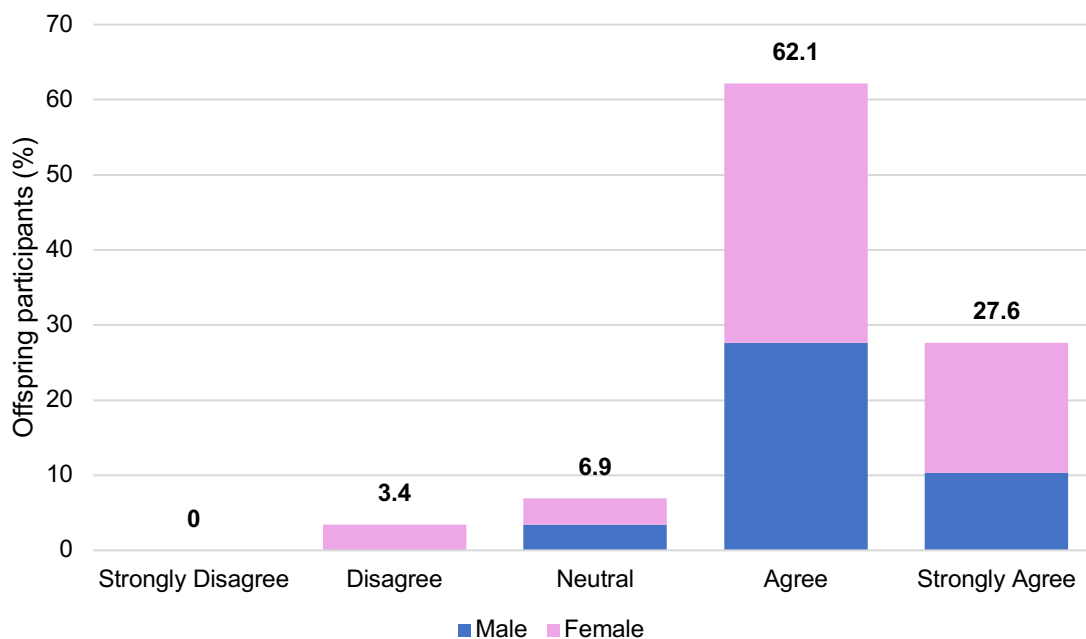


Figure 5.1: Centenarian offspring ratings of whether or not they were engaged with hobbies throughout life.

Offspring were also asked if throughout their lives they had been engaged in organisations, clubs, or societies within their communities. The vast majority (n=26, 89.7%) answered positively as seen in Table 5.9:

Table 5.9: Centenarian offspring engagement in organisations, clubs, and societies throughout life

	Total n (%)	Male n (%)	Female n (%)
Yes	26 (89.7)	9 (75)	17 (100)
No	3 (10.3)	3 (25)	0 (0)

When asked the same question, the centenarian cohort from Study III, was also seen to have had a strong positive result as 81.6% (n=40) answered yes. When offspring participants were then asked about whether they were still involved in such organisations, clubs and societies in the present day, the number of those that remained involved appeared to drop off as only 65.5% (n=19) reported being still involved and the remaining 34.5% (n=10) reported that they no longer participated in such activities. Table 5.10 offers insight into centenarian offspring engagement in this regard by age and sex:

Table 5.10: Centenarian offspring engagement in organisations, clubs and societies by age and sex

Gender	Age Groupings		n	%
Male	50-64 years	Yes	4	66.7
		No	2	33.3
	65-74 years	Yes	5	83.3
		No	1	16.7
Female	50-64 years	Yes	11	100.0
	65-74 years	Yes	6	100.0

In terms of feeling well connected socially, when asked if they felt connected to others in their life, 58.6% of offspring participants (n=17) strongly agreed, 34.5% (n=10) agreed and 6.9% (n=2) answered that they felt neutral to this statement. No participants disagreed with this statement. Participants were then asked if they felt that they had family/friends or other significant people to whom they could turn to or rely

on throughout their lives. All participants answered favourably to this question, with 51.7% (n=15) strongly agreeing and 48.3% (n=14) agreeing with this statement. In exploring participants feelings of loneliness, they were asked whether they would say that they have often felt lonely. Although most participants (72.4%) disagreed with this statement results, overall results were mixed. Figure 5.2 offers a comparison between the offspring and their centenarian parents of whom most participants (72.4%) disagreed that they often felt lonely:

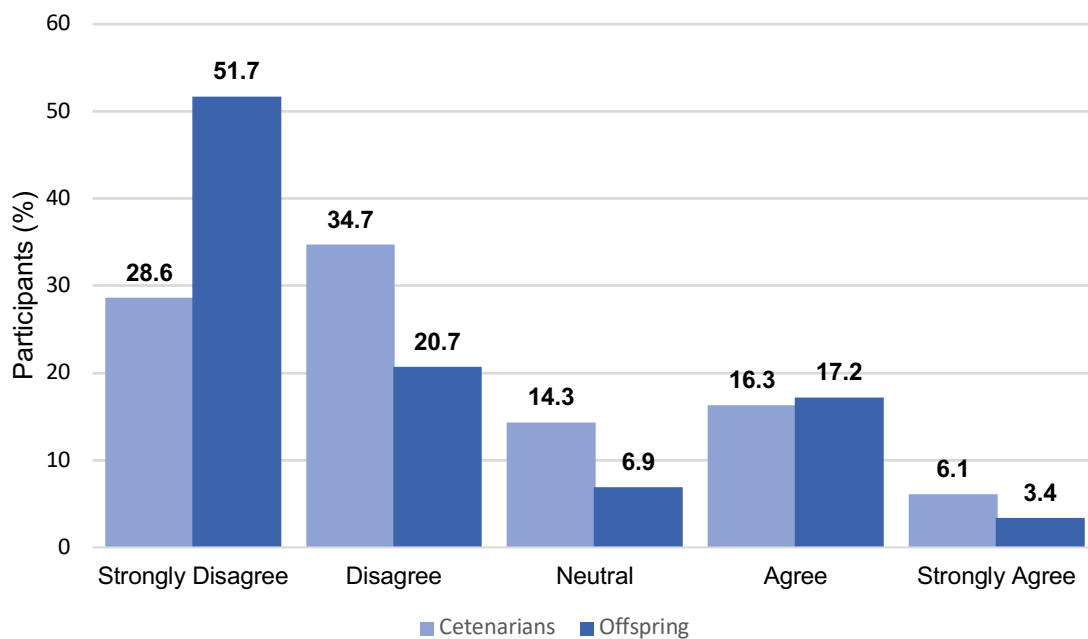


Figure 5.2: Comparison of centenarian offspring and centenarian’s ratings of their feelings of being often lonely.

Table 5.11 provides a breakdown of the centenarian offspring sample feelings of often being lonely by age and sex:

Table 5.11: Centenarian offspring and their ratings of their feelings of being often lonely by age and sex.

Gender	Age Groupings		n	%
Male	50-64 years	Strongly Disagree	3	50.0
		Disagree	1	16.7
		Agree	2	33.3
	65-74 years	Strongly Disagree	4	66.7
		Disagree	2	33.3
Female	50-64 years	Strongly Disagree	4	36.4
		Disagree	2	18.2
		Neutral	2	18.2
		Agree	2	18.2
		Strongly Agree	1	9.1
	65-74 years	Strongly Disagree	4	66.7
		Disagree	1	16.7
		Agree	1	16.7

5.4.2.3 Religion and Spirituality

On asking participants if they would identify themselves as being religious, spiritual, or both, 41.4% of the offspring sample (n=12) indicated that they would identify themselves as being spiritual. As seen in Table 5.12, equal numbers of offspring regard themselves as being religious or both religious and spiritual while a smaller number wouldn't identify as any of these:

Table 5.12: Centenarian offspring religious and/or spiritual identities

	Male n (%)	Female n (%)	Total n (%)
Religious	4 (33.3)	3 (17.6)	7 (24.1)
Spiritual	3 (25.0)	9 (52.9)	12 (41.4)
Both	3 (25.0)	4 (23.5)	7 (24.1)
Neither	2 (16.7)	1 (5.9)	3 (10.3)

When asked if they would say that their religion or spirituality played an important role in their life, most participants answered favourably with 79.3% either strongly agreeing (n=5, 17.2%) or agreeing (n=15, 51.7%) with the statement. A further 17.2% (n=5) felt neutral to its importance in their lives whilst 3.4% strongly disagreed with it being of significance for them. When compared to their parents' perceptions of the importance

of religion and spirituality, although largely favourable there is some minor shifts in category of importance as highlighted in Figure 5.3:

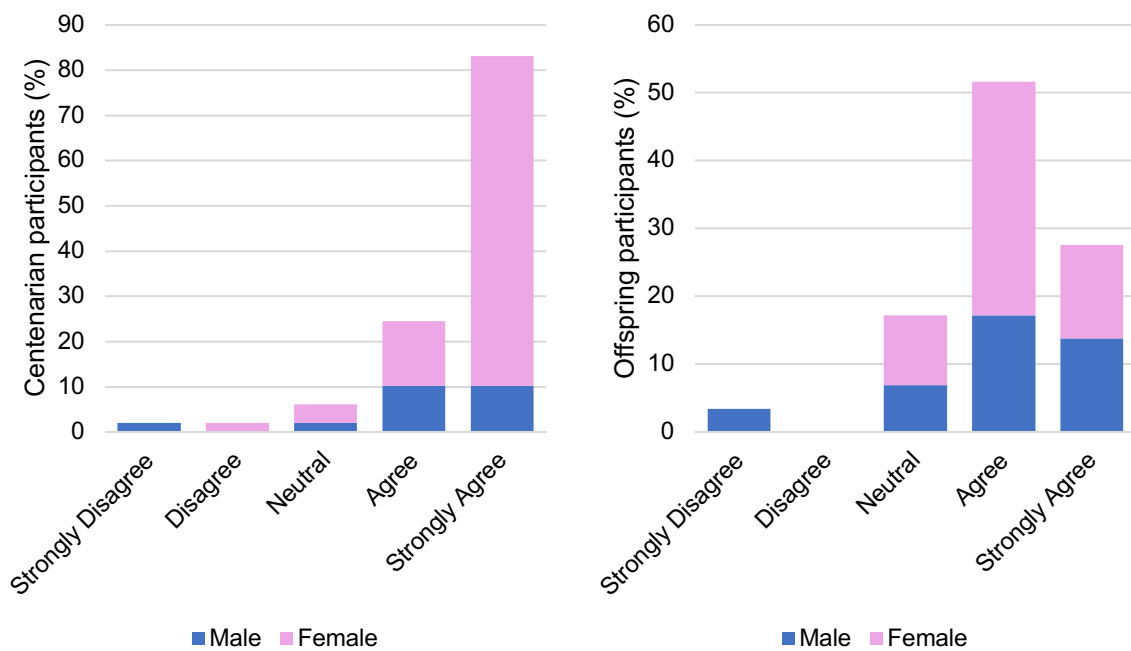


Figure 5.3: Comparison of centenarian and centenarian offspring’s ratings of the importance of religion/spirituality in their lives by sex

Comparatively from a peer perspective, Table 5.13 highlights the perceptions of TILDA older adults in terms of the importance of religion in their lives:

Table 5.13: TILDA older adults’ perceptions of the importance of religion in their lives

	Female (n=3,737)				Male (n=3,022)			
	Wave 1	Wave 2	Wave 3	Wave 4	Wave 1	Wave 2	Wave 3	Wave 4
Not important	13.9	14.3	14.8	14.4	23.7	24.1	24.9	24.6
Somewhat important	29.5	27.1	29.5	30.7	33.3	32.3	31.6	33.2
Very important	56.6	58.6	55.7	55.0	43.1	43.6	43.5	42.2

Frequency of attendance at mass was captured amongst the sample of centenarian offspring to ascertain their participation in organised practice/religious services and as seen in Table 5.14, results were mixed with the number of participants (24.1%) that

continue to go to mass every Sunday being equal to those (24.1%) who never attend mass/church services:

Table 5.14: Centenarian offspring attendance at mass/religious services

	Male n (%)	Female n (%)	Total n (%)
Daily	2 (16.7%)	0 (0%)	2 (6.9%)
4-6 days a week	0 (0%)	1 (5.9%)	1 (3.4%)
2-3 days a week	0 (0%)	2 (11.8%)	2 (6.9%)
Once a week	2 (16.7%)	2 (11.8%)	4 (13.8%)
On Sundays only	3 (25.0%)	4 (23.5%)	7 (24.1%)
2-3 times a month	1 (8.3%)	2 (11.8%)	3 (10.3%)
Once a month	2 (16.7%)	1 (5.9%)	3 (10.3%)
Never	2 (16.7%)	5 (29.4%)	7 (24.1%)

In comparison, Table 5.15 provides an overview of TILDA older adults by sex of their frequency of mass attendance across Waves 1-5:

Table 5.15: TILDA older adults' frequency of mass attendance

	Female (n=3,737)				Male (n=3,022)			
	%				%			
	Wave 1	Wave 2	Wave 3	Wave 4	Wave 1	Wave 2	Wave 3	Wave 4
Never/almost never	9.1	9.2	10.0	10.6	11.1	12.9	12.3	12.6
Once or twice a year	9.1	10.1	11.0	11.2	12.1	11.5	13.5	13.5
Every few months	8.6	8.9	8.7	9.9	8.8	9.5	9.5	9.9
Once or twice a month	8.6	10.3	9.5	9.4	8.8	9.4	9.0	9.7
Once a week	48.5	46.1	45.4	43.5	49.8	47.2	46.3	44.3

5.4.2.4 Perceived Health Status

The first question asked in this domain related to the healthcare access growing up. Participants were asked if they felt that they had good access to healthcare services/providers as they needed them growing up. The majority of participants answered this question favourably, as 51.7% (n=15) agreed with this statement,

41.4% (n=12) strongly agreed, 3.4% reported feeling neutral and 3.4% (n=1) strongly disagreed. When asked the same question but as it pertained to the present day (time of participation), similar answers to the above were seen (Table 5.16):

Table 5.16: Centenarian offspring ratings of whether or not they have good access to healthcare services/providers at this time.

	n	%
Strongly Disagree	1	3.4
Disagree	0	0
Neutral	2	6.9
Agree	14	48.3
Strongly Agree	12	41.4

Following on from this, the type of healthcare of the offspring had when growing up was captured. Most offspring participants (n=21, 72.4%), reported having had public healthcare, 24.1% (n=7) had private health access during childhood and 3.4% (n=1) were unsure of their type of healthcare during this time. When asked about their access to healthcare in the present day, strikingly different results were seen with 62.1% (n=18) having private healthcare access and 37.9% (n=11) in possession of public healthcare. Table 5.17 highlights into healthcare access of offspring participants at the time of participation by age:

Table 5.17: Type of access to healthcare services held by centenarian offspring.

	%		
	50-64 years	65-74 years	Total
Public	41.2	33.3	37.9
Private	58.8	66.7	62.1

Comparatively, Table 5.18 provides further insight into the healthcare access of TILDA older adults by age:

Table 5.18: Type of access to healthcare services held by TILDA older adults

	%				
	50-59 years	60-64 years	65-69 years	70-79 years	>=80 years
Not covered	19	10	10	1	0
Health insurance	51	50	41	8	3
Medical card	25	31	33	53	68
Dual cover	5	9	17	38	29

Participants were then asked to rate their own health throughout their life to measure their self-rated health (SRH). As seen in Table 5.19, there was a largely favourable result to this question with almost half of participants (n=14, 48.3%) rating their health as very good and 27.6% (n=8) rating their health as excellent. Additionally, no participants rated their health as being poor:

Table 5.19: Centenarian offspring and their self-rated health

	%		
	50-64 years	65-74 years	Total
Excellent	17.6	41.7	27.6
Very Good	47.1	50	48.3
Good	29.4	8.3	20.7
Fair	5.9	0	3.4
Poor	0	0	0

Comparably, Table 5.20 highlights the self-rated health for older adults of similar age profiles from TILDA research:

Table 5.20: TILDA older adults and their self-rated health

	%			
	50-59 years	60-64 years	65-69 years	70-79 years
Excellent	18	14	13	10
Very Good	30	30	25	24
Good	31	33	35	35
Fair	16	18	20	25
Poor	4	6	7	7

5.4.3 Exploratory Data

5.4.3.1 Living Conditions

Most centenarian offspring (n=26, 89.7%) reported having lived in property owned by their parents growing up as seen in Table 5.21:

Table 5.21: Property lived in by centenarian offspring growing up.

	n	%
Property owned by parents	26	89.7
Property rented by parents	1	3.4
Council House	1	3.4
Other	1	3.4

When asked if they felt safe and secure in the homes in which they grew up, 69% (n=20) strongly agreed, whilst 31% (n=9) agreed. Almost all participants (n=28, 96.6%) had access to utilities such as heat, electricity and running water growing up. The majority of participants reported that they either strongly agreed (n=19, 65.5%), or indeed agreed (n=7, 24.1%) that they had sufficient access to utilities in the home in which they grew up. Two participants (6.9%) were neutral to this statement, whilst one participant (3.4%) disagreed with this statement. As seen in Figure 5.4, 86.2% (n=25) of participants reported that they felt that they had comparable access to utilities to that of their peers growing up. Three participants (10.3%) reported viewing their utility access as better, with one participant (3.4%) self-reporting being worse off than their peers:

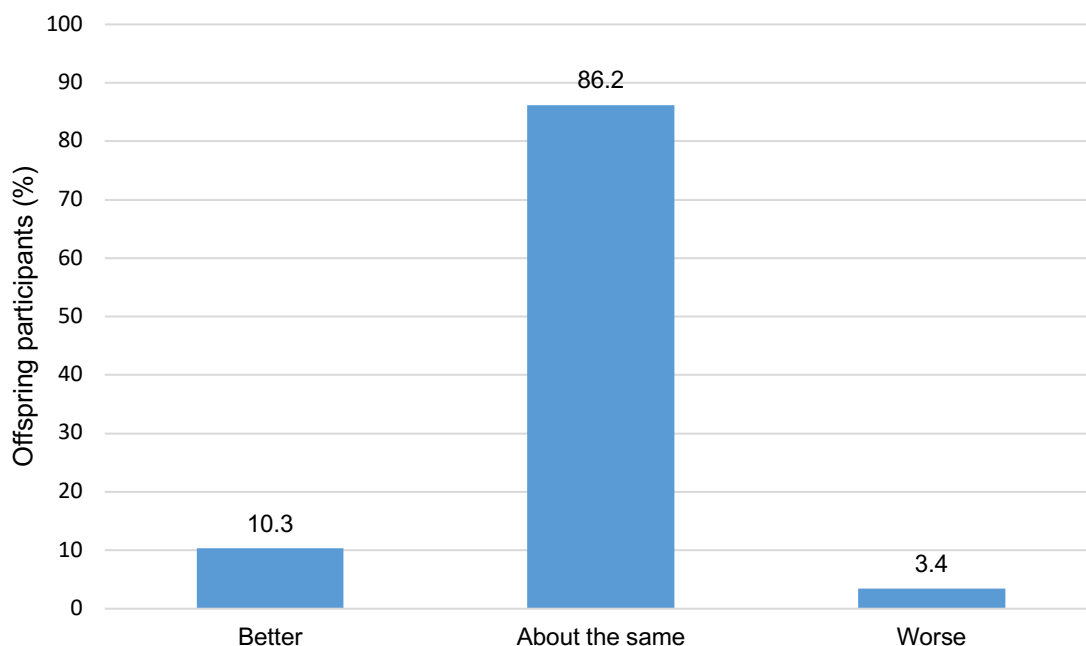


Figure 5.4: Centenarian offspring’s perception of access to utilities in childhood in comparison to peers

As seen in Table 5.22, 75.9% (n=22) of participants strongly agreed that they liked the home in which they grew up while 20.7% (n=6) agreed and 3.4% (n=1) reported feeling neutral to this statement. No participants reported either disagreeing or strongly disagreeing with this statement:

Table 5.22: Did offspring participants like the homes in which they grew up

	n	%
Strongly Disagree	0	0
Disagree	0	0
Neutral	1	3.4
Agree	6	20.7
Strongly Agree	22	75.9

5.4.3.2 Education and Employment

Exploratory data was obtained in relation to participants education and included a question on the type of education they had access to growing up. Most participants reported having attended public school (n=26, 89.7%) compared to private school

(n=3, 10.3%) for their primary and/or secondary level education. For all three that attended private school, their parents financed this for them. Of the participants that continued their education beyond second level schooling, for 37.9% (n=11), their parents funded their third level education, whilst for 34.5% (n=10) their parents did not as seen in Table 5.23:

Table 5.23: Did offspring’s centenarian parent finance education beyond second level

	n	%
Yes	11	37.9
No	10	34.5
Not Applicable	8	27.6

The majority of the offspring (n=27, 93.1%) reported that they had stayed in school for as long as they would have liked to. When their centenarian parents were asked if they would have liked to have obtained a higher level of education most centenarians (n=34, 69.4%) answered ‘no’ indicating an overall contentment with their educational attainment. Of the two offspring participants (6.9%) that didn’t reach the level of education that they would have liked to, one (3.4%) offered a further explanation for this, attributing family responsibilities at home on the farm as the only son as the reason for them not continuing their education. Participants were also asked whether they felt that their centenarian parent(s) viewed education as being important. While no participants strongly disagreed with this statement, 6.9% (n=2) disagreed, 13.8% (n=4) were neutral, 24.1% (n=7) agreed and 55.2% (n=16) strongly agreed as seen in Figure 5.5:

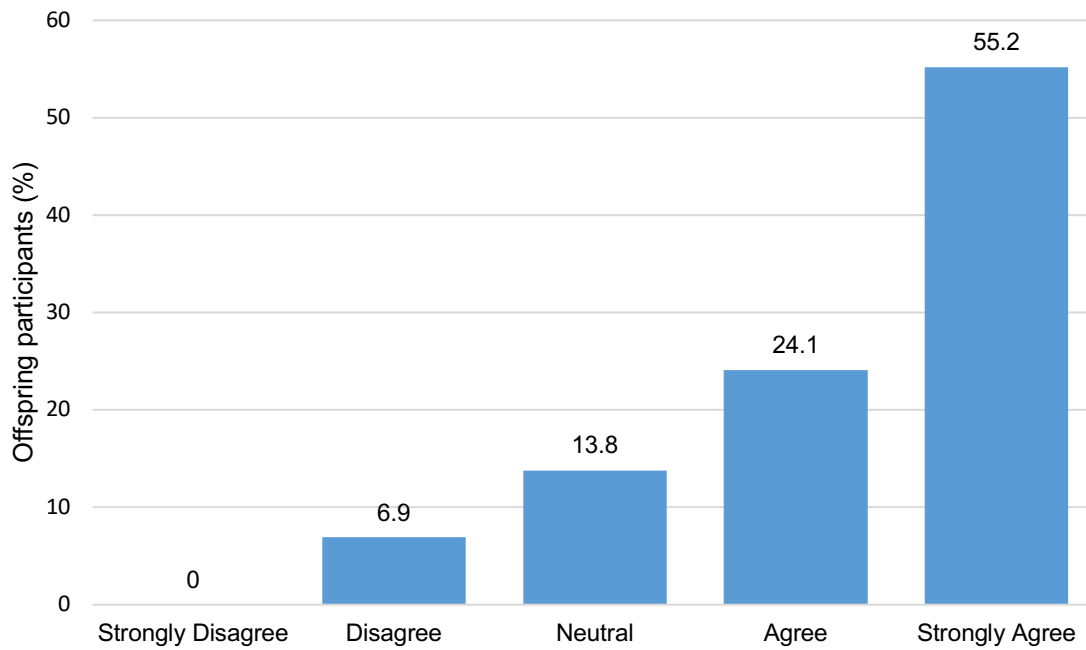


Figure 5.5: Centenarians offspring’s perception of whether or not their centenarian parent viewed their education of being of importance.

In terms of employment in adolescence it was noted that almost equal numbers of offspring both did and didn’t have part-time jobs growing up as seen in Table 5.24:

Table 5.24: Centenarian offspring financial and household contributions during adolescence

	Yes n (%)	No n (%)
Did offspring have a part-time job growing up	15 (51.7)	14 (48.3)
Did offspring have to contribute to household financially growing up	20 (69.0)	9 (31.0)
Did offspring have to contribute in other ways to household growing up	25 (86.2)	4 (13.8)

Table 5.25 lists the ways by which offspring participants contributed to their households when growing up:

Table 5.25: Types of household contributions made by the centenarian offspring growing up.

	n	%
Household Chores	16	55.2
Farm Work	6	20.7
Outdoor Work	4	13.8
Limited Duties (Youngest Child)	3	10.3
Taking Care of Younger Siblings	3	10.3
Taking Care of Older Relatives	2	6.9

As seen in Figure 5.6, there was variance across answers given by offspring to whether they felt that there were any worries or concerns about money or finances that they could remember growing up with equal numbers of participants strongly disagreeing (n=8, 27.6%), disagreeing (n=8, 27.6%) and agreeing (n=8, 27.6%) with this statement:

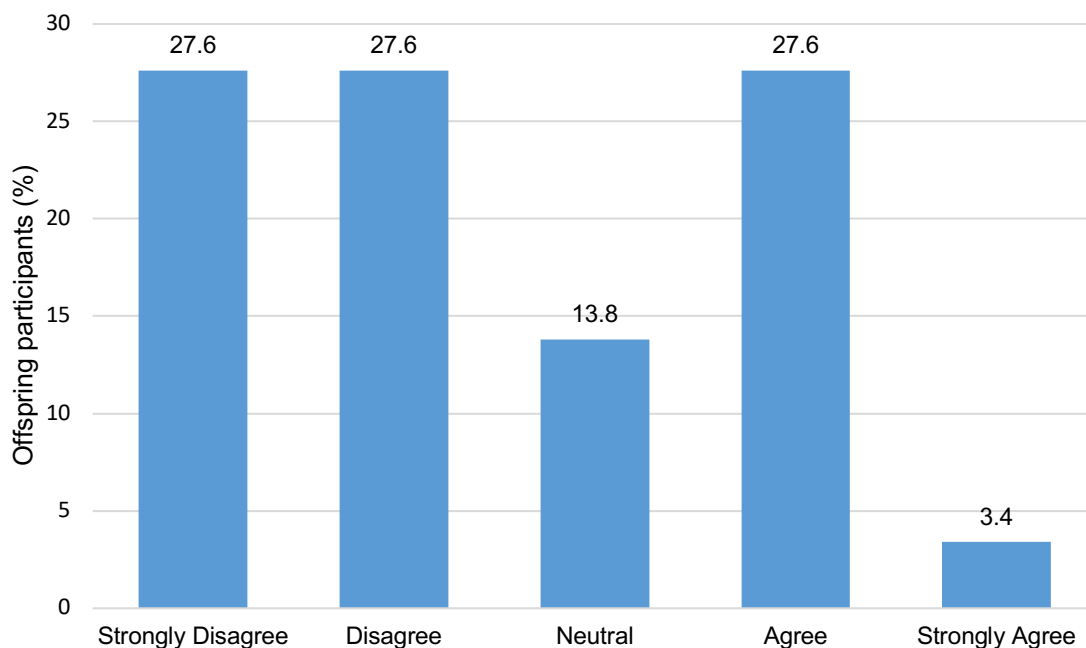


Figure 5.6: Centenarian offspring's rating of if there were financial concerns/worries during their childhood/adolescence that they were aware of

Variance was also seen in participants responses to rating these concerns on a scale of one to ten, though being least concerned was reported by the highest number of participants (n=11, 37.9%) (Figure 5.7):

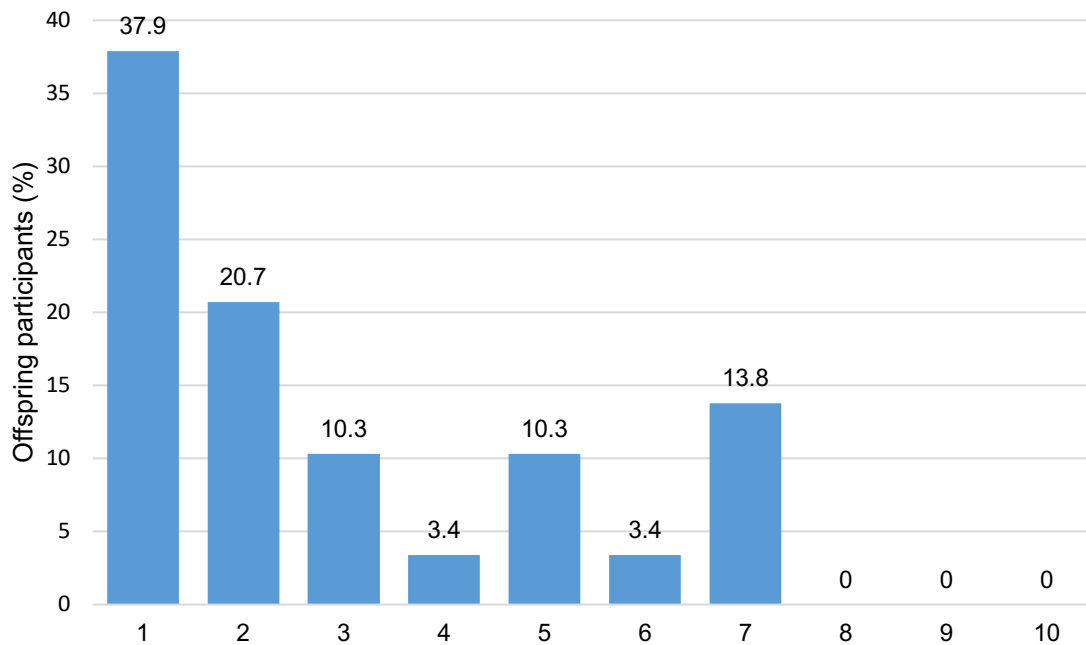


Figure 5.7: Centenarian offspring ratings on a scale of one to ten (with one being least concerned and ten being most concerned) of any financial concerns/worries in their family during childhood.

When asked how they viewed their household’s financial situation in comparison to their peers, 75.9% (n=22) felt that they were about the same as their peers, 20.7% (n=6) felt they were in a better position and just 3.4% (n=1) felt that they were worse off. When asked if whether they felt that their centenarian parent influenced their career choice the results were varied. Although most participants answered neutrally (n=9, 31%), there was an equal amount of people who both agreed and disagreed (n=7, 24.1% for each, respectively) seen in Figure 5.8:

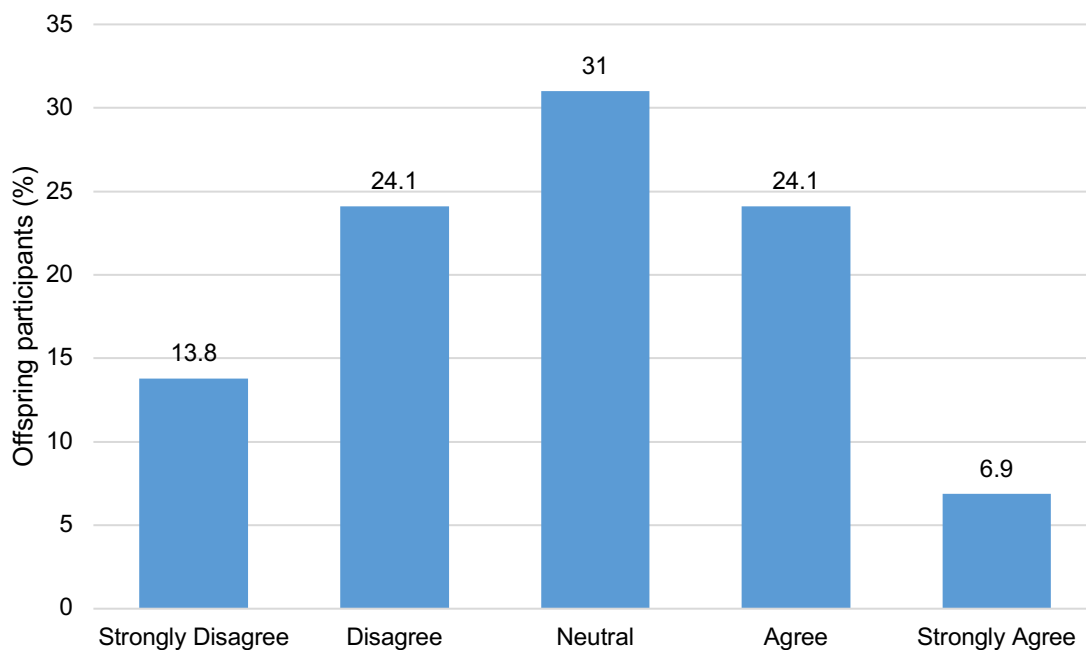


Figure 5.8: Centenarian offspring ratings of whether or not their centenarian parent influenced their career choice in adulthood.

5.4.3.3 Social Connectedness and Engagement

Mixed opinions were reported when offspring participants were asked if they felt that their centenarian parent influenced their engagement in organisations, clubs, and societies as most participants (n=12, 41.4%) did agree that their centenarian parent swayed their engagement, but as per Table 5.26 variance was observed otherwise:

Table 5.26: Centenarian offspring ratings of the influence of their centenarian parent on their involvement in organisations, clubs, or societies

	n	%
Strongly Disagree	4	13.8
Disagree	6	20.7
Neutral	5	17.2
Agree	12	41.4
Strongly Agree	2	6.9

5.4.3.4 Religion and Spirituality

Offspring participants were also asked if their centenarian parent's views on religion and spirituality influenced their own views on religion in adulthood as highlighted in Table 5.27:

Table 5.27: Centenarian offspring ratings of the influence of their centenarian parent's views on their own religion and spirituality

	n	%
Strongly Disagree	1	3.4
Disagree	2	6.9
Neutral	3	10.3
Agree	14	48.3
Strongly Agree	9	31.0

It may be significant to note that of those that strongly agreed (n=9, 31%) to the above, 3.4% (n=1) of participants went on to explain that this influence was negative and highlighted several impacts this had on them later in life including lack of career choices by virtue of being their gender, feelings of inadequacy compared to siblings of the opposite sex and shame for the adoption of their first child.

5.4.3.5 Perceived Health Status

Participants were asked to rate their health in comparison to their centenarian parent at the same age. Although 65.5% (n=19) of participants felt that their health right now was equal to that of their centenarian parent at the same age, interestingly, 20.7% (n=6) felt that they were worse off and 13.8% (n=4) reported that they were better off than their parent had been. Figure 5.9 offers insight into participants answers both as a whole group and when stratified by sex:

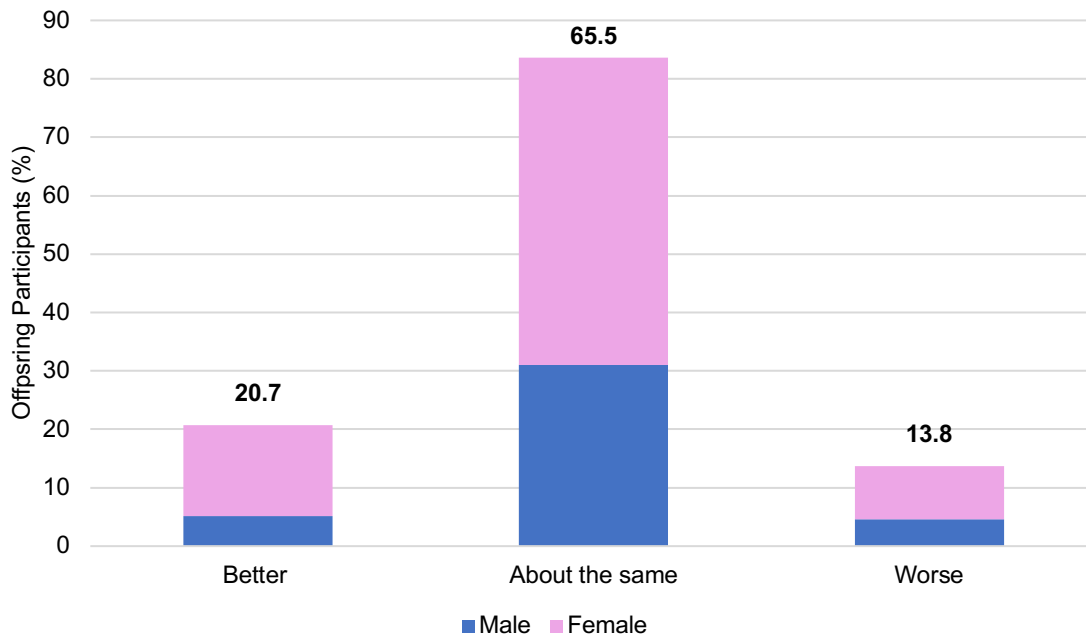


Figure 5.9: Centenarian offspring views of their own health in comparison to their centenarian parent at the same age

Among the last questions asked by participants was whether they themselves would like to live to be a centenarian. In total, 69% (n=20) of the offspring said that ‘yes’, they would, 27.6% (n=8) answered ‘no’ and 3.4% (n=1) didn’t provide an answer to this question. What is interesting to note is the sex observed differences in participants’ responses. As seen in Table 5.28, almost all male participants answered this question positively with 91.7% (n=11), agreeing that they would like to live to be 100 years. Their female counterparts on the other hand were more segregated and while 52.9% (n=9) agreed, the remaining 47.1% (n=8) stated they would not like to reach this age:

Table 5.28: Centenarian offspring’s desire to live to become a centenarian themselves.

	Male n (%)	Female n (%)	Total n (%)
Yes	11 (91.7)	9 (52.9)	20 (68.7)
No	0 (0)	8 (47.1)	8 (27.6)
Unsure	1 (8.3)	0 (0)	1 (3.5)

Participants were asked to explain in more detail their reasons as to why they either did or didn't wish to obtain the same longevity as their centenarian parent. Twenty-seven participants (93.1%) provided answers to this question (Table 5.29):

Table 5.29: Centenarian offspring's reasons for and against wanting to become a centenarian themselves.

	n	%
Who doesn't want to live to 100!	2	7.4
Yes! If remained independent and in good health	14	51.9
Opportunity to meet future generations	1	3.7
Would not like to lose independence	5	18.5
Would not like to live with ill-health or disease	6	22.2
Would not like to be a burden or become dependent on others	7	25.9
Would not like to go into a nursing home	7	25.9
Would not like to outlive all friends and family	1	3.7
Would rather die younger and keep dignity	5	18.5%
Reduced quality of life (QoL) does not appeal to me	3	11.1%
Age is not a big deal for me	1	3.7%
Lack of social contacts would affect QoL	2	7.4%

A final open-ended question was asked to complete the questionnaire in which the offspring participants were asked if there was anything else they would like to share. A small number of participants (n=9) took the opportunity to share their thoughts with several reflecting positively on their centenarian's parents experience of ageing, their own relationships and further detailing the influence of religion on their own lives (Appendix IX).

5.5 Discussion

Research concerning the offspring of centenarians specifically is rather limited. Aside from their genetic predisposition towards longevity, there is a paucity of research in regard to other potentially advantageous factors. While the concept of genetic inheritance in general populations has been discussed to varying degrees in the

literature (Vaupel *et al.*, 1998; Christensen *et al.*, 2006; Piraino *et al.*, 2014; Pal and Tyler, 2016), it still remains somewhat elusive. According to Vagero *et al.*, (2018) while the importance of genetics in longevity requires no explanation, its true significance towards survivorship depends on its interaction with several other factors and its influence is heightened if such interactions occur early in life. Health, being a key component of human capital, is regarded as a constant factor to be considered throughout the life cycle (Kane *et al.*, 2018) and as such numerous studies have focussed on the long-term impact of childhood circumstances on future health and ageing (Ehrlich, 1990; Galama and Kippersluis, 2018). Research has indicated that returns on investment in health during early life are considerably higher when compared to other life stages (Cunha and Heckman, 2009).

Patterns of intergenerational transmission mean that of socio-economic status is likely to be passed from one generation in families to the next. Several childhood circumstances including general health behaviours (Salinas-Miranda *et al.*, 2015; Crouch *et al.*, 2017), parent's educational attainment, family's socioeconomic status (Case *et al.*, 2002; 2005), early life development (Almond *et al.*, 2005; Glatta *et al.*, 2007), adverse childhood experiences (Bellis *et al.*, 2014; Hughes *et al.*, 2017), and lack of access to healthcare (Shen, 2014) have been shown to have correlations with health disparities in adulthood (Bellis *et al.*, 2014; Fedrows *et al.*, 2018; Angelini *et al.*, 2019). Some studies have found that adverse shocks during childhood can also negatively impact adult health, while other studies have demonstrated the positive effects of childhood circumstances on future health and wellbeing (Shen, 2014; Slopen *et al.*, 2017). Relatedly, research has shown that a safe and secure home environment is essential in promoting health and wellbeing not only in childhood but also health later in life (Härkönen, 2001; Dush *et al.*, 2013). Low-income children with poor quality home environments are more likely to face negative implications across multiple domains when compared to their wealthier peers (Evans and English, 2002; Evans and Kim, 2013; Cheung and Lucas, 2015; Cheung and Chou, 2019; Duncan *et al.*, 2019). According to Nomaguchi and Milkie, (2020) the physical home environment in childhood is an important pathway through which socioeconomic inequalities create health and developmental disparities throughout the life course. While most centenarian offspring in this sample reported having grown up in what could be considered stable home environments as provided to them by their parents, they also

perceived these environments as being largely comparable to that of their peers. Most participants (86.2%) compared their utility access in their households as being the same and similarly, 75.9% rated their household's financial position as also being the same when compared to their childhood peers. Thus, while the benefit of positive childhood environments and their impact on health later in life is well documented in the research literature, there is no evidence to support that centenarian offspring in the Republic of Ireland are any better off than those with non-longevous parents.

Education is another important factor that exerts far-reaching influence on health in later life (Chen and Hu, 2018). Education is among the best-established protective factors for the preservation of cognition in ageing (Whally *et al.*, 2006). Several epidemiologic studies have highlighted how highly educated individuals have a reduced risk of dementia and cognitive decline (Roe *et al.*, 2007; Cheng, 2016; Mukadam *et al.*, 2019; Wilson *et al.*, 2019). Education in early life has been proven to be positively related to longevity and research by Chen *et al.*, (2019) revealed that high education in early life served as a protective factor in ageing. Furthermore, Chen and colleagues demonstrated how education may help to postpone cognitive decline in cognitively normal ageing older persons when compared to their poorly educated counterparts. Interestingly, an earlier study by Dutta *et al.*, (2013), did establish associations between being the child of a longer-lived parent (not specifically centenarians) and a slower rate of cognitive decline. However, when controlled for environmental variables including socioeconomic and lifestyle factors these associations modified the parental longevity effect on cognitive decline, albeit to a small extent which is suggestive of the protective effects of parental longevity being mediated heavily by inherited biological attributes.

On the other hand, research has highlighted the protective effect of educational attainment on functional health in later life and older persons with higher levels of educational attainment have been proven to have a lower probability of mortality as well an increased likelihood of recovery from illness and disability (Freedman *et al.*, 2008; Martin *et al.*, 2012). In a study by Jagger *et al.*, (2009), older adults who had received nine or more years of formal education were less likely to have chronic illness or disability when compared to their peers. Education has also been shown to be indicator of lifestyle and research has indicated that education in early life may

cultivate the knowledge, skills, and ability necessary for continued engagement well into later adulthood (Parisi *et al.*, 2012). While it was observed in this offspring sample that they themselves did have greater educational attainment when compared to their centenarian parents (having all achieved at least secondary education), their educational attainment was largely comparable to that of their peers. This may be attributable (at least in part) to the major expansion in education attendance in the Republic of Ireland in the late 1960s that came with the introduction of free secondary schooling in 1968. While most offspring participants (79.3%) reported that they perceived their education as being of importance to their centenarian parent, no inferences can be made that their educational success was improved or enhanced as a result of being a child of a long-lived adult.

Social connectedness and the associated biopsychosocial health benefits is not a new phenomenon in research but rather is well documented in the literature (House *et al.*, 1982; Berkman *et al.*, 2000; Seppala *et al.*, 2013; Holt-Lunstad *et al.*, 2015; Torres *et al.*, 2016; Holt-Lunstad, 2021). The importance of social connections, that is, the quantity, quality, and benefits of human relationships, has become a major focus of the empirical research into the social determinants of health (Donovan and Blazer., 2020). Loneliness and social disconnect is an incredibly pervasive problem that affects all strata of society. Loneliness and social isolation have been associated with several negative health outcomes and health-related behaviours, such as mortality, cardiovascular disorders, functional decline, and mental disorders (Courtin and Knapp, 2017). One study identified an effect of social isolation on all-cause mortality that rivalled that of traditional risk-factors, such as smoking, alcohol intake, obesity, and physical inactivity (Holt-Lunstad *et al.*, 2015).

Specific to its psychological impact, it is thought to contribute to the promotion of positive emotions as well buffering the harmful effects of stress (Berkman *et al.*, 2000). Similarly, social integration has been established to have positive health effects for an individual (Holt-Lunstad *et al.*, 2010; Nieminen *et al.*, 2015). While being integrated into social networks has positive implications for both health and wellbeing, it is not only the quantity of social relationships that is important, but also the quality of those relationships (McMunn *et al.*, 2009; Wahrendorf and Siegrist, 2010; Windsor and Anstey, 2010; Santini *et al.*, 2015). According to Donovan and Blazer, (2020), 24% of

community-dwelling adults aged 65 and older in the United States (approximately 7.7 million people) are socially isolated and 4% (1.3 million people) are severely socially isolated. Comparatively in the Irish setting, Ward *et al.*, (2019) revealed that almost one third of adults aged 50+ in Ireland experienced emotional loneliness at least some of the time. Interestingly, despite most offspring participants rebutting feelings of loneliness, 20.6% did agree that they often felt lonely. Contrastingly however, among the same offspring sample, when asked if they felt well connected to others in their life, 93.1% answered favourably. Similarly, when offspring were asked if had people in lives that they could turn to or rely on, 51.7% strongly agreed and a further 48.3% agreed that they had. TILDA researchers, in exploring loneliness in Irish older adults, observed that those aged 75 years and older were less likely than younger participants to report being in the least lonely group and more likely to report being moderately lonely (Ward *et al.*, 2019). These findings coupled with the weight of international research attributing centenarian longevity to social connectedness and social capital (Koch *et al.*, 2006; Hensley *et al.*, 2012; Araújo *et al.*, 2016; Heinz *et al.*, 2021; Teixeira *et al.*, 2021) lend to further exploration within this realm specifically.

The role of religion and its influence on longevity has garnered significant research attention with mounting evidence linking active engagement with religion and being positively predisposed to longevity when compared to those who do not (McCullough *et al.*, 2000; Musick *et al.*, 2004; Chida *et al.*, 2009; Rote *et al.*, 2013; Kim *et al.*, 2015). Several explanations have been offered for the association between affiliation with a religious organisation and longevity, most of them suggesting that religiosity affects health rather than that mental or physical health affecting religiosity. One common explanation is that religious affiliation is associated with social support, which is one of the most robust predictors of mortality as discussed in the previous chapter (Holt-Lunstad *et al.*, 2010; 2015). Attendance at religious services is associated with greater social support in cross-sectional studies (Sorensen *et al.*, 2011; Doane, 2013; Hill *et al.*, 2019; Bradley *et al.*, 2020). In a longitudinal study by Strawbridge *et al.*, (2001) attendance at religious services was also found to predict increases in social relationships over a 30-year span. Another potential explanation for the association between religion and longevity is increased involvement in volunteering activities (Galen, 2012; Wilson, 2012; Shor and Roelfs, 2013; Russell *et al.*, 2019; Wallace *et al.*, 2019).

Ireland, a country traditionally characterised by a high level of religious belief and practice, has witnessed a dramatic shift in religious practices in recent years. While Catholicism remains the dominant religion in the country with 78.3% of the total population identifying with this religion, a significant number of people in Ireland now identify themselves as having no religion, as national census data showed that 9.8% of the Irish population now identifies as having no religion, an increase on the previous 5.9% reported in 2011 (Central Statistics Office, 2017). Centenarian offspring, when asked if religion or spirituality played an important role in their lives, 79.3% answered favourably to this statement. Similarly, TILDA research noted that the majority (81%) of its participants reported religion as being important to them (Orr *et al.*, 2019). Although not asked in this study, results from the 2016 census in Ireland indicated that 81% of 50- to 54-year-olds describe themselves as Catholic compared to 91% of 80- to 84-year-olds and although this number rises amongst older age groups the converse is seen amongst younger cohorts (Central Statistics Office, 2017). This led to the concern that the perceived health benefits seen in older persons as a result of their religious associations may not transcend to future generations given modern participation (or lack thereof) in organised religion. However, the implications of such will likely not be seen for some time.

According to Coleman (2005; 2011), almost two decades ago, it was predicated that baby-boom generation (to which the offspring sample belong) will be the first of a succession of cohorts with steadily weakened socialisation to their respective religions. While the importance of religion to centenarian offspring at this time remains apparent, it also appears to correspond with that of their peers when compared to TILDA participants. Therefore, despite religion being of great importance to both centenarians and their offspring, as it corresponds generally with that of their peers, the argument cannot be made that having a centenarian parent increases ones' religiosity thus bringing with it any added protective bonuses.

Research to date has indicated that desire to achieve longevous life is a strong predictor for survivorship to advanced ages irrespective of age, gender, and comorbidities (Araújo *et al.*, 2021). However, achieving extended life expectancy is only considered desirable if one can maintain a good standard or quality of life with meaning and purpose. Moreover, the clinical, ethical, and social implications of

advanced longevity generate various debates (Serra *et al.*, 2011). Generally, there appears to be relative consensus on the desire for longevity, irrespective of age group, or country of residence.

In a recent study by Bowen and colleagues (2020), in a sample of European going university students, they found that while 25.8% of the participants wanted to live 100 or more years, the majority (74.2%) were not inclined towards this extreme of ageing. Within the sample, more than one fifth wanted to live less than 80 years and over half (53%) preferred to live to see their 80s or 90s. In another (earlier) study conducted with young and middle age adults in the United States, Bowen and Skirbekk (2017) observed that 26.4% expressed desire to achieve at least centenarian status, 24.6% opted to want to live into their nineties and 31.9% would be content with reaching their 80s. Becoming older and indeed the process and profile of ageing has been shown to sway people's feelings towards obtaining advanced longevity (Huohvanainen *et al.*, 2012; Karppinen *et al.*, 2016). In a sample of Finnish older adults (aged 72-96), when asked regarding their attitude towards living to see 100 years, 37.2% (Huohvanainen *et al.*, 2012) and 32.9% (Karppinen *et al.*, 2016) positively confirmed their desire to reach this milestone birthday. Karppinen *et al.*, (2016) in further exploring the reasons behind participants wishes for longevous life revealed that participants desire to reach 100 years was caveated in that they only wished to achieve advanced age if they could remain autonomous, healthy, and independent in doing so. It was also observed that among those who wanted to achieve centenarian status, they reflected positively on their lives lived and expressed rational reasons for why they wished to exceed average life expectancies with contentment in life, establishing purpose and their children being among the top answers given. Such results could be likened to that of the offspring sample of this study, of whom most confirmed that they too would like to see their hundredth birthday and, in their explanations, provided similar answers.

Brandao *et al.*, (2019) found comparable results when examining the close family members (aged 25-86 years) of a sample of Portuguese centenarians (n=115) as 56.5% of participants expressed wishes to reach 100 years. They suggested that having a close relationship with a centenarian person may have a positive influence on one's attitude towards obtaining extreme longevity. However, as reported in this study of Irish offspring and in Karppinen and colleagues (2016) Finnish study, there

were conditions attached to participants' desire to see 100 years and these related to maintaining their independence, possessing general good health, maintaining their cognition, having good social connectedness, and avoiding the need for long term residential or nursing home care. Interestingly, there was a marked sex difference observed amongst Irish offspring who expressed desire to achieve centenarian status as 91.7% of male participants highlighted how they wished to reach the milestone birthday in comparison to 52.9% of females.

Relatedly, one's desire to survive may be influenced by their perception of the potential burden of care that may arise later in life. This takes into consideration late life challenges for older persons and poses the question of who will provide the necessary support and care both the end of life but also throughout late old age as the need arises with the advanced prolongation of life (Bornet *et al.*, 2021). Thus far, few studies have investigated core issues surrounding centenarian's caregivers, however, it was observed, in a study of Portuguese older persons that many reported not wanting to live longevous life to just become a burden to their families (Brandão *et al.*, 2019). These concerns matched those of our centenarian offspring sample of whom several commented that they would face the unavailability of family support if they themselves became centenarians and so they would rather not face this expected reality later in life. While the perspective of this cohort may have been shaped by their first-hand experience of a having a parent reaching the extremities old age, the weight placed on this on aspect of longevity, highlights a key concern of longevity attainment generally (Eggert *et al.*, 2020) and emphasises the need for future research exploring this topic further.

5.6 Conclusion

While this research offers some insight into centenarian offspring and their social factors and characteristics, the real 'result' of this study is that it provides researchers with suggestions for further research and investigation. Furthermore, it highlights the importance of inquiring and understanding not only the lives of our centenarians but also the significance of exploring the transgenerational nature of longevity. Taking cognisance of this knowledge and information and acknowledging its implications, will allow healthcare practitioners, policy makers and other relevant personnel to best

prepare for and create desirable conditions to promote health and wellbeing amongst our future generations of the oldest old.

Genetic predisposition can largely predict one's long-term mortality (Gibson *et al.*, 2019). However, while such biological influences are modest, they are not robust, and so other psychosocial factors though under-examined in research should not be ignored. Children tend to live longer than their parents and this is likely to be determined not only by genetics but also by what experience parents brings to the next generation, and by the improved life circumstances of the children themselves in their childhood and adult life (Vagero *et al.*, 2018). Despite desire to achieve long life being an ambition of many, research has highlighted how the proportion of individuals who are willing to live longer at 100 years of age is similar to those who do not share such wishes. While health status appears to be significant in shaping this desire, but social and psychological factors also play a role, which can be observed by the importance given in particular to one's ability to maintain their independence and also remain well connected to others socially. While this research unveiled interesting findings relating to Irish centenarian offspring and several key social factors influences in their lives, it could not make any inferences on the basis of advantages or protective benefits that may have been inherited from their long-lived parent(s). Thus, whether or not being the child of a long-lived parent is in any way advantageous is yet to be determined. Although Ireland has been in a dramatic state of flux in recent decades, there have been many societal advances made to the benefit of her people. However, these shared advances have made it more challenging to decipher what influences (if any) were predetermined or indeed created. Furthermore, as gene pools within populations continue to widen and as life expectancies continue to increase, understanding longevity inheritance from a social perspective calls for additional exploration.

Finally, despite the richness of this study's findings, some limitations must be acknowledged. The cross-sectional design of the study prevented the relationships between variables to be determined, which could be of particular interest given the marked increasing incidence in centenarian populations globally its impact on wider societies. Additionally, given the small sample size of study participants these exploratory findings cannot and should not be generalised to the entire centenarian

offspring population. Longitudinal research with both a larger sample of offspring and an appropriate age matched control group with a more intense focus is ultimately required if any definitive deductions are to be made based on advantageous social factor influences on longevity inheritance in the children of centenarians.

Chapter Six

Conclusion and Recommendations

6.0 Introduction

The overarching goal of the research presented herein was to better understand the way by which social factors may have shaped or influenced the ageing of Irish centenarians. The work focuses on a very specific generation that have not been empirically studied to date in the Republic of Ireland. The sociocultural and historical influences of the last century make this cohort group different between countries, different within the same country from other age groups, and may even be distinct from the future centenarians' generations. This chapter presents the study's conclusions and critiques the strengths and limitations of the research conducted. The implications of the findings and subsequent recommendations for future work are presented. This study's contribution to knowledge is also summarised.

6.1 Contribution to Knowledge

As identified this research is novel as it constitutes the first-time centenarians have been explored empirically in the Republic of Ireland. Furthermore, the relative newness of the topic area makes this study distinctive. It is important however to situate this study in the context of its independent and original contribution to the body of knowledge on the role of social factors on the attainment of longevity amongst centenarians within the Irish setting. The studies conducted throughout the work presented in this thesis allowed for an exploration into the influence of social factors on Irish centenarians and deduced the following findings, (i) a multidimensional model that goes beyond biological aspects of ageing and instead extends to include social factor influences is paramount in conceptualising and promoting successful longevity, and (ii) certain social factor variables, particularly social connectedness, contribute to centenarians' experience of survivorship and, therefore, should be considered concomitant to successful ageing. Studying centenarians as expert survivors holistically allows for the development of knowledge pertaining to the processes outside of genetic and physiologic ageing that may apply to older adults as well and should be further examined in light of the trajectory of population ageing. It is hoped that this work can contribute to further basic and applied research in the gerontological field.

6.2 Summary of Findings

This thesis has sought to explore the social factors and key characteristics of Irish centenarians. The demographic changes seen in the Irish population over the last number of decades have led to an increasingly older population. Juxtaposed with the heightened incidence of centenarians globally alongside increasing population diversity and the dilution of genetics, these changes provide a rationale for the need to explore social factors and their role in longevity attainment. Exceptional longevity represents an extremely well lived phenotype (Pignolo, 2019; Pradas *et al.*, 2019). According to Kolovou *et al.*, (2014) and supported by Pignolo (2018) centenarians are survivors who display a delayed onset of age-related diseases or resistance to disease and illness otherwise occurring earlier in life. Prior research on long-lived individuals reported that despite a huge variability amongst those who survive to exceptional old age, there is a high prevalence of disease and disability as well as impaired cognitive performance (Poon *et al.*, 2010). Associations have been drawn in previous research in respect to the genetic disposition of ageing however, it is highly unlikely that there exists just one single biomarker responsible for the attainment of long life (Sandana and Michael, 2019). However, it is possible, that those experiencing declines to health and functionality as they journey to advanced age are still able to maintain a high quality of life with respect to social and psychological well-being. Therefore, successful ageing at one hundred years may not mean to stay healthy for longer but, rather, to adapt. This work assumes that decline is to be expected at advanced ages. Furthermore, a successful centenarian is someone who still searches for a positive trajectory that can be heavily moderated by one's social factors. This may be attained through social connectedness, specific coping mechanisms, personality characteristics, lifestyle behaviours, religious affiliations, personal beliefs, or attitudes.

This study has provided insights into longevity through the qualitative story-telling narratives of the Irish centenarian participants. These narrative accounts demonstrate the value of the theoretical position of Rowe and Kahn (1987) in encompassing 'successful' ageing from a biopsychosocial perspective with a specific social lens. This research highlighted how centenarians can be notably content and happy with their life journeys, appreciative of the health they have maintained in ageing and stress the importance of supportive social networks. The ability to obtain a higher sense of being and acceptance of ageing with a positive outlook (p.85) on the past, present, and

future events is not a coincidence amongst this cohort. Their resilience and positive outlook in life may be attributable, at least in part, to a childhood that was rich in social connectedness. Despite varying experiences of poverty having grown up in a 'poor Ireland' (p.61) participants recalled having had happy and fulfilling childhood years which later translated into adulthood. Stability in terms of their family and their environments from a young age was regarded as being beneficial as it lent to positive adaptability to circumstances later in life. The centenarians' family members particularly their parents, grandparents, and siblings in their adolescence and now their own children were observed to play a significant role in providing social support and emotional security to them. Irish centenarians akin to centenarian populations previously studied credited their overall wellbeing to their strong social support networks (Eisner *et al.*, 1999; Freeman *et al.*, 2013; Cheung and Lau, 2016; Yin *et al.*, 2020). Such networks provided them with a sense of belonging and emotional security which was sustained throughout their lives. These centenarian outlooks confirmed that views of successful ageing are much more elaborate than broad stereotypes suggest and reach far beyond basic resources of physical health and instead extend to include psychological factors and indeed social factors (Jopp *et al.*, 2015). The study of the lived experience of centenarians while revealing extensive heterogeneity within this population stressed the significance of the social determinants of health and their influence on longevity.

Despite centenarians' self-reports of the importance of several social factors throughout their lives, the author acknowledged a dearth in the available published literature to corroborate this information. In conducting the scoping review, studies of centenarians in many regions of the world were examined to find social factor commonalities among this category of exceptionally long-lived individuals. Centenarians share many intersectional lifestyle characteristics that may contribute to their longevity though it is difficult to prove causality for each lifestyle factor's influence on centenarians' extremely long life. Nonetheless, many of the behaviours and social-environmental health determinants of centenarians can stand on their own as evidence-based complementary lifestyle practices (Nair and Collins, 2020). An important finding that emerged from the scoping review was that while there is strong suggestive qualitative evidence to support the influential role of social factors on ageing, there was limited consensus from a quantitative perspective and ultimately,

further empirical research that examines social factors is needed to validate their significance in relation to centenarian longevity.

The strength of social connectedness was very much to the fore in study 3 of this thesis as previously discussed (Chapter 4). In reporting on the primary data obtained this research further emphasised the importance of having strong social support networks in promoting health from a biopsychosocial standpoint. Social factors including education and religion also proved to be of importance for this centenarian cohort this study, but it is important to recognise that this study's results are limited by the observational and cross-sectional nature of its design and ultimately no inferences can be explicitly made. Future longitudinal studies focussing on understanding the role of social factors in centenarian longevity is warranted to explore this area in greater depth and expand on this knowledge more specifically.

The final study of this thesis looked to broadly explore the transgenerational nature of longevity through the offspring of Irish centenarians. Although biological influences of longevity are distinct, they are not all encompassing and so other health determinants including social factors should be taken into consideration. While this research offered some insight into a sample of centenarian offspring, ultimately it couldn't determine any correlations between social factors and being the child of a long-lived parent. Therefore, whether being the child of a centenarian is beneficial in this regard is yet to be proven. Nonetheless, this study has its value in that it provides researchers with suggestions for further research and draws attention to the need to understand not only the lives of centenarians but also the future generations coming behind them in considering 'inheritance of longevity'. As genetics continue to be diluted and people continue to live longer, understanding longevity inheritance from a social perspective calls for more advanced exploration.

6.3 Critique of the Current Study

Although the findings from this thesis contribute to a better understanding of ageing and through exploring the influence of social factors on Irish centenarians, some limitations must be considered. Firstly, the three population-based studies conducted used observational and cross-sectional data sets, and consequently did not allow for

causal relationships to be investigated. Therefore, results require scrutiny and caution is needed in their interpretation. Given the number of centenarians in the Republic of Ireland, their age-related vulnerability, and a lack of an accessible national registry of centenarians in the Republic of Ireland (or any other similar records), recruitment for these studies proved difficult. Secondly, the studies were based on a selected sample of individuals with no/minor cognitive impairment. This procedure was warranted since all studies require self-appraisal measures. As participation in studies 1,3 and 4 also required the participant to be able to self-consent (participants positively selected), there is a risk of selection bias by virtue of having recruited participants who potentially had healthier lifestyles, and better subjective health than nonparticipants. Thus, some concerns with findings' generalization are required. It was not within the scope of this thesis to include more vulnerable individuals, and this is an important caveat to the research findings. The research techniques and analyses adopted for use while suitable for the research conducted it is important to recognise that most analysis strategies have their limitations. As the questionnaires in studies 3 and 4 relied on participants self-reporting, the likelihood of information and recall bias was also increased and so the author also acknowledges this limitation.

6.4 Implications for Health and Social Policy

The findings from this thesis have several implications for social policy and include (but are not limited to) priority issues such as (i) health promotion, (ii) healthcare services (iii) employment, retirement, and financial security and (iv) religious, cultural, and social participation.

6.4.1 Health Promotion

The health profiles of future generations of centenarians will likely not be akin to our current cohort. Poor health behaviours such as obesity and physical inactivity are two known risk factors common to several diseases, yet despite this knowledge, younger cohorts have a higher prevalence of obesity than their equivalents a generation ago (Hämmig, 2019; Rock *et al.*, 2020; Serna-Gutiérrez *et al.*, 2022). Developing health promotion approaches that invest early in the health of our future generations is paramount. Health promotion must be at the centre of policy reform to ensure that the underlying causes and effects of health challenges are sufficiently addressed and

includes interventions at the personal, organisational, social, and political levels to facilitate adaptations (lifestyle, environmental, *etc.*) conducive to improving or protecting health (Bachynsky, 2020; WHO, 2020; Ackley *et al.*, 2021). This entails placing a greater focus on population-based interventions and community empowerment strategies that can increase people's control over their health, reduce health risks and inequities, enhance social cohesion and community solidarity, and create supportive environments for sustainable population health and wellbeing.

6.4.2 Healthcare Services

Traditionally, healthcare delivery was built on the premise of treating single diseases however with the increasing incidence of older persons, we are presented with a considerable challenge when it comes to ensuring adequate health and social care provision. A study by Hernández *et al.*, (2019) showed that the estimated lifetime prevalence of multi-morbidities for older Irish adults is 73.25%. The presence of multi-morbidities increases the likelihood of hospital admission, length of stay and readmission, raises healthcare costs, reduces quality of life, and increases dependency, polypharmacy, and mortality (Glynn *et al.*, 2011; Prados-Torres *et al.*, 2018; Woolford *et al.*, 2021; Gudnadottir *et al.*, 2022). With multi-morbidity being normative amongst these populations (Schäfer *et al.*, 2010; Marengoni *et al.*, 2011) significant emphasis needs to be placed on improving health system operations, particularly when one considers the dearth seen in services presently. Interestingly however, Hogan *et al.*, (2021) noted that outcomes (with the exception of mortality) amongst Irish centenarians hospitalised due to hip fracture were relatively similar to that of younger patients and that those who survived until discharge did not have a significantly longer length of stay, validating the benefits of active management amongst this cohort.

Therefore, an adequate response to the transition requires a strong emphasis on primary prevention and an equitable distribution of resources. However collective innovation and strategic planning are essential in creating evidence-based policy appropriate for the silver economy. Ultimately there is an intrinsic need to be proactive now as opposed to reactive in the future in best equipping societies to successfully meet the demands of an ageing population. Informed knowledge generated from

evidenced based research should facilitate the development of guidelines and policies for use in establishing mechanisms to provide adequate holistic care for the oldest old.

6.4.3 Employment and Retirement

The ageing population has led to increasing concerns about pensions and their future sustainability. The fiscal sustainability of pension systems has become firmly entrenched on the policy agenda of the European Union with the European Commission (2010) stating that for many countries given the increases in life expectancy the future pension situation is untenable. As a result, much of the dominant policy discourse around ageing and pension provision over the last decade has focussed on postponing retirement and prolonging employment in line with the concept of active ageing and this is likely to remain in place. Notwithstanding this, issues such as issues productivity, economic growth and global competitiveness will need to be accounted for from a policy perspective with reference to an ageing workforce.

6.4.4 Social Participation

Considering its advantageous health benefits, the need to support for older adults to remain socially engaged should be at the fore in terms of policy development. Interventions should maximise policies which promote social capital and facilitate continued social engagement in maintaining one's health and wellbeing in ageing. Promoting social engagement, and ways to facilitate access to these, should also form part of social policies for wellbeing in ageing. Research on social support interventions may need to explore strategies for expanding and strengthening a global rather than merely local or national sense of belonging to a community.

The onset of the Covid-19 pandemic in early 2020 has further raised questions of how older persons can avoid isolation in times of social distancing. Technical solutions to these questions should be considered alongside policies which seek to maintain biopsychosocial health. The continued development of social connectivity technologies, as well as growing technological skills in older age groups, present opportunities for developing virtual social participation.

In considering social connectedness and the Covid-19 pandemic, it would be remiss not to acknowledge the feelings of increased social isolation and loneliness reported amongst the general population during this time period. While the prevalence of loneliness and social isolation among older adults during the COVID-19 pandemic was striking and qualitative reports from this thesis echoes the findings of numerous published studies, there is evidence to support that psychological sequelae of social isolation and loneliness might be a larger problem in young adults than older adults with many younger persons reporting elevated levels of loneliness during pandemic times (Beam and Kim, 2020; Groarke *et al.*, 2020; Loades *et al.*, 2020). Loneliness however is not new a problem for children and adolescents and thus warrants considerable attention in health and social policy. In one study from before the pandemic, trends of eight-year-olds' loneliness across 24 years showed that up to 20% of children consistently reported feeling lonely (Lempinen *et al.*, 2018). According to Dooley *et al.*, (2019), there is a notable increase in anxiety and depression among young people in Ireland and higher rates of self-harm. Furthermore, Ireland has the fourth-highest suicide rate in Europe among young people (UNICEF, 2017) and so the Irish youth are no exception to the ill-effects of social isolation. In the United Kingdom, a study by Fancourt *et al.*, (2021) found that being a woman, being younger, having lower educational attainment, lower income, and living alone or with children were all risk factors for higher levels of anxiety and depression during the Covid-19 pandemic. Interestingly, while Fancourt and colleagues did report that many of these inequalities in experiences were reduced as lockdown continued, differences were still evident 20 weeks after the start of lockdown which highlights the prompt need for additional services in this area in order to safeguard and protect the health and wellbeing of future generations.

Thus, going forward considerations are two-fold with regards to social participation. The preservation of personal behaviours and characteristics, as well as established habits, routines, and rituals of centenarians is vitally important in practice in terms of social engagement. Therefore, specific to the older person, one must consider, addressing the preservation of function and providing opportunities for meaningful engagement and maintaining a sense of autonomy. However, in relation to the general population and in considering the importance of social factors within the different outputs as presented in this thesis, interventions must stress the importance of social

engagement and participation not only in later life but also across the life course to promote holistic health and wellbeing for all.

6.5 Recommendations for Future Research

In concordance with that other scholars have reported, this thesis recognises that centenarians present special features and constitute a markedly heterogeneous group. Particularly in the Republic of Ireland, the last 100 years were of profound political, economic, and social changes, and the current generation of centenarians were born in a unique time relative to social norms and expectations. Common infrastructure such as electricity and piped water, opportunities for further education, access to cars among many other banal things in modern day were positively nuanced. From this point onwards the ageing of the population will represent one of the most significant demographic and social developments that Irish society has encountered. Societies around the world are faced with the challenges that come with increasing life expectancies. With advanced longevity attainment there is a responsibility on societies to improve the health of their populations, meet their health and social service needs, assure quality of care, and guarantee equity whilst simultaneously strive to be cost-effective in a finance orientated world.

As for further studies, several directions are suggested. In the first instance, future research on very old adults should use longitudinal designs. Only within this methodology will investigators be able to explore the predictive effects of several factors and the effective influence of age for successful ageing. Secondly, further investment in more diversified methodological approaches such as using a wider range of sources of information would permit for the inclusion of a broader range of individuals. Finally, future research should focus on cross-cultural perspectives, comparing centenarian from different regions and cultures. This is essential so that we can gain a greater scientific understanding of each of the biopsychosocial elements of longevous life and their interactions with one another.

6.6 Conclusion

Whilst population ageing brings challenges, it also presents opportunities. This thesis has highlighted the importance of social factors in the lives of centenarians and their role in their lives as perceived by them. Although social connectedness is presented as a dominant social factor that appeared to have largely positive connotations for health and longevity amongst Irish centenarians its causality remains undetermined. Notwithstanding this and in considering future ageing demography, the research is suggestive of the need for further investment to explore this concept as well as other social factors and their role in survivorship in greater depth.

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Appendices

Appendix I – Qualitative Study Participants Information Sheet and Consent Form



**Athlone Institute of
Technology**
***Department of Nursing and
Healthcare.***

PARTICIPANT INFORMATION SHEET

We would like to invite you to take part in a research study. We are interested in speaking to you to understand what the secret is for successful ageing. Please take your time to decide whether or not you wish to take part.

Why have I been invited?

You have been invited to participate as you are an Irish citizen aged 100 years old or more.

Do I have to take part?

It is entirely up to you to decide whether or not to take part. You may want more information in relation to the study and should this be the case, please do not hesitate to contact me. If you do decide to take part, you will be asked to sign a consent form. **You are still free to withdraw at any time in the process of the study without giving a reason.**

What do I need to do?

Taking part will involve meeting with our researcher to tell your story. **Breaks will be available at any point during the session.** With your permission, we would like to audio-record the meeting as audio recording of interviews gives an accurate summary of the interview.

What are the possible disadvantages, risks, or side effects of taking part?

There are no risks predicted to you taking part. There is a chance that in telling your story life issues that are sensitive or distressing may be recalled. You can stop at any stage if you feel uncomfortable and can refuse to answer any questions without need for explanation. A significant other of your choosing will also be present to support you throughout this interview.

What are the possible benefits of taking part?

It is hoped that this research will guide policymakers and help them understand life for the older person in order improve services for those coming behind you.

Will my taking part in the study be kept confidential?

All the information which is collected about you during the research will be kept strictly confidential. The data will be collected and stored in accordance with the Data Protection Act 1998 and secured against unauthorised access.

What will happen to the results of the study?

The research should be completed by the end of 2019. You will be offered a copy of the results of the study once it is complete. The results of the study will be published in a peer-reviewed journal; with all data completely anonymised meaning **you will not be identifiable**.

What if there is a problem?

Any problems identified will be addressed. If you have a concern about any aspect of this study, you can speak with me, and I will do my best to answer your questions. If you remain unhappy and wish to complain formally, you can contact the project supervisors as listed.

Who has reviewed the study?

This research is supported and funded by the Department of Nursing and Healthcare within Athlone Institute of Technology.

Contact Details

If you have any questions relating to this research, or concerns about participation, please contact Alison Fagan.

Researcher

Ms Alison Fagan

Tel: 0872635911

Email: a.fagan@research.ait.ie

Project Supervisors

Ms Lorraine Gaffney

Email: lgaffney@ait.ie

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Email: mmcdonnell@ait.ie



INFORMED CONSENT FORM

Title of Project: To Examine the Factors Affecting the Health and Wellbeing of Centenarians Living in Ireland

Name of Researcher: Alison Fagan

	Yes	No
Have you read the Participant Information Sheet for the above study?		
Have you had the opportunity to ask questions and discuss the study?		
Have you received satisfactory answers to all of your questions?		
Have you received enough information about the study?		
Do you understand that your participation is voluntary, and you are free to withdraw at any time, without giving any reason, and without any penalty?		
Do you understand that interviews will be audio-recorded, and these recordings will be destroyed after the data is coded? Do you consent to this?		
Do you agree to taking part in the above study?		

Full Name in Capitals.....

Signed.....

Date.....

Full Name of Researcher.....

Signed.....

Date.....

When completed original copy will be retained by principal investigator with a copy returned to the participant via email or post.

Appendix II – Qualitative Interview Topic Guide

Interview Topic Guide

Participants will be asked a series of questions on the topics below pertaining to the various stages of their lives to ascertain how they lived. Participants will lead the story.

Childhood	<ul style="list-style-type: none"> • Where they grew up geographically – urban or countryside areas (hectares, farm type if applicable) • Parents' occupation • Number of siblings and own position in family • Education and responsibilities as a child: • Health in childhood • Hobbies and pastimes/interests growing up • Social life and friends • Religion/Existential beliefs • Lifestyle habits including diet, physical exercise, smoking, alcohol consumption, travel
Adulthood	<ul style="list-style-type: none"> • Marriage • Career • Location – mobility in adulthood • Children: (1) How many children (2) Education they achieved (3) Where are they now • Religion/ Existential beliefs • Lifestyle habits including diet, physical exercise, smoking, alcohol consumption, travel • Social life and friends • Interaction with parents and siblings • Social Capital (Social support given and received)
Current Life	<ul style="list-style-type: none"> • Lifestyle habits today including diet, physical exercise, smoking, alcohol consumption, travel • Attitude to health • Role in the family, family support in their present lives • Social life and friends • Role of religion/Existential beliefs • Are they satisfied with their lives lived • Is there anything they would do differently • Who influenced them most in their lives • What do they view as important in successful ageing • Any advice on how to reach 100 years old

Appendix III – Centenarian Quantitative Study Research Pack



Research Hub East Campus
Athlone Institute of Technology
Dublin Road
Athlone
Co. Westmeath

Dear Participant,

I would like to invite you to take part in a research study exploring the social factors that have influenced how Irish centenarians (persons aged 100 years or older) like you have aged. Before you decide whether or not you would like to take part, it's important that you understand why the research is being done and what your involvement will be in the study. Please take your time to read the following information, if anything you read is not clear please contact me on 0857515678 with any questions that you may have.

What is this study about?

Centenarians are one of, if not the fastest growing population group not only in Ireland but also worldwide. This study is being done as part of my PhD and the primary aim of this research is to explore the social factors that have influenced you as you have aged. This information will help in planning for future generations coming behind you.

Why have you been invited to take part?

You have been invited to participate as you are an Irish citizen aged 100 years old or more.

Do you have to take part?

It is completely up to you to decide whether or not you would like to take part. If you want more information in relation to the study, please do not hesitate to contact me by telephone on 0857515678. If you do decide to take part, you will be asked to sign a consent form, but you are still free to withdraw from the study at any time without having to explain yourself.

What will taking part involve?

To take part in this study you will need to complete the questionnaire enclosed and return it to me via post in the prepaid envelope provided.

What are the possible disadvantages, risks or side effects of taking part?

There is a chance that answering some of the questions in this questionnaire may bring back memories that are sensitive or distressing for you. You are free to stop at any stage if you feel uncomfortable and can refuse to answer any questions without need for explanation.

What are the benefits of taking part?

As people are living longer, it is hoped that this research will guide policymakers and help them to have a better understanding of life for the older people in Ireland in order to improve services available to them.

Will my taking part in the study be kept confidential?

All the information which is collected during the course of the research will be kept strictly confidential. The data will be collected and stored in accordance with the Data Protection Act 2018 and secured against unauthorised access.

What will happen to the results of the study?

The results of the study will be published through the submission of a PhD thesis. Results from this study may also be made available through conference participation and publication in peer-reviewed journals. All data will be completely anonymised meaning that you will not be identifiable.

Who has reviewed the study?

Ethical approval was granted by Athlone Institute of Technology Ethics Committee.

Who is funding this study?

This research is supported and funded by Athlone Institute of Technology President Seed Fund. |



Who should you contact for more information?

If you have any questions relating to this research, or concerns about participation, please contact Alison Fagan via email at a.fagan@research.ait.ie, by telephone on 0857515678 or by post c/o Athlone Institute of Technology Research Hub, East Campus, Dublin Road, Athlone, Co. Westmeath.

Contact Information

Project Supervisors

Dr Mary McDonnell Naughton	mmcdonnell@ait.ie
Dr Patricia Heavey	pheavey@ait.ie
Ms Lorraine Gaffney	lgaffney@ait.ie

Consent Form

Please tick the below boxes and sign at the end of the page if you agree to participate in this research study by answering a questionnaire relating to Irish centenarians and the social factors that contribute to their ageing.

1: General	Tick
I confirm that I have read and understood the Information Letter for this study.	
I understand that this study is entirely voluntary, and I can stop participating at any time without giving a reason.	
I understand that I will not be paid or compensated for participating in this study.	
I know how to contact the research team if necessary.	
I agree to take part in this research study having been fully informed of the risks and benefits.	
I agree to being contacted by AIT to follow up on my participation in this study, provided I have not stated I wish to withdraw completely from the study.	

2: Retention of Information for Future Research	Tick
I agree to my personal information being stored for possible future research related to the current study on ageing. I understand any future research must be approved by a Research Ethics Committee.	
I understand that I will not be paid for any future uses or outcomes from the processing of my personal information	

To be completed by the Participant

Name (BLOCK CAPITALS)

Signature

Date

This questionnaire is a part of a research study exploring the social factors that have influenced how Irish centenarians like you have aged. Your participation in this study is greatly appreciated and I hope that you find this questionnaire interesting to complete. Your answers are very important. Please remember that your participation is voluntary and that you are free to withdraw from the study at any time without having to provide a reason.

How to fill in this questionnaire:

Please answer questions by

Ticking a box like this

Or circling an answer like this: 1 2 **3** 4 5

Sometimes you will find an instruction telling you which questions to answer next like this:

Yes No (Go to Question 7)

How to return this questionnaire:

Please post this questionnaire back in the prepaid envelope provided.

Alison Fagan
Research Hub East Campus
Athlone Institute of Technology
Dublin Road
Athlone
Co. Westmeath

If you have any questions about the questionnaire, please feel free to call me on 0857515678.

I.D Number (office use only)							
Date of Birth	_ / _ / _ _ _ Date/Month/Year						
Gender	Male <input type="checkbox"/> Female <input type="checkbox"/> Other <input type="checkbox"/>						
Where were you born?	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%;">At home</td> <td style="width: 50%;"></td> </tr> <tr> <td>In Hospital</td> <td></td> </tr> <tr> <td>Other</td> <td></td> </tr> </table> <p>If other, please specify (e.g. nursing home): _____</p>	At home		In Hospital		Other	
At home							
In Hospital							
Other							
Electoral Area at Birth (please include town and county).							
Electoral Area during Childhood (please include town and county).							

1. Are you married, or have you ever been married?

YES NO

2. Are you a widow(er)?

YES NO

3. For how many years have you been widowed?

4. Have you ever been separated or divorced?

YES NO

5. Did you remarry?

YES NO

6. Do you have a significant other whom you never married?

YES NO

7. If yes, is this spouse/significant other still living?

YES NO

8. Do you live with your spouse/partner now?

YES NO

9. Do you have any children?

YES NO (to Question 13)

10. How many children do you have?

11. Have any of your children passed away?

YES NO

12. If yes, at what age(s) did they pass away?

13. Apart from your spouse/partner and children, do you have any other family members (such as brothers, sisters, cousins, nieces, nephews) that are significant in your life?

YES NO

14. Have any of these family members lived to be 100 years old?

YES NO

If yes, who are they to you (e.g. brother, sister, aunt etc.)?

15. Did either of your parents live to be 100 years old?

Please tick only one box

YES NO

If yes, who and what age did they live until?

16. Did your parents work?

YES NO

17. Was your parents work outside of the home?

YES NO

18. What jobs did your parents have?

Mother: _____

Father: _____

19. Did your parents have a farm (animals and/or crops)?

YES NO (Go to Question 22)

20. If your parents did farm, did they have their own land, or did they farm on land belonging to someone else?

Own Land Other Land

21. Can you remember approximately how many acres of land they farmed?

22. Were there any worries or concerns about money or finances growing up that you can remember?

YES NO

Tell me more about these concerns:

23. How many brothers and/or sisters did you have?

24. Where do you come in the family? (i.e. oldest, in the middle, youngest). Give the number if possible (e.g. 3rd oldest child out of six children).

25. Are any of your brothers or sisters still alive today?

YES NO

If yes, who and what age are they now?

26. Would you say that you have had good friend(s) throughout your life?

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

27. Would you say these friend(s) have been important in your life? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

28. Would you say that you have family/friends or other persons to whom you could turn to or rely on throughout your life? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

29. Throughout your life would you say that you have you often felt lonely? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

30. Do you feel connected to those around you? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

31. At what age did you leave formal education? _____

32. What was the highest level of education you achieved? (Please tick only one box).



Didn't attend school	<input type="checkbox"/>
Primary School (did not receive Primary School Certificate)	<input type="checkbox"/>
Primary School (received Primary School Certificate)	<input type="checkbox"/>
Secondary School to Inter Cert	<input type="checkbox"/>
Secondary School to Leaving Certificate	<input type="checkbox"/>
Technical College	<input type="checkbox"/>
Nursing Qualification	<input type="checkbox"/>
Apprenticeship/Trade	<input type="checkbox"/>
University	<input type="checkbox"/>
Other	<input type="checkbox"/>

If other, please specify:

33. Would you have liked to have obtained a higher level of education?

YES NO

34. If yes, please tell me why you think you didn't reach the level of education you would have liked?

35. Did you work after you left formal education?

YES NO

36. What did you do after leaving formal education?

37. Were you a stay at home parent/homemaker?

YES NO

38. Would you have liked to have had a different job or career if you had other options available to you?

YES NO

If yes, please tell me more about this:

39. Did you enjoy your job/work? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

40. At what age did you retire? (Please tick only one box).

Younger than 50 years (<50 years)	
50 – 55 years	
56 – 61 years	
62 – 67 years	
Older than 67 years (>67 years)	
Haven't Retired	

If you haven't retired, please tell me more about this and what you have continued to do:

41. On retiring did you engage in any of the following activities? (Tick all that apply).

Engaged in existing hobbies	
Took up new hobbies/activities	
Sports	
Family Duties e.g. minding grandchildren, caring for parents.	
Volunteering	
Social Organisations	
Other Employment	
Travel (in Ireland)	
Travel Abroad	
Other (please specify: _____)	

42. Throughout your life have you been engaged in organisations, clubs or societies in your community?

YES NO

43. Are you still an active member of any of these organisations, clubs or societies now?

YES NO

44. Throughout your life would you have considered yourself to have had many hobbies or interests outside of the home?

YES NO

45. What were these hobbies or interests? Tell me more about them.

46. Would you identify as being religious or spiritual? (Please tick only one box).

Religious	Spiritual	Both	Neither

47. Do you feel that religion/spirituality has played a very important role in your life? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

48. During your adult life, how often did you attend religious services/places of worship (e.g. church)? (Please tick only one box).

Daily	<input type="checkbox"/>	On Sundays only	<input type="checkbox"/>
4-6 days a week	<input type="checkbox"/>	2-3 times per month	<input type="checkbox"/>
2-3 days a week	<input type="checkbox"/>	Once a month	<input type="checkbox"/>
Once a week	<input type="checkbox"/>	Never	<input type="checkbox"/>

49. Prior to the Covid-19 outbreak how often did you attend with religious services/places of worship (e.g. church)? (Please tick only one box).

Daily	<input type="checkbox"/>	On Sundays only	<input type="checkbox"/>
4-6 days a week	<input type="checkbox"/>	2-3 times per month	<input type="checkbox"/>
2-3 days a week	<input type="checkbox"/>	Once a month	<input type="checkbox"/>
Once a week	<input type="checkbox"/>	Never	<input type="checkbox"/>

50. Do you listen to mass or religious services on the radio or watch it on television?

Radio Television Both Neither

51. Growing up what type of property did you live in?

Property owned by parents	
Property rented by parents	
Council house	
Lived with grandparents	
Lived with other family member (e.g. aunt, uncle)	
Other (Please specify: _____)	

52. What type of property are you living in right now?

House owned by you personally	
House that you are renting	
Council house	
House owned by a family member or friend	
House rented by a family member or friend	
Residential Care/Nursing Home	
Other (Please specify: _____)	

53. Are you living with anyone else in this property?

YES NO (Go to Question 55)

54. Who is this person to you? (e.g. I live with my sister Mary)

55. Are you happy with where you are living right now? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

56. Are you in receipt of a care service (e.g. home help) from the Health Service Executive (HSE) or another homecare provider?

YES NO

57. What type of access do you have to healthcare?

Public Private

58. Have you always had this type of healthcare?

YES NO

If no, when did this change?

59. Would you agree that you have had good access to healthcare throughout your life? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

60. How would you rate your health throughout your life? (Please tick only one box).

Excellent	Very Good	Good	Fair	Poor

61. How would you rate your health right now? (Please tick only one box).

Excellent	Very Good	Good	Fair	Poor

62. On a scale from 1 to 10, how concerned are you about the Covid-19 pandemic? (Please circle one number).

Least concerned.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	Most concerned
-------------------------	----	----	----	----	----	----	----	----	----	-----	-----------------------

63. Do you feel that the Covid-19 pandemic has had an impact on your life? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

64. Explain in more detail the impact the Covid-19 pandemic has had on your life? (Feel free to add a page if this space is not enough and label [it](#) Q.64)

65. If there is anything you would like to tell me, please write in the space below. Feel free to add a page if this space is not enough and label it Q.65. I am very interested to read what you have to say.

Thank you very much for taking the time to answer my questions. Please return the questionnaire via post in the prepaid envelope provided. All your answers will remain confidential.

Appendix IV – Centenarian Participants’ County of Residence at Birth

Centenarian participants’ county of residence at birth		
	N	%
Dublin	4	8.2%
Roscommon	2	4.1%
Wexford	1	2.0%
Mayo	6	12.2%
Antrim	1	2.0%
Kerry	1	2.0%
Louth	4	8.2%
Carlow	1	2.0%
Meath	1	2.0%
Tipperary	2	4.1%
Offaly	3	6.1%
Cork	4	8.2%
Galway	6	12.2%
Other	2	4.1%
Clare	3	6.1%
Waterford	1	2.0%
Westmeath	1	2.0%
Monaghan	1	2.0%
Cavan	1	2.0%
Wicklow	1	2.0%
Leitrim	2	4.1%
Sligo	1	2.0%

Appendix V – Centenarian Participants’ County of Residence in Childhood

Centenarian participants’ county of residence in childhood		
	N	%
Dublin	5	10.2%
Roscommon	2	4.1%
Wexford	1	2.0%
Mayo	6	12.2%
Kerry	2	4.1%
Louth	4	8.2%
Carlow	1	2.0%
Meath	1	2.0%
Tipperary	1	2.0%
Offaly	3	6.1%
Cork	4	8.2%
Galway	6	12.2%
Other	1	2.0%
Clare	4	8.2%
Waterford	1	2.0%
Westmeath	1	2.0%
Monaghan	1	2.0%
Cavan	1	2.0%
Leitrim	2	4.1%
Sligo	1	2.0%
Donegal	1	2.0%

Appendix VI – SOLAS Employment by Occupation Groupings

SOLAS Employment by Occupation Groupings	
Managers, Directors, Senior Officials	<ul style="list-style-type: none"> • Functional managers & directors • Production managers in manufacturing, mining & energy • Financial managers & directors • Advertising, marketing & sales directors • Human resource managers • ICT specialist & project managers • Financial institution managers & directors • Managers & directors in transport & logistics • Managers & directors in retail & wholesale • Hotel & accommodation managers • Restaurant managers • Publicans • Managers & proprietors in other services
Professionals	<ul style="list-style-type: none"> • Chemical, biological & physical scientists; R&D managers • Other natural & social scientists • Civil engineers • Electrical & electronic engineers • Production, process, design & development engineers • Quality control engineers; other regulatory professionals • Engineering professionals N.E.C. • Programmers & software developers • ICT professionals N.E.C. • Medical practitioners • Pharmacists • Physiotherapists • Occupational & other therapy professionals • Nurses & midwives • Other health professionals N.E.C. • Higher & further education teaching professionals • Secondary teachers • Primary & nursery teachers • Teaching & other educational professionals

	<ul style="list-style-type: none"> • Barristers, judges, solicitors & related professionals • Accountants & tax experts • Mgt. consultants, business analysts & project managers • Actuaries, economists & statisticians; other business professionals • Social workers & welfare professionals • Media professionals
Associate Professionals	<ul style="list-style-type: none"> • Laboratory technicians • Electrical, electronic & engineering technicians • Process & quality assurance technicians • Other technicians • IT operations technicians • IT user support technicians • Health associate professionals • Youth & community workers • Welfare & housing associate professionals • Army personnel • Gardaí • Protective service occupations • Artistic, literary & media occupations • Design occupations • Sports & fitness occupations • Brokers & insurance underwriters • Finance & investment analysts • Financial & accounting technicians • Financial accounts managers • Other business associate professionals • Buyers & procurement officers • Business sales executives • Marketing associate professionals • Sales accounts & business development managers • Estate agents <i>etc.</i>; conference and exhibition managers • Environmental & other public services associate professionals • Human resources & industrial relations officers

	<ul style="list-style-type: none"> • Vocational & industrial trainers & instructors • Regulations inspectors; health & safety officers
Administrative and Secretarial	<ul style="list-style-type: none"> • Government administrative occupations • Financial administrative occupations • Records & library clerks <i>etc.</i> • Stock control, transport & distribution administrative occupations • Other administrators • Office managers & supervisors • Personal assistants & other secretaries • Receptionists
Skilled Trades	<ul style="list-style-type: none"> • Farmers • Horticultural, agricultural & fishing trades N.E.C. • Metal forming, welding & related trades • Metal machining, fitting & instrument making trades • Vehicle trades • Electrical & electronic trades <i>etc.</i> • Bricklayers • Plumbers • Carpenters & joiners • Plasterers • Painters & decorators • Other construction trades • Printing trades • Butchers, fishmongers, <i>etc.</i> • Chefs & cooks • Catering & bar managers • Other skilled trades
Caring, Leisure and Other Services	<ul style="list-style-type: none"> • Nursery nurses & assistants • Childminders, <i>etc.</i> • Educational support assistants • Care workers, home workers, <i>etc.</i> • Leisure & travel service occupations • Hairdressers & beauticians, <i>etc.</i> • Housekeepers & caretakers, <i>etc.</i>

Sales and Customer Services	<ul style="list-style-type: none"> • Sales assistants • Sales related occupations • Sales supervisors • Customer service occupations
Process, Plant and Machine Operatives	<ul style="list-style-type: none"> • Food, drink & tobacco process operatives • Chemical & related process operatives • Plant & machine operatives • Assemblers • Routine operatives • Construction operatives • Road transport drivers • Mobile machine drivers & operatives • Other drivers & transport operatives
Elementary Occupations	<ul style="list-style-type: none"> • Elementary agricultural occupations • Elementary construction occupations • Elementary process plant occupations • Elementary administration occupations • Elementary cleaning occupations • Elementary security occupations • Elementary sales & storage occupations • Kitchen & catering assistants • Waiters & waitresses • Bar staff • Other elementary services occupations

(SOLAS, 2022)

Appendix VI – Occupation of Centenarian Participants on Leaving Formal Education

Occupation of centenarian participants on leaving formal education		
	N	%
Housekeeper	1	2.0%
Ambulance Assistant	1	2.0%
Secretary	3	6.1%
Tradesperson	2	4.1%
Farmer	2	4.1%
Civil Service	2	4.1%
Religious Order	2	4.1%
Dentist	1	2.0%
Agricultural Industry	4	8.2%
Domestic Attendant	1	2.0%
Horse Trainer	1	2.0%
Teacher	3	6.1%
Healthcare Assistant	3	6.1%
Shopworker	2	4.1%
Personal Assistant	1	2.0%
Scientist	1	2.0%
Family Duties	3	6.1%
Doctor	1	2.0%
Nurse/Midwife	3	6.1%
Pharmacist	1	2.0%
Tailor/Seamstress	2	4.1%
Accountant	1	2.0%
Childcare	1	2.0%
Hospitality Industry	4	8.2%
Post Office Worker	1	2.0%
Printing Co. Employee	1	2.0%

Appendix VII - Offspring Quantitative Study Research Pack



Research Hub East Campus
Athlone Institute of Technology
Dublin Road
Athlone
Co. Westmeath

Dear Participant,

I would like to invite you to take part in a research study exploring the lives lived by Irish centenarians. I am interested in hearing from you as the child of a centenarian parent and I am curious as to how having a parent who has lived to be 100 years or older has shaped your own life and the impact it has made (if any) on you. Before you decide whether or not you would like to take part, it's important that you understand more about why this research is being done and what taking part will involve. Please read the following information carefully. Should you have questions in relation to the study or if anything you read is not clear please do not hesitate to contact me on 0857515678.

What is this study about?

Centenarians are one of, if not that fastest growing population group not only in Ireland but worldwide and this trend shows no sign of slowing down anytime soon. It is well documented that people with familial longevity (families wherein the life expectancy is greater than that of the average population) not only live longer but live more years in good health in comparison to their peers. While the role of genetics in contributing to living longer cannot be disputed, a range of other factors including environmental factors and social factors shared by the centenarians and their family members may help to identify what else in one's life contributes to exceptional ageing. This study is being done as part of my PhD and in exploring the phenomena of Irish centenarians I am very interested in gaining an insight into what it is like to have a centenarian parent.

Why have you been invited to take part?

You have been invited to participate as you are the child of an Irish centenarian (i.e. a person who has lived to be 100 years or older) and I am interested in gaining a deeper understanding what this experience has been like for you.

Do you have to take part?

It is entirely up to you to decide whether or not you would like to partake in the study. If you want more information in relation to the study please do not hesitate to contact me directly, I am happy to help and answer any questions that you may have. If you do decide to take part, you will be asked to sign a consent form, however, you are still free to withdraw at any time in the process of the study without having to explain yourself or the reasons for your decision to withdraw.

What will taking part involve?

Taking part will involve completing the enclosed questionnaire and returning it to me via post in the prepaid envelope provided.

What are the possible disadvantages, risks or side effects of taking part?

There are no foreseeable risks to participating in the study. You may find some questions are concerned with personal choices, opinions or preferences. Should you feel uncomfortable in relation to answering any of the questions in the questionnaire you are free to stop participating in the study or you can also refuse to answer any question without need for explanation.

What are the benefits of taking part?

The direct benefits to you are minimal, but I do think the study will contribute to a better understanding of life for older people in Ireland and positively influence and improve the services available to them through policy reformation and development.

Will my taking part in the study be kept confidential?

All the information which is collected during the course of the research will be kept strictly confidential. The data will be collected and stored in accordance



with the Data Protection Act Ireland 2018 and secured against unauthorised access.

What will happen to the results of the study?

The results of the study will be published through the submission of a PhD thesis. Results from this study may also be made available through conference participation and publication in peer-reviewed journals. All data will be completely anonymised and as such you will not be identifiable.

Who has reviewed the study?

Ethical approval was granted by Athlone Institute of Technology Ethics Committee.

Who is funding this study?

This research is supported and funded by Athlone Institute of Technology President Seed Fund.

Who should you contact for more information?

If you have any questions relating to this research, or concerns about participation, please contact Alison Fagan via email at a.fagan@research.ait.ie, by telephone on (0857515678) or by post c/o Research Hub East Campus, Athlone Institute of Technology, Dublin Road, Athlone, Co. Westmeath.

Contact Information

Project Supervisors

Dr Mary McDonnell Naughton	mmcdonnell@ait.ie
Dr Patricia Heavey	pheavey@ait.ie
Ms Lorraine Gaffney	lgaffney@ait.ie

Consent Form

Please tick the below boxes and sign at the end of the page if you agree to participate in this research study and answer the following questionnaire as an individual with a parent who has lived to be 100 years of age or older.

1: General	Tick
I confirm that I have read and understood the Information Letter for this study.	
I understand that this study is entirely voluntary and, I can stop my participation at any time without giving a reason.	
I understand that I will not be paid or compensated for participating in this study.	
I know how to contact the research team if necessary.	
I agree to take part in this research study having been fully informed of the risks and benefits.	
I agree to being contacted by AIT to follow up on my participation in this study, provided I have not stated I wish to withdraw completely from the study.	

2: Retention of Information for Future Research	Tick
I agree to my personal information being stored for possible future research related to the current study on ageing. I understand any future research must be approved by a Research Ethics Committee.	
I understand that I will not be paid for any future uses or outcomes from the processing of my personal information	

To be completed by the Participant

 Name (BLOCK CAPITALS)

 Signature

 Date



This questionnaire is a part of a research study exploring the social factors that have influenced how Irish centenarians like your parent(s) have aged. As the child of a centenarian living in Ireland, I greatly value your participation in this study and hope that you find this questionnaire interesting to complete. Your answers are very important. Please remember that your participation is voluntary, and you are free to withdraw from the study at any time should you wish to do so.

How to fill in this questionnaire:

Please answer questions by

Ticking a box like this

Or circling an answer like this: 1 2 **3** 4 5

Sometimes you will find an instruction telling you which questions to answer next like this:

Yes No (Go to Question 7)

How to return this questionnaire:

Please post this questionnaire back to me directly in the prepaid envelope provided to:

Alison Fagan
Research Hub East Campus
Athlone Institute of Technology
Dublin Road
Athlone
Co. Westmeath

If you have any questions about the questionnaire, please feel free to call me on 0857515678.



I.D Number (office use only)	
Date of Birth	_/_/_ Date/Month/Year
Gender	Male <input type="checkbox"/> Female <input type="checkbox"/> Other <input type="checkbox"/>
Which of your parents lived to be 100 years old? (Please tick only one box).	Mother <input type="checkbox"/> Father <input type="checkbox"/> Both <input type="checkbox"/>
What age is your centenarian parent(s) at the time of you completing this questionnaire? <i>(If both are living and both are centenarians please distinguish between your two parents (e.g. mother, 101 years & father, 100 years).</i>	
What electoral area did you belong to during childhood <i>(please include town and county).</i>	



1. Growing up, what type of housing did you live in? (Please tick only one).

Property owned by parents	<input type="checkbox"/>
Property rented by parents	<input type="checkbox"/>
Council house	<input type="checkbox"/>
Lived with grandparents	<input type="checkbox"/>
Lived with another family member (e.g. aunt, uncle)	<input type="checkbox"/>
Other (please specify: _____)	<input type="checkbox"/>

2. Would you say that you felt safe and secure in the home in which you grew up? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. Did you have access to utilities such as heat, running water and electricity in your home growing up?

YES (Go to Question 5) NO

4. If you did not have access to these utilities, what resources did you use instead of them (e.g. natural light/candles/torches, well or spring water). Please tell me more:

5. Would you say that you had sufficient access to utilities (heat, running water, electricity etc.) in the home in which you grew up? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

6. Growing up, in comparison to your peers, how would you have viewed your access to the utilities mentioned above (heat, running water, electricity)? (Please tick only one box).

Better	About the same	Worse

7. Did you like the home in which you grew up? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

8. Did you go to school?

YES NO (Go to Question 14)

9. At what age did you leave school? _____

10. What was the highest level of education you achieved? (Please tick only one box).

Primary School	
Primary School (obtained Primary School Certificate)	
Secondary School to Group Cert	
Secondary School to Intercert	
Secondary School to Leaving Certificate	
Technical College	
Nursing Qualification	
Apprenticeship/Trade	
University	
Other (please specify: _____)	

11. Did you attend public or private school (at either primary or secondary school level)?

Public Private

12. If you attended private school did your parents pay for this?

YES NO N/A

If no, who paid for your private schooling?

13. If you continued your education beyond secondary schooling (e.g. technical college, apprenticeship, university), did your parents pay for this?

YES NO N/A

If no, who paid for your education after leaving secondary school?

14. Did you stay in school for as long as you would have liked to?

YES NO

If no, please tell me why you didn't reach the level of education you would have liked to?

15. Do you feel that your centenarian parent(s) viewed education as being important? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

16. Growing up, did you have a part-time time job?

YES NO

17. Growing up, did you have to contribute financially to the household (i.e. give some or all of your wages to either of your parents)?

YES NO

18. Growing up, were you expected to contribute in ways other than financially to the household (e.g. household chores, babysitting, caring for older relatives etc.)?

YES NO

Tell me more about this and the contributions that you made:

19. Do you feel that there were any worries or concerns about money or finances growing up that you can remember? (Please tick only one).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. Rate these concerns/worries on a scale from 1 to 10 with 1 being least concerned and 10 being most concerned. (Please circle only one number).

Least concerned.	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	Most concerned
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21. Growing up, in comparison to your peers, how would you have viewed your household's financial situation? (Please tick only one box).

Better	About the same	Worse

22. After you left school did you work/get a job?

YES NO

If yes, what did you work as? (e.g. farmer, stay at home parent, teacher etc.)

23. Did your centenarian parent(s) influence your career choice? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

24. Would you say you are happy with the career choice you made? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

25. Do you still work now?

YES (Go to Question 27) NO

26. At what age did you retire? (Please tick only one box).

Younger than 50 years (<50 years)	
50 – 55 years	
56 – 61 years	
62 – 67 years	
Older than 67 years (>67 years)	

27. Would you say you have had many hobbies or pastimes throughout your life? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

28. Throughout your life have you been engaged in any organisations, clubs or societies in your community?

YES NO

29. Are you still involved with these (or similar) organisations, clubs or societies in your community today?

YES NO

30. Did your centenarian parent(s) involvement in organisations, clubs or societies influence your participation in them? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

31. Do you feel that you are well connected to others in your life? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

32. Would you say that you have family/friends or other persons to whom you could turn to or rely on throughout your life? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

33. Would you say that you have often felt lonely? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

34. Would you yourself identify as being religious or spiritual? (Please tick only one box).

Religious	Spiritual	Both	Neither

35. Would you say religion/spirituality has played a very important role in your life? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

36. Prior to the Covid-19 outbreak how often did you attend religious services/places of worship (e.g. church)? (Please tick only one box).

Daily		On Sundays only	
4-6 days a week		2-3 times per month	
2-3 days a week		Once a month	
Once a week		Never	

37. Did your centenarian parent's views on religion/spirituality influence your own views on religion in adulthood? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

38. Growing up, would you say that you had good access to healthcare services/providers (GP, Public Health Nurse, Physiotherapist, Dentist) as you needed them? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

39. Do you feel that you have healthcare services/providers (e.g. GP, Public Health Nurse, Physiotherapist, Dentist) etc. readily available to you at this time? (Please tick only one box).

Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

40. Growing up, do you know if you had access to public or private healthcare?

Public Private Unknown

41. What type of access to healthcare have you at this time?

Public Private

42. How would you rate your own health throughout your life? (Please tick only one box).

Excellent	Very Good	Good	Fair	Poor

43. In comparison to your centenarian parent at the same age, how would you rate your health right now? (Please tick only one box).

Better	About the same	Worse

44. Would you personally like to live to be 100 years of age?

YES NO

Explain your answer to *Question 44* in more detail:

45. If there is anything you would like to tell me, please write in the space below. Feel free to add a page if this space is insufficient. I am very interested to read what you have to say.

Thank you very much for taking the time to answer my questions. Please return the questionnaire via post in the prepaid envelope provided. All your answers will remain confidential.

Appendix VIII – Offspring Participants County of Residence Growing Up

Offspring participants' county of residence in Childhood		
	N	%
Dublin	4	13.8
Roscommon	1	3.4
Limerick	1	3.4
Mayo	3	10.3
Meath	1	3.4
Westmeath	7	24.1
Tipperary	1	3.4
Louth	2	6.9
Cavan	1	3.4
Cork	3	10.3
Galway	1	3.4
Offaly	1	3.4
Down	1	3.4
Wicklow	1	3.4
Leitrim	1	3.4

Appendix IX – Centenarian Offspring Perceptions of Parents Longevity

Centenarian Offspring Perceptions of Parents Longevity

“Watching my mum trying to answer questions was hard as she is getting deafer, eyesight not great and her health has failed since Christmas gone. She may not make it to her 103rd birthday because she was only given a year since she was last in hospital Portiuncla 2019 December... Mum too had pneumonia that impinged on her ongoing heart problem of atrial fibrillation - recently she has had a chest infection with worsening heart failure, every day is a bonus for her. I am glad of having carers coming in despite of the pandemic to give me a break as I have had to move home permanently”

“I came from a very stable home and had a great opportunity to mix with urban and rural communities which gave me a great balance in my life especially in my career as a G.P”

“... it’s probably not too many that lives to be 100 and to be in the shape our dad is in”

“Mother's favourite sayings are: ‘Your health is your wealth’ and ‘It's better to be born lucky than rich’, which are both very true, we didn't have much wealth, but we had health. My mother is the oldest sibling in her family and the rest of her family 3 brothers, and 2 sisters are dead. Her other sister died at 90 years of age and the rest were younger. Her dad, my grandfather, lived to be 93 years old. Her mum was 87 years old. My mother has a very inquisitive nature maybe extreme; she would have made a great detective or journalist. I often wonder if she was young now and had a career what it would be. As regards food she ate organic which my dad grew. She also loves her wines and whiskeys and still to this day she can drink brandy. She has a very strong digestive system and would try any type of new dishes and variety for her is the ‘spice of life’”

“Mum would often say that 'old age has nothing to recommend it' as every day is a struggle for her, she has less and less energy and more and more medical issues but we as a family are glad that she is still with us and still has all her faculties in that she can still see/hear and converse with us. Prior to Covid restrictions she was the person around whom our whole world revolved with many family gatherings and lots of wonderful memories created for her and us. She is still obviously very much the centre of our world but the lack of visitors to her home has caused a lot of sadness and a lack of stimulation from all the various age groups in our family. She has little to look forward to now but is still very thankful for all the blessings that are in her life. Her quality of life is reducing daily, but we are very privileged to be in her company and to be able to care for her”

“My parent’s attitude to religion had a very negative impact on my childhood, my teenage years and my early married life. My parents were totally under the influence of the church to a point where common sense and compassion were often over-rated. My career prospects (‘Why would a girl need to go to university?’), relationship with my brother (‘boys are more important than girls’) and the adoption of my first child (‘shame!!’) were all combined to cause pain and misery”

“People who know me well would tell you that I usually have a lot to say on some subjects so I will confine my comments to my centenarian mother and almost centenarian father. They were excellent parents who by their example showed us the value of honesty, humility, integrity, hard work, loyalty, and support. Their example showed us the value of community the Vincentian motto "It is in giving that we receive". They were an extremely warm and loving couple and welcoming to extended family and friends. While they set the bar very high, we all hope to pass their attributes on to our own children who know/knew them well and loved them. Finally, but importantly, our Down's Syndrome Sister has also been a huge and unifying influence in my own and my other sisters lives and families”

“Strong religious beliefs, community connections and fish on a Friday. Routine and the ability to process life events has always stood to him”.

“We as a family feel blessed to have our mother still with us in her 100th year, happy and healthy. The pandemic had not been easy, but my mother is now fully vaccinated, and we all look forward to a better 2021”.
