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Frailty increases the likelihood of elder abuse – a systematic literature review

and;

A cross-sectional study exploring frailty in older people and the possible inter-relationship with early adverse childhood experiences

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Doctorate in Clinical Psychology

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Frailty increases the likelihood of elder abuse – a systematic review

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Dedication

For my grandfather

Who still inspires me today

“Do not go gentle into that good night, old age should burn and rave at close of day; rage, rage against the dying of the light” – Dylan Thomas

Contents

Thesis Portfolio Abstract

This thesis aimed to review abuse across the lifespan of an individual, from childhood to older age and how frailty may be both a consequence and a predictor of abuse. The thesis is split into two chapters. The first chapter is a systematic literature review assessing whether frailty is associated with an increased incidence of elder abuse and neglect (EAN). The review included nine studies which provide evidence that frailty may lead to an increased incidence of elder abuse and neglect. Furthermore, it reviews other factors and perpetrator characteristics that may also lead to elder abuse and neglect. Recommendations comprise using longitudinal studies to establish internationally recognised definitions and measures for both frailty and EAN, and the development of evidence-based interventions for people who are older. The second chapter is an empirical study exploring the potential link between adverse childhood experiences (ACEs) and an increased level of frailty in people who are older. A cross-sectional questionnaire design was completed in an NHS setting. Correlation and multiple hierarchical regression analyses were performed. Although there was no association reported between ACEs and frailty, both an increased number of social connections and a positive perception of self were negatively correlated with frailty. Recommendations suggest creation of preventative measures for frailty that incorporate both physical and social interventions, within the context of recent social distancing measures imposed by COVID-19.

Lay Summary

Unfortunately, abuse and neglect can happen at any point during an individual's lifetime. When it does happen, it can have devastating consequences for the personal and wider community. As such, this thesis hopes to explore how abuse and neglect during childhood may make it more likely for a person to experience abuse and neglect as an older adult.

The thesis comprises two chapters. The first chapter is a review of studies; it is concerned with whether being frail in older age increases a person's chances of experiencing elder abuse and neglect (EAN). This is a priority as the global population of older adults is currently the fastest growing population in the world. The chapter reviewed nine studies which looked at various risk factors that might lead to an individual being a survivor of EAN, including frailty. It also reviewed other risk factors and perpetrator characteristics that might also contribute to an increased chance of EAN. Overall, this chapter found that female, frail, cognitively impaired, oldest-old individuals who require more assistance with ADLs and have lower sociodemographic status are at the most risk of abuse.

The second chapter is a research study. The study was carried out with people aged 65 years or older. It was interested in finding out if there was a relationship between adverse childhood experiences (ACEs) and increased levels of frailty in older age. It was also interested to review whether an individual's resilience reduced the unhelpful impact of ACEs in older age. Participants completed three questionnaires to assess their level of frailty, resilience, and number of ACEs in childhood. The results showed that there was not a relationship between number of ACEs in childhood and how frail they were as adults. However, that there was a relationship between how many social outlets someone had, their confidence in themselves, and a reduction in frailty. This suggests that future treatments of frailty should include a social aspect as well as helping people with their physical health.

Chapter 1. Systematic Review

Frailty increases the likelihood of elder abuse – systematic review

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Abstract

Objective: As the global population of people who are older increases, there is also potential for the incidence of elder abuse and neglect (EAN) to rise. Although previous reviews have assessed potential risk factors for EAN in the past, there has been a scarcity when considering geriatric syndromes such as frailty. Therefore, this review assessed whether a potential relationship existed between frailty and increased EAN.

Method: A systematic review of the literature was completed. Included databases comprised: EMBASE, OVID, AMED, and Proquest. Studies reporting on frailty and one form of EAN, containing adults 60 years of age or older, in community or institutional settings, were included.

Results: This review included 9 studies reporting on frailty and EAN. The methodological strength of the studies ranged from moderate to good. A narrative analysis provides evidence that frailty is associated with an increased incidence of EAN and that female, frail, cognitively impaired, oldest-old individuals who require more assistance with ADLs and have lower sociodemographic status are at the most risk of abuse.

Conclusion: Although there has been an increase in research reviewing the risk and protective factors for both frailty and EAN there is still a paucity when considering their potential overlap and association.

Word count: 201

Introduction

The United Nations has stipulated that the population of people aged 60-years and older will double from 962 million, in 2017, to 2.1 billion by 2050. In addition to this, the population of individuals aged 80-years and over will triple from 137 million to 425 million in the same period (United Nations, Department of Economic and Social Affairs, 2019). In the United Kingdom (UK), the population of those aged 65 and over is estimated to grow from 10.4 million to 12.4 million by 2025 with life expectancy increasing by 1.7 years (Guzman-Castillo et al., 2017). As a result of increased life expectancy, there has been a global epidemiological shift, in which older adult mortality is more likely to result from age-related degenerative diseases than from infectious diseases (Vaupel, 2010). However, with the recent outbreak of COVID-19, healthcare systems may be placed under unprecedented strain as there may be an increase in mortality caused by infectious diseases (Hewitt et al., 2020). As age related disease increases, resulting in physical and cognitive decline, so too does the incidence of frailty which has been described as the most problematic expression of aging in this population (Clegg, Young, Iliffe, Rikkert, & Rockwood, 2013b). The global prevalence of frailty in community settings ranges from 3.9% to 51.4% and its incidence is reported to be 43.4 cases per 1000 people (Ofori-Asenso et al., 2019; Siriwardhana, Hardoon, Rait, Weerasinghe, & Walters, 2018). This is in line with a recent report reviewing frailty in Scotland, which stated that the percentage of mild, moderate, and severe frailty in the over 65 population ranged from 5% to 55% (Healthcare Improvement Scotland, 2019). However, this has been noted to change depending on the instrument used to measure frailty and the country prevalence is studied in (O'Caoimh et al., 2018).

Frailty

Frailty has been associated with several negative health outcomes such as falls (Cheng & Chang, 2017), institutionalisation (Kojima, 2018), delirium (Persico et al., 2018), disability (Kojima, 2017), and premature mortality (Dent & Hoogendijk, 2014; Kojima, Iliffe, & Walters, 2018). Furthermore, it is also an independent risk factor for poorer long-term outcomes after surgery and contributes to service burden and increased costs for both the individual and healthcare systems (Bock et al., 2016; Lin, Watts, Peel, & Hubbard, 2016). Frailty has also been associated with increased caregiver burden in informal care settings (Ringer et al., 2016). It is also estimated that an individual diagnosed with frailty will cost the healthcare system seven times more than their non-frail counterparts (Hajek et al., 2018). As a result of these negative outcomes, international agencies such as the World Health Organisation (WHO) and the European Innovation Partnership on Active and Healthy Ageing (EIP on AHA) have developed long-term support plans. These plans are designed to promote wellbeing,

independence, and autonomy for older people by strengthening links between research, practice, and healthcare policy. At a more local level, the General Medical Services (GMS contract in England dictates that all primary care services, working with individuals aged 65 and over must use validated and appropriate tools to identify those suspected and/or are living with frailty. Furthermore, in individuals diagnosed with severe frailty, practices must provide annual medication assessments, monitor falls over a 12-month period, and undertake routine clinical reviews.

The WHO definition, which defines frailty as: "*a clinically recognisable state in which the ability of older people to cope with every day or acute stresses is compromised by an increased vulnerability brought by age-associated declines in physiological reserve and function across multiple organ systems"* is widely accepted and has been adopted by the European Union (World Health Organisation, 2016). Although frailty research has increased exponentially over the past decade because of the consequences discussed above, there is still no internationally consensus for a frailty definition (Rockwood & Howlett, 2018). This is thought to be the result of its complex aetiology, congruency with other syndromes of aging, varied use of different frailty measures, and the independent work of frailty researchers as a result of cultural differences (Dent, Kowal, & Hoogendijk, 2016). Nonetheless, most definitions of frailty have common factors such as decreased reserves/ capacity to tolerate stressors, impairment across multiple physiological systems, and increased vulnerability to negative health outcomes (Gobbens, Luijkx, Wijnen-Sponselee, & Schols, 2010).

Regardless of definition, the two most common conceptualisations of frailty are: 1) the **frailty index** and 2) **frailty phenotype** (Rodríguez-Laso et al., 2020; WHO, 2016). The former, suggests that frailty is the consequence of an accumulation of deficits across the life course of a human which can comprise symptoms, diseases, disabilities, and/or laboratory abnormalities (Mitnitski, Rutenberg, Farrell, & Rockwood, 2017). These are calculated on a 40-point scale for example, if an individual scored 20 out of 40 deficits their frailty score would be 0.50. The scale includes both physical and psychosocial components of frailty. Fried's frailty phenotype, on the other hand, suggests that frailty is present when individuals meet three or more criteria that define frailty: self-reported exhaustion, slow walking speed, unintentional weight loss, weakness, and low physical activity (Fried et al., 2001). It is thought that frailty is maintained due to undernutrition, declining energy expenditure, and a cycle of sarcopenia and is triggered by stressors in the person's environment (Walston, 2015). In terms of the factors that lead to frailty, psychological factors such as depression and anxiety (Dent & Hoogendijk, 2014; Monin et al., 2016; Vaughan, Corbin, & Goveas, 2015), sociodemographic factors such as living alone, poverty, deprivation, and low education level (Hoogendijk et al., 2014; Poli et al., 2017; Semba et al., 2006), polypharmacy (Gutiérrez-

Valencia et al., 2018), diseases (dementia, cancer, and endocrine disorders) and comorbidity (Espinoza, Quiben, & Hazuda, 2018) have all been identified.

Elder Abuse and Neglect

Another consequence of an aging global population is thought to be an increasing incidence of elder abuse and neglect (EAN) (Yon, Mikton, Gassoumis, & Wilber, 2017). Similar to frailty, elder abuse is being increasingly recognised as an extensive problem that is destructive for both the individual and wider society (Yunus, Hairi, & Choo, 2019). EAN, like frailty, has been linked to several negative health outcomes such as increased incidence of disability (Schofield, Powers, & Loxton, 2013), early mortality (Baker, 2007), depression and anxiety (Cooper & Livingston, 2014; Santos, Nunes, Kislaya, Gil, & Ribeiro, 2017), chronic pain (RM Yunus et al., 2018), and hospitalisation (Dent & Hoogendijk, 2014). EAN is commonly categorised into five subtypes: physical, emotional (psychological), sexual, financial (exploitation), and neglect. The WHO and Action on Elder Abuse, in the United Kingdom, define EAN as "*a single or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust which causes harm or distress to an older person*" (World Health Organisation, 2015). This definition has also been adopted by the International Network for the Prevention of Elder Abuse and is the most utilised. A recent review by Yon, Mikton, Gassoumis, & Wilber, (2017) estimated the pooled prevalence for aggregate EAN in the community was 15.7%, with the most common being psychological abuse (11.6%), followed by financial abuse (6.8%), neglect (4.2%), physical abuse (2.6%), and sexual abuse (0.9%). This translates to one in six older adults worldwide, resulting in roughly 141 million people, these estimates were even higher when considering institutional settings. A review by Yon, Ramiro-Gonzalez, Mikton, Huber, & Sethi, (2019) reported that 64.2% of staff had admitted to EAN and that the prevalence for psychological 33.4%, physical 14.1%, financial13.8%,, and sexual abuse was 11.6%, and 1.9% respectively. These figures are consistent with anecdotal evidence that abuse of older adults in institutional and/or residential facilities is higher than in the community (Castle, Ferguson-Rome, & Teresi, 2015).

Although EAN affects millions of people who are older every year, it has been suggested that EAN research is 10 to 30 years behind other forms of abuse such as child abuse and domestic violence (National Research Council, 2003). However, research has now reached saturation and academics are now able to explore and identify key variables and/or risk factors related to EAN. Bonta & Andrews, (2010) argue that risk factors can be either static or dynamic in nature. Static variables are those that do not change over time and often include gender, and a history of child abuse and/or violence. Dynamic variables, however, are those which can be altered through short or long-term interventions such as perpetrator substance abuse and/or

victim depression. Several reviews have discussed risk factors and have categorised them as victim and perpetrator characteristics. Victim characteristics comprise physical and cognitive impairment leading to dependency, mental health problems – particularly depression, substance misuse, interpersonal problems within family relationships, and unhelpful attitudes such as self-blame or desire to protect the perpetrator. Perpetrator characteristics, on the other hand, revolve around unmet needs for assistance, depression, dependency on the older person, unhelpful attitudes towards aging, and the strongest predictor – drug misuse (X. Q. Dong, 2015; Johannesen & Logiudice, 2013; Pillemer, Burnes, Riffin, & Lachs, 2016; Storey, 2020). Roberto & Teaster's (2017) contextual theory of elder abuse combines both Bronfenbrenner's (1986) ecological model of human development and the Centre for Disease Control social-ecological model and stipulates that the intersectional elements of an individual's identity such as age, gender, disabilities, and ethnicity, interact with their dynamic relationships, community, and societal norms which all influence EAN. As such, although EAN can be construed as an individual problem, it is a public health issue that exists in relational, community, and societal settings worldwide (Lowenstein, Eisikovits, Band-Winterstein, & Enosh, 2009; Pillemer et al., 2016)

Aims

Frailty and elder abuse can be devastating for both the individual, wider society, and place a huge burden on global populations. Furthermore, both frailty and EAN share several negative health outcomes such as increased hospitalisation, disability, depression and anxiety symptoms, and early mortality. Although there have been reviews assessing risk factors for EAN, Yunus et al., (2019) note that there has been a scarcity of evidence when considering "geriatric syndromes" such as frailty. As such, this literature review aims are:

- To Investigate whether there is a relationship between frailty and EAN
- To investigate other factors such as social, economic, physical, emotional, and systematic in the context of this potential relationship

Method

Protocol

The systematic review was completed following PRISMA-P guidelines and the protocol was registered on PROSPERO with the reference number: CRD42019161910 available from https://www.crd.york.ac.uk/prospero/display_record.php?ID=CRD42019161910

Search Strategy

A search strategy was developed in consultation with the author's supervisor and an expert librarian. The following databases were searched: AMED, EMBASE, Psychinfo, PsychArticles, and OVID MEDLINE(R) via OVID; PubMed, CINAHL via Ebsco Host; and Social Services Abstracts via Proquest. A search of online Dissertation and Theses databases (via ProQuest) was also completed to identify potential unpublished studies. Finally, a hand search was completed of reference list of relevant papers and the author completed a search of Google Scholar (first 10 pages). The following combination of search terms were used: aged OR geriatric* OR older people OR older adult OR seniors AND frail* OR frail elder* AND abuse* OR elder mistreatment OR neglect*.

Data Extraction

After completing the initial search 1887 papers were identified, once duplicates were removed 1434 remained. After an abstract screen 43 papers were reviewed in full to assess eligibility to be included in the review. Once eligibility had been assessed, 9 studies were included and assessed for methodological quality. Figure 1 demonstrates the PRISMA-P flow diagram of the full systematic search process (Moher, Liberati, Tetzlaff, & Altman, 2009).

Inclusion and exclusion criteria

The follow inclusion criteria were used: studies comprising older adults (≥60-years-old) in a community, residential, institutional, or care setting. Studies also had to report on frailty, one form of abuse (physical, emotional, financial, or sexual) and/or neglect and report and/or discuss an association between these variables in their results. Abuse was defined using the WHO definition of elder abuse, taken from Action on Elder Abuse: "*a single, or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust which causes harm or distress to an older person*" (Action on Elder Abuse, 1995).

In terms of exclusion criteria, studies that could not be sourced in English or were published before the above definition of elder abuse were excluded.

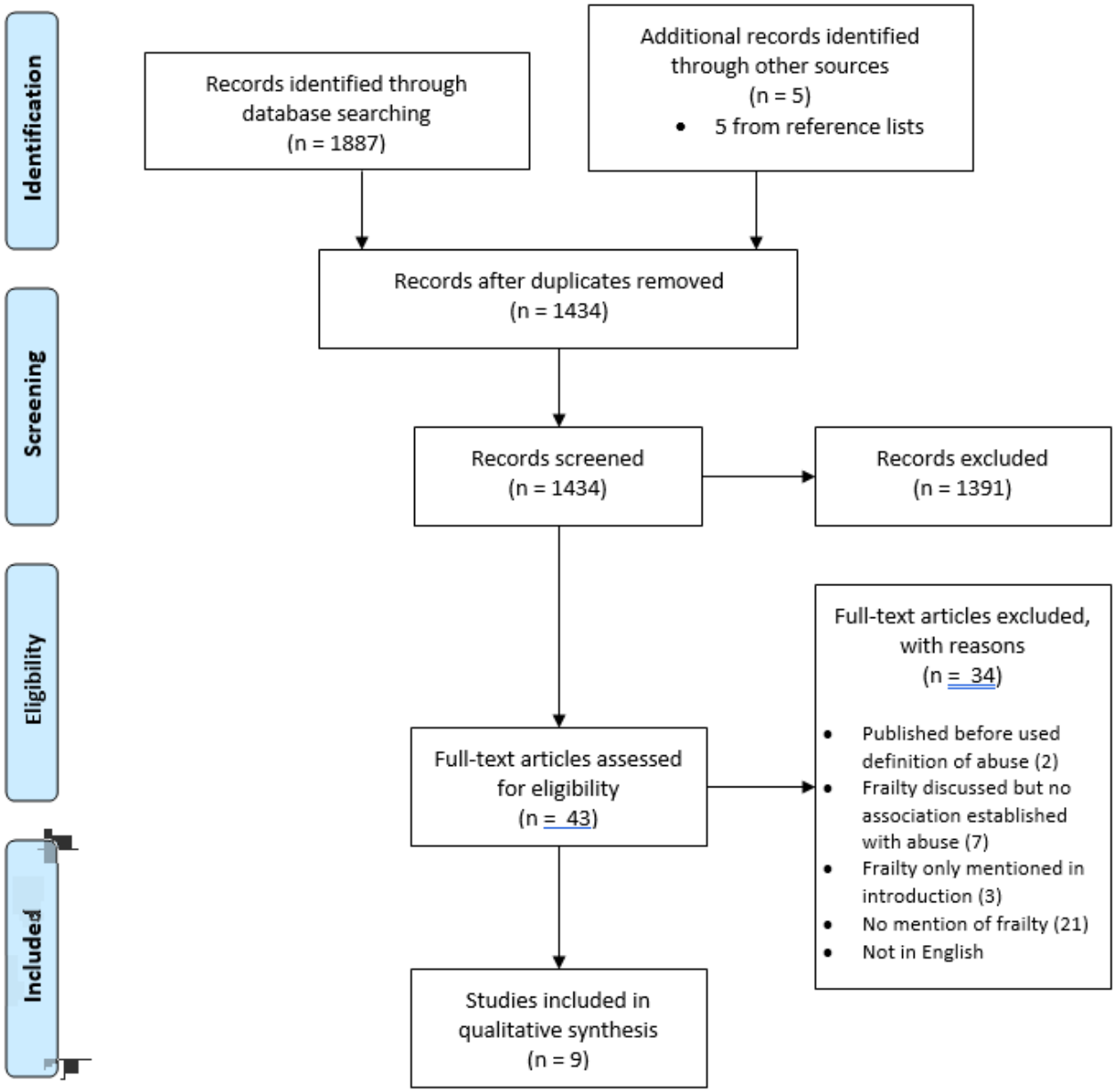

Figure 1 – Prisma Flow Diagram

Quality Assessment

Methodological quality was assessed using the Joanna Briggs Institute (JBI) critical appraisal tool for analytical cross-sectional studies (Moola et al., 2017). The JBI critical appraisal tool for analytical cross-sectional studies uses 8-items to addresses potential bias and confounders that may be introduced into the study's design, conduct, and analysis. These domains are rated as either: "*yes*", "*no*", or "*unclear*", ranked as either a 1, 0 , or 0.5 , respectively. Based on previous literature (Arab-zozani et al., 2018), studies were placed into one of three categories: good (7 to 8), moderate (4 to 6), or poor (1 to 3). In line with best

practice and to ensure consistency in the quality assessment, all papers were blindly rated by a second researcher (AF). There was a strong agreement between the two researchers (k = .865, *p* = .001).

Results

Characteristics of included studies

A total of nine studies were included in this review. All included studies were of a cross-sectional design and sampled a total of 4207 participants; of which, 2312 were community dwelling older adults and 1895 were in residential care and/or hospital. The mean age of participants ranged from 73 – 89 and all studies had a higher ratio of females to males ranging from 54.8% - 96.6%; only one study did not provide a breakdown (M. Cohen, 2008). In terms of location, two studies were completed in America (Fulmer, Paveza, VandeWeerd, Fairchild, et al., 2005; Fulmer, Paveza, VandeWeerd, Guadagno, et al., 2005), three in Israel (M. Cohen, 2008; M. Cohen, Halevy-Levin, Gagin, Priltuzky, & Friedman, 2010; Iecovich, Lankri, & Drori, 2004), two in Mexico (Piña-Escudero, García-Lara, & Avila-Funes, 2017; Torres-Castro, Szlejf, Parra-Rodríguez, & Rosas-Carrasco, 2018), one in Japan (Anme, McCall, & Tatara, 2005; Shibusawa, Iwano, Kaizu, & Kawamuro, 2014), and one in the United Kingdom (Lee, Majeed-Ariss, Pedersen, Yusuf, & White, 2019).

In terms of reported percentages of abuse, five studies discussed physical abuse which ranged from 2.2% to 59.3% of the participants studied (Anme et al., 2005; M. Cohen et al., 2010; Iecovich et al., 2004; Lee et al., 2019; Piña-Escudero et al., 2017; Torres-Castro et al., 2018), three reported on emotional/psychological abuse, ranging from 46% to 65% of (Anme et al., 2005; Iecovich et al., 2004; Piña-Escudero et al., 2017), three reported on sexual abuse, ranging from 1.3% to 7.10% (Anme et al., 2005; Iecovich et al., 2004; Piña-Escudero et al., 2017), four reported on financial abuse, ranging from 2.8% to 40% (Anme et al., 2005; M. Cohen et al., 2010; Iecovich et al., 2004; Piña-Escudero et al., 2017; Torres-Castro et al., 2018), eight reported on neglect, ranging from 12.6% to 42.8% (Anme et al., 2005; M. Cohen, 2008; M. Cohen et al., 2010; Fulmer, Paveza, VandeWeerd, Fairchild, et al., 2005; Fulmer, Paveza, VandeWeerd, Guadagno, et al., 2005; Iecovich et al., 2004; Piña-Escudero et al., 2017; Torres-Castro et al., 2018), and four reported on multiple abuses, ranging from 4.2% to 85.7% (Anme et al., 2005; M. Cohen et al., 2010; Iecovich et al., 2004; Torres-Castro et al., 2018).

Several different measures were used for both frailty and EAN. In both cases, there are currently no identified “gold standard” measures and this has been noted as a weakness of both evidence bases. For example, in a recent review of frailty measure in clinical practice

and research, Dent et al., (2016) found that from 422 identified studies, 29 different frailty measures had been used and that in many of these had been edited from their original format. As mentioned previously, this is thought to be due to frailty's complex aetiology, congruency with other OA conditions, and the separate work of frailty researchers due to cultural differences. In terms of elder abuse measures, after reviewing 695 papers in their review, Gallione et al., (2017) notes that although 11 tools were identified they were unable to indicate a single tool as "gold standard" as many had been designed for use in specific situations for example, the emergency department, or in combination to assess all aspects of elder abuse.

See Table 1 for a breakdown of the key characteristics of each study.

Table 1. Overview of included studies

Study	Study Design/ Location	Sample population/ inclusion	Gender ratio (% female)	Mean age (SD ±)	Measure(s) used for frailty and abuse(s) and/or neglect	Key Findings (frailty)	Other factors identified leading to abuse	Perpetrator Characteristics (if reported)
Anme, T., McCall, M., & Tatara, T. (2005)	Cross-Sectional Japan	78 community dwelling older adults, aged 60 years or older, receiving at least one support service.	78.6%	Abused men 80.3 (SD 12.4) Abused women 81.2 (SD 7.0)	Frailty measure was based on five categories of level ADL impairment. Abuse measure designed for study, based on National Centre on Elder Abuse criteria (NCEA, 2004)	Individuals with a greater level of frailty, needing more help with ADLs were more likely to be abused (57.1%) than those who were not abused (32.8%; .10<p<.05).	-Cognitive impairment -reduced social role -behavioural problems -increased dependency in ADLS -sensory disorders	-Higher incidence of health problems -Less likely to understand health needs of older person -More likely to be a daughter/ daughter-in-law -More likely to experience care burden -Less likely to receive support from family and/or healthcare
Cohen, M. (2008)	Cross-sectional Israel	781 community dwelling older adults, aged 70 or over, admitted to hospital who needed help with either ADL or IADLs	Unclear	Unclear	Frailty measured based on a referral letter. Expanded indicators for abuse questionnaire (E-IOA) (M. Cohen, Halevi-Levin, Gagin, & Friedman, 2006)	More neglected than non-neglected patients showed frailty, had lower albumin levels in their blood and had more severe incontinence problems.	-Lower education -Poorer economic status -Severe incontinence problems -Malnutrition	-Higher subjective caregiver burden
Cohen, Miri, Halevy-	Cross-sectional	71 older adults, aged 70 or over, who were hospitalised in internal	82.25%	81.6 (SD 7.5).	Frailty defined by blood levels of	Significantly more of those identified for	-Being female -Single marital status	

Levin, S., Gagin, R., Priltuzky, D., & Friedman, G. (2010)	Israel	medicine and orthopaedic departments, living in nursing homes or sheltered-home and needed help with ADLs			albumin and assistance with ADLs. A 24-item maltreatment and abuse questionnaire based on previous questionnaires Expanded indicators for abuse questionnaire (E-IOA) (M. Cohen et al., 2006)	abuse were frail older women.	-Lower levels of albumin -Higher levels of incontinence problems -Higher levels of ADL dependency	
Fulmer, T., Paveza, G., VandeWeerd, C., Fairchild, S., Guadagno, L., Bolton-Blatt, M., & Norman, R. (2005)	Cross-sectional America (New York)	405 community dwelling older adults aged 70 and over, with MMSE score of ≥18, using paid and/or unpaid care ≥20 hours and with telephone at home	96.6% in neglect group and 86% in no neglect group	82.7 (SD, 6.5) in neglect group; 81.8 (SD, 7.5) in no neglect group	Frailty measure unclear Elder Assessment Instrument (EAI) (Fulmer, Street, & Carr, 1984) Neglect diagnosed by a specialised neglect assessment team (NAT)	Elders in the neglect group were frailer and more biopsychosocially vulnerable	-higher level of need for ADL -higher levels of depression -cognitive impairment -childhood physical abuse and neglect -higher levels of neuroticism	-more likely to report unmet needs for assistance -experienced childhood abuse -report lower levels of standards for caregiving
Fulmer, T., Paveza, G., VandeWeerd, C., Guadagn	Cross-sectional America (New York)	405 community dwelling older adults aged 70 and over, with MMSE score of ≥18, using paid and/or unpaid care ≥20 hours	63%	81.5 years (SD, 7.9)	Frailty measure unclear Mini-Mental Status Examination (MMSE)	Data indicated that older adults who are assessed as frailer, dependant, and isolated and who show physical signs of neglect are more	-Higher dependency on caregiver -Lower socioeconomic status	-being a paid caregiver

o, L., Fairchild, S., Norman, R., Bolton-Blatt, M. (2005)		and with telephone at home			Elder Assessment Instrument (EAI) (Fulmer et al., 1984) Neglect diagnosed by a specialised neglect assessment team (NAT)	likely to screen positive and to have final diagnosis of neglect.		
Iecovich, E., Lankri, M., & Drori, D. (2004)	Cross-sectional Israel	120 community dwelling older adults aged 60 and over for women and 65 and older for men. Unclear inclusion criteria	83.3%	74.17 (SD, 8.18)	Unclear how frailty measured - 36.8% were physically frail and 2.6% were mentally frail Study designed measures used to assess elder abuse and neglect	Results indicated that those who were functionally frail and disabled experienced all forms of abuse and neglect more than those who were functionally independent.	-being female -being unmarried -living with others -	-more likely to be male -being the person's spouse -drug addiction -unemployment
Lee, J. A., Majeed-Ariss, R., Pedersen, A., Yusuf, F., & White, C. (2019)	Observational Retrospective Analysis UK (Manchester)	39 community dwelling older adults, aged 70 and over at the time of an assault and who had experienced a forensic medical examination	94.87%	70-96 (SD, 6.47)	Frailty measured on a point-based system used in conjunction with the Rockwood Clinical Frailty Scale	Clients with greater levels of frailty were more likely to be assaulted in hospital and residential care and more likely to experience physical violence .	-more likely to be assaulted in residential care -cognitive impairment	-being a paid caregiver
Piña-Escudero, S. D., García-Lara, J. M. A., & Avila-Funes, J. A. (2017)	Cross-sectional Mexico	852 community-dwelling older adults over the age of 70 taken from the Mexican study of Nutritional and Psychosocial Markers of Frailty (Ruiz-Arregui et al., 2013)	54.8%	77.7 (SD, 6.0)	Frailty measured using the Fried Frailty Phenotype Study designed measure to define mistreatment	Significant association between frailty score and mistreatment (OR=1.16; 95% CI 1.02 to 1.3, p=0.022). However, not the case once controlled for	-higher incidence of depression -higher incidence of disability -higher incidence of comorbidities	

						confounding variables.		
Torres-Castro, S., Szlejf, C., Parra-Rodríguez, L., & Rosas-Carrasco, O. (2018)	Cross-sectional Mexico	487 community dwelling older adults over the age of 60, able to walk with or without a device, able to complete questionnaire with and/or without aid (MMSE score ≤ 10 help would be mandatory), and able to complete all laboratory tests.	80%	73	Frailty measured using the Fried Frailty Phenotype Geriatric Mistreatment Scale (GMS) (Giraldo-Rodríguez & Rosas-Carrasco, 2013)	Frailty was associated with total abuse in participants with depression (OR=5.23, 95% CI = 1.87-14.56) but not in those without (OR=0.55, 95% CI=0.10-2.87), after adjustment for sociodemographic and clinical confounders.		

Quality assessment of included studies

Methodological quality was assessed using the Joanna Briggs checklist of analytical cross sectional studies (Moola et al., 2017) and is summarised in table 2. Overall, only 1 study received a “yes” on all criteria (Torres-Castro et al., 2018). See Table 2 for an overview of methodological assessment.

Study subjects, settings, and inclusion criteria

Inclusion and exclusion criteria were rating “unclear” for eight studies. This was due to exclusion criteria not being clearly defined. The one study that reported exclusion criteria did so on the basis of institutionalisation, lack of consent and/or any chronic illness that affected the participants ability to complete the questionnaire (Torres-Castro et al., 2018). However, all studies reported sufficient inclusion criteria to test their hypothesis and support replicability of the study. In terms of participant characteristics and settings, eight studies were rated as *yes* as they reported on a minimum of age, gender, marital status, and physical and mental health characteristics with only Cohen, (2008) receiving an *unclear* due to not providing a tabular breakdown of characteristics.

Validity and reliability of measures used

Eight studies were rated as *unclear* due to not using a valid and reliable measure of frailty or abuse and/or failing to provide how they were diagnosed (Anme et al., 2005; M. Cohen, 2008; M. Cohen et al., 2010; Fulmer, Paveza, VandeWeerd, Fairchild, et al., 2005; Fulmer, Paveza, VandeWeerd, Guadagno, et al., 2005; Iecovich et al., 2004; Lee et al., 2019; Piña-Escudero et al., 2017). Torres-Castro et al., (2018) was the only study to use a validated measure for both frailty and EAN. The limited use of using standardised measures for both frailty and EAN has been noted in the literature (Dent et al., 2016; Gallione et al., 2017).

Frailty

Three studies employed either the Fried Frailty Phenotype (Fried et al., 2001; Piña-Escudero et al., 2017; Torres-Castro et al., 2018) or the Clinical Frailty Scale (CFS) (Lee et al., 2019; Rockwood et al., 2005). Fried et al's., (2001) frailty phenotype is based on five pre-defined criteria which assess the presence and/or absence of frailty symptoms (exhaustion, weight loss, slow gait speed, reduced handgrip strength, and sedentary behaviour). These are scored on a 6-level ordinal scale, ranging from 0 to 5, resulting in a robustness score which can be categorised as “no frailty”, “pre-frailty”, and “frailty”. The CFS, is a 9-point judgement-based scale that reviews information on a participant’s mobility, function, cognition, and comorbidities. The scale ranges from “very fit” to “terminally ill”, the original scale was expanded from a 7-point scale to a 9-point scale to incorporate more complex care plans. In

a recent review of frailty measures in population-based studies, both the frailty phenotype and the CFS demonstrated good reliability and validity (Bouillon et al., 2013). It should be noted, that although the above frailty measures are the most commonly used there is no agreed "gold standard" within frailty literature (Pritchard et al., 2017).

Six studies did not use a validated or reliable measure; Anme et al., (2005) used a standard designation implemented across Japan which is based on five categories of ADL impairment and is used for determining eligibility for long-term care insurance in Japan. Cohen, (2008) measured frailty based on a referral letter from a family physician and/or an assessment on admission to hospital. Cohen et al., (2010), defined frailty based on assistance needed with ADLs and participant's levels of albumin in their blood. Lower levels of albumin are often associated with impairment in metabolic function and the liver. Neither Fulmer, Paveza, VandeWeerd, Guadagno, et al., (2005) or Fulmer, Paveza, VandeWeerd, Fairchild, et al., (2005) noted how frailty was measured and/or diagnosed; however, both discussed its association with abuse in their results and discussion sections.

Abuse and/or neglect

Several different measures were used to measure abuse and/or neglect. Two studies used the Elder Assessment Instrument (EAI) (Fulmer, Paveza, VandeWeerd, Fairchild, et al., 2005; Fulmer, Paveza, VandeWeerd, Guadagno, et al., 2005). The EAI was developed by Fulmer, Street, & Carr, (1984) and is a 41-item assessment comprised of seven sections which review symptoms, signs, and subjective reports of elder abuse, exploitation, and neglect. The assessment does not provide a total score but recommendations on when and where an individual should be referred if abuse, exploitation, and/or neglect is suspected. On a test of 501 community dwelling older adults attending hospital its internal consistency (Cronbach's alpha) was rated as 0.84 and its test/retest reliability as 0.83 (p = .0001) (Evans, Hunold, Rosen, & Platts-Mills, 2017). Two studies used the expanded-indicators of abuse (E-IOA) questionnaire (M. Cohen, 2008; M. Cohen et al., 2010). The E-IOA was closely based on the indicators of abuse questionnaire (IAO) (Kosberg, 1988) and is comprised of 46-items focused on the care receiver and 44-items focused on the caregiver. The E-IOA has reported good reliability (Cronbach's alpha was .18 to .91) and was found to discriminate between non-abused and abused groups; correctly identifying 98% of non-abused and 92% of abused groups respectively (M. Cohen et al., 2006). The E-IOA has to be delivered by trained geriatric social workers as part of a comprehensive assessment, it takes up to 2-hours, with ratings completed by the health care professional (X. Q. Dong, 2017).

Table 2. Overview of Methodological Assessment

Study	Inclusion and exclusion criteria	Study subjects described in detail	Exposure measured in reliable way	Objective standards used for measurement	Are confounders identified	Were strategies to deal with them stated	Are outcomes measured in a reliable way	Appropriate statistical analysis used	Total Methodological Score
Anme, T., McCall, M., & Tatara, T. (2005)	Unclear	Yes	Unclear	Unclear	Yes	Yes	Yes	Yes	6.5 (Moderate)
Cohen, M. (2008)	Unclear	Unclear	Unclear	Yes	Yes	Unclear	Yes	No	5 (Moderate)
Cohen, Miri, Halevy-Levin, S., Gagin, R., Priltuzky, D., & Friedman, G. (2010)	Unclear	Yes	Unclear	Yes	Yes	Yes	Yes	Yes	7 (Good)
Fulmer, T., Paveza, G., VandeWeerd, C., Fairchild, S., Guadagno, L., Bolton-Blatt, M., & Norman, R. (2005)	Unclear	Yes	Unclear	Yes	Yes	Unclear	Yes	Unclear	6 (Moderate)
Fulmer, T., Paveza, G., VandeWeerd	Unclear	Yes	Unclear	Yes	Unclear	Unclear	Yes	Unclear	5.5 (Moderate)

, C., Guadagno, L., Fairchild, S., Norman, R., Bolton-Blatt, M. (2005)									
Iecovich, E., Lankri, M., & Drori, D. (2004)	Unclear	Yes	Unclear	Yes	No	Unclear	Yes	No	4.5 (Moderate)
Lee, J. A., Majeed-Ariss, R., Pedersen, A., Yusuf, F., & White, C. (2019)	Unclear	Yes	Unclear	Yes	Yes	Unclear	Unclear	No	6 (Moderate)
Piña-Escudero, S. D., García-Lara, J. M. A., & Avila-Funes, J. A. (2017)	Unclear	Yes	Unclear	Yes	Yes	Yes	Yes	Yes	7 (Good)
Torres-Castro, S., Szlejf, C., Parra-Rodríguez, L., & Rosas-Carrasco, O. (2018)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	8 (Good)

Only one study (Torres-Castro et al., 2018) used the Geriatric Mistreatment Scale (GMS), the GMS was developed based on previous scales and refined through expert consensus panels and systematic psychometric evaluations (Giraldo-Rodríguez & Rosas-Carrasco, 2013). The 22-item scale comprises questions on neglect and physical, psychological, economic, and sexual mistreatment. A response of "yes" to any of these items is considered evidence of mistreatment. The scale is designed to be carried out by trained health care professionals with a previous background in elder abuse. It has reported good internal consistency of 0.82, 0.72, 0.55, 0.80, and 0.81 for psychological, physical, economic, neglect, and sexual abuse, respectively. It is also available in both English and Spanish versions, although validation has happened on the Spanish scale only (Giraldo-Rodríguez & Rosas-Carrasco, 2013). Three studies (Anme et al., 2005; Iecovich et al., 2004; Piña-Escudero et al., 2017) used measures that had been adapted to assess abuse and/or neglect. Although they were based on previous literature and published measures, it is unclear what their validity and/or reliability is to measure abuse.

Confounding variables

Studies were rated a "yes" if they had identified confounders such as sociodemographic factors (age, gender, ethnicity, and income), physical health-related variables (comorbidities), and mental health variables (depression and cognitive function) (Santos et al., 2017; Vaughan et al., 2015) and/or highlighted selection and/or information bias in their sampling methods (McDonagh, Peterson, Raina, Chang, & Shekelle, 2008). Seven studies were marked *yes* for identifying potential confounding variables and discussing information and/or selection bias (Anme et al., 2005; M. Cohen, 2008; M. Cohen et al., 2010; Fulmer, Paveza, VandeWeerd, Fairchild, et al., 2005; Lee et al., 2019; Piña-Escudero et al., 2017; Torres-Castro et al., 2018). Two studies were marked as *unclear*; Fulmer, Paveza, VandeWeerd, Guadagno, et al., (2005) was marked *unclear* as they were unable to take independent histories of participants enrolled in the study and Iecovich et al., (2004) as they did not highlight potential sources of bias within their sample.

When considering strategies used to reduce the confounding variables above, six studies (Anme et al., 2005; Cohen, 2008; Cohen et al., 2010; Fulmer, Paveza, VandeWeerd, Fairchild, et al., 2005; Piña-Escudero et al., 2017; Torres-Castro et al., 2018) were rated a *yes* due to the use of either appropriate study designs (restriction and matching) or statistical analysis (stratification or multivariate models) to manage bias and confounds (Pourhoseingholi, Baghestani, & Vahedi, 2012). However, three studies (Fulmer, Paveza, VandeWeerd, Guadagno, et al., 2005; Iecovich et al., 2004; Lee et al., 2019) were rated as *no* due to using insufficient statistical analysis to manage confounding variables.

Outcomes measured in a reliable way

Eight studies were rated *yes* when considering if their outcomes were measured in a valid and reliable way, that the measurement tools were validated, and that the researchers collecting the data were similar in terms of their expertise, training, and level of education (Anme et al., 2005; M. Cohen, 2008; M. Cohen et al., 2010; Fulmer, Paveza, VandeWeerd, Fairchild, et al., 2005; Fulmer, Paveza, VandeWeerd, Guadagno, et al., 2005; Iecovich et al., 2004; Piña-Escudero et al., 2017; Torres-Castro et al., 2018). Lee et al., (2019) was rated as *unclear,* although medical examination case notes were reviewed, no explanation as how this process was carried out was given reducing replicability of the study.

Statistical analyses

Three studies were rated a *yes* for using robust statistical analysis to explore a statistical relationship between frailty and abuse and/or neglect (Anme et al., 2005; Cohen et al., 2010; Piña-Escudero et al., 2017; Torres-Castro et al., 2018). Three studies were rated as *unclear* as although they completed robust analysis these were predominantly bivariate models and they had not potentially controlled for all confounding variables (Fulmer, Paveza, VandeWeerd, Fairchild, et al., 2005; Fulmer, Paveza, VandeWeerd, Guadagno, et al., 2005; Iecovich et al., 2004). Cohen, (2008) was rated as a no for using a forward stepwise regression model which has been associated with several methodological problems (Pallant, 2020). Lee et al., (2019) and Iecovich et al., (2004) were also rated a no as they only provided descriptive statistics.

Although not part of the JBI assessment tool, power calculations were also carried out on each study and were rated a *yes* if the sample size was enough to provide power of at least 0.8 at a medium effect size of 0.5. Seven studies were rated *yes* for achieving a power of at least 0.8 (Anme et al., 2005; M. Cohen, 2008; M. Cohen et al., 2010; Fulmer, Paveza, VandeWeerd, Fairchild, et al., 2005; Fulmer, Paveza, VandeWeerd, Guadagno, et al., 2005; Piña-Escudero et al., 2017; Torres-Castro et al., 2018); whereas, two studies was rated *unclear* as they did not provide enough information to complete a calculation and/or used only descriptive statistics (Iecovich et al., 2004; Lee et al., 2019).

Main findings reported from studies

Abuse(s) and Neglect

Overall, eight studies reported a relationship between frailty and abuse and/or neglect with the only exception being Piña-Escudero et al., (2017). Anme et al., (2005) noted that individuals with a greater level of frailty, needing more help with ADLs, were more likely to be abused (*p = .05)*. Furthermore, when controlling for age and gender, the risk of abuse for frail elderly increased for those who had lost their social roles (OR=6.67, 95% CI=.039 – .544, p = .01), wandered due to cognitive impairment (OR=15.012, 95% CI=2.100 – 107.31, p = .01) , were incontinent (OR=9.883, 95% CI=2.343 – 41.685, p = .01), were over-eating (OR=25.944, 95% CI=1.928-349.195, p = .01), and had sensory difficulties (OR=6.981, 95% CI=1.915-25.446, p = 0.1). Similar findings were reported by Cohen et al., (2010), as indicators of abuse such as high level of ADL dependence, incontinence, higher levels of albumin, age, and gender, were all associated with a higher incidence of all types of disclosed abuses by frail individuals (F(5, 61=9.45, p = .001, *d* = 1.28).

Torres-Castro et al., (2018) also reported that frailty was associated with physical abuse (OR=2.50, 95% CI=1.18-5.33, p = .02) and total abuse (combination of 5 subtypes) (OR=2.52, 95% CI=1.22-5.21, p = .01) when adjusting for potential confounders but not with caregiver neglect or depression. However, they noted that depression was an effect modifier between total abuse and frailty, as it was associated with total abuse in participants recorded with depression (OR=5.23, 95% CI=1.87-14.56) but not in those without (OR=0.55, 95% CI=0.10-2.87). This was also reported by Piña-Escudero et al., (2017), as those who disclosed abuse had a higher frailty score (OR=1.16, 95% CI=1.02- to 1.3, p=0.022); furthermore, those who disclosed abuse also scored higher on depressive symptoms [M = 15.5 (SD = 10.7) vs M = 10.8 (SD = 8.5), *p* = .001, *d* = 0.52], and comorbidities [M = 2.07 (SD = 1.4) vs M = 1.78 (SD = 1.3), *p* = 0.013, *d* = 0.22] than those who did not disclose abuse. However, the association between frailty and abuse was no longer significant after controlling for socioeconomic and clinical factors such as disability, cognitive impairment, depressive symptoms, and the presence of comorbidity.

Although more descriptive in nature, Iecovich et al., (2004) reported that those who were functionally more frail experienced all forms of abuse more than those who were able bodied. Furthermore, unmarried women, living with others, who were disabled were at the highest risk of both abuse and neglect. Interestingly, although focused on sexual abuse only, Lee et al., (2019) reported that women who were frailer (seven or more on the Rockwood scale) were more likely to experience physical violence during an assault, have a diagnosis of dementia, and score higher on measures of depression.

In both their studies, when comparing neglect and no neglect groups, Fulmer, Paveza, VandeWeerd, Fairchild, et al., (2005) and Fulmer, Paveza, VandeWeerd, Guadagno, et al., (2005) reported that elders who were frailer, dependent, isolated, biopsychosocially limited, and were diagnosed with a cognitive impairment were more likely to be diagnosed with neglect by a specialist team on admission to hospital. The strongest predictor of neglect was the report of physical childhood trauma [M = 9.10 (SD = 4.21) vs M = 6.94 (SD=2.46), p = .001, d = 0.864]. Cohen's (2008) study echoed the results above, they noted that participants showing neglect were more likely to show symptoms of frailty than those who were not. Specifically, those who were female (OR= 1.8, 95% CI=1.10-3.25), older (OR=2.3, 95% CI= 1.92-3.95), and had a higher ADL dependence (OR = 1.98, 95% CI= 1.96-4.99).

Other identified factors and perpetrator characteristics

Eight studies also reported on other factors, as well as frailty, which could lead to a higher incidence of EAN (Anme et al., 2005; M. Cohen, 2008; M. Cohen et al., 2010; Fulmer, Paveza, VandeWeerd, Fairchild, et al., 2005; Fulmer, Paveza, VandeWeerd, Guadagno, et al., 2005; Iecovich et al., 2004; Lee et al., 2019; Piña-Escudero et al., 2017). These comprised having poorer physical (lower levels of albumin, incontinence, and comorbidities) and mental health (depression and anxiety), cognitive impairment, increased dependency in ADLs, being female, a poorer socioeconomic status, being unmarried, lower educational attainment, unhelpful attitudes towards aging, and an experience of neglect and/or abuse in childhood.

Five studies reported on perpetrator characteristics that could potentially lead to an increased incidence of EAN (Anme et al., 2005; Fulmer, Paveza, VandeWeerd, Fairchild, et al., 2005; Fulmer, Paveza, VandeWeerd, Guadagno, et al., 2005; Iecovich et al., 2004; Lee et al., 2019). Perpetrator characteristics comprised a higher incidence of health problems, being less likely to understand the needs of an older adult, more likely to experience subjective care burden, more likely to report unmet need for assistance, experiences of abuse and or neglect in childhood, drug misuse, and lower socioeconomic status. In terms of gender, this is culturally dependant as this often reflects whose role it is to care for the older person within that society (Pillemer et al., 2016).

Discussion

Summary of main findings

Most studies included in this review suggest a potential association between frailty and an increased potential for EAN. Still, the only two studies to specifically assess this association directly were Piña-Escudero et al., (2017) & Torres-Castro et al., (2018) both of which scored well on methodological quality but differed in terms of their reported findings; with Piña-Escudero et al., (2017) reporting that the association between frailty and abuse was no longer significant after controlling for sociodemographic and clinical factors. This highlights that although frailty and EAN share several negative health outcomes only two studies were identified where the main aim was to investigate this potential relationship.

Nonetheless, although other studies were assessing wider factors associated with elder abuse, the preliminary findings would indicate that there is a potential relationship between frailty and EAN. Specifically, that female, frail, cognitively impaired, oldest-old individuals who require more assistance with ADLs and have lower sociodemographic status are at the most risk of abuse. This is in line with current research and reviews. Two recent comprehensive reviews by Dong, (2015) & Storey, (2020), which reviewed 35 and 198 studies respectively, highlighted the identified risk factors above. Interestingly, however, neither review explicitly emphasises frailty as a risk factor; however, both indicate several risk factors that are implicated in both EAN and frailty. Such as, lower education level, lower income, higher dependency, poorer physical and mental health, cognitive impairment, poorer social support, and substance misuse. Although there has been an increase in research reviewing the risk and protective factors for both these “geriatric giants” (Wang, Brisbin, Loo, & Straus, 2015) there is still a paucity when considering their potential overlap and association.

Strengths and limitations of the review

To the best of the researcher’s knowledge, this is the first systematic review to look at a potential association between frailty and EAN. A potential strength of this review is, according to best practice, the development and registration of a protocol which helps to reduce bias, duplication of results, whilst keeping reviews up-to-date (PLoS, 2011). Furthermore, although none was found, this review also reviewed sources of grey literature which was deemed essential due to the growing EAN evidence base. All studies were also co-rated by a second independent person with strong agreement being researched.

There are also some important methodological considerations to note when analysing this review. Potential bias may have been introduced as the review only included studies published in English and due to the sampling methods implemented by the studies

themselves, as a large proportion employed convenience sampling and self-report methodologies. In addition, studies also used various measures for both frailty and EAN making cross comparisons very difficult and limits generalisability of findings.

Limitations of the literature

Findings should also be reviewed considering the wider limitations of both EAN and frailty research bases. The complicated nature EAN often goes underreported in studies with older adults. Gallione et al., (2017) noted that for every case of elder abuse successfully identified or reported twenty-four go undetected; leading to vastly different prevalence and incidence rates within the community. This has been noted as a limitation of all current EAN research and has been highlighted as a priority for future research (Fraga Dominguez, Storey, & Glorney, 2019). Truong, Burnes, Alaggia, Elman, & Rosen, (2019), suggest that the barriers to disclosure are often internal such as self-blame, stigma, embarrassment, and fear of retaliation and/or escalation from the perpetrator. Furthermore, Burnes, (2017), in line with the contextual theory of elder abuse, suggests that due to often being embedded within familial circumstances, victims will often worry that perpetrators will be implicated and face legal consequences. Finally, Rodríguez, Wallace, Woolf, & Mangione, (2006) also note that health care professionals may also be reluctant to report elder abuse due to its congruency with symptoms of aging (such as bruising), victim denial, and a lack of knowledge regarding procedures and policy.

Another factor when considering elder abuse research is the current lack of internationally recognised definition, for example WHO, NCEA, and the NRC all define EAN differently (National Research Council, 2003; World Health Organisation, 2015). This has led to some methodological inconsistencies when studies have attempted to systematically assess correlates, prevalence, incidence, and severity of EAN (Wallace & Crabb, 2017). This lack of definition is due to EAN's complex aetiology and large cultural and societal differences, making it difficult for one definition to capture the idiosyncratic variation in cultural norms. In Asia, inherited from Confucian teachings, filial piety stresses the virtues of property and benevolence (Canda, 2013). This means that there is an expectation for adult children to always provide care, respect, financial support, and to demonstrate obedience. As a result, Asians may identify culturally specific forms of EAN that may not be deemed abusive from a western perspective (Tam & Neysmith, 2006). For example, failure to acknowledge an elder when entering and leaving the home is seen as an intolerable form of disrespect and abuse in Korea (Chang, 2019). In addition, cultural beliefs may also result in higher incidences of specific forms of EAN. In India, due to religious tenets, it is traditional that individuals prepare for their next reincarnation by giving away their possessions. This has been linked to increased

financial exploitation, as individuals will often give away their accumulated wealth to younger family members. Cultural beliefs and practises have also been linked to devastating impacts on specific individuals, for example accusations of witchcraft directed at older women in Africa can lead to physical abuse and early mortality (Lydiah Kabole, Nguzo Kioli, & Onkware, 2013; Schnoebelen, 2009). A final note on current definitions, they have been criticised as being professionally driven, particularly in the UK, Ireland, and the USA, which can result in disempowerment and paternalism (Killick, Taylor, Begley, Carter Anand, & O'Brien, 2015).

In addition to there being no recognised definition, there is still debate as to which screening and/or assessment tool should be considered the "gold standard". This is largely due to the factors described above, that it would be very difficult for a singular measure to capture all the culturally sensitive types of abuse. Nonetheless, Cohen, (2013) has suggested that a singular measure should be based on three components: it should ask direct questions about older person's direct experience, second it should measures the signs and symptoms of abuse, and third it should be able to review the potential risk of abuse presented to an older adult. Although some progress has been made in the development of measures that meet Cohen's criteria, there is still a need for a more robust psychometric for assessing EAN in various populations and settings (Cooper, Manela, Katona, & Livingston, 2008; XinQi Dong, 2014)

Frailty research also faces similar challenges highlighted above, like EAN, there is also no internationally recognised definition for frailty due to its complexity, congruency with aging symptomology and variation in research methodology. In addition to this, there are also a plethora of different frailty measures; for example, Theou et al., (2015) identified 262 modified versions of Fried's original frailty phenotype which had a considerable impact on its classification and predictability. Although arguably smaller than Theou et al's., (2015) research, five different frailty measures were used in the nine studies identified for this paper. Multiple reviews have discussed the need for a standardised measurement to be used in research and clinical practice, as this would hopefully lead to consistent recognition and measurement of frailty worldwide (Dolenc & Rotar-Pavlič, 2019; Faller et al., 2019; Rodríguez-Mañas et al., 2013).

Like this review, a large proportion of studies reviewing risk and protective factors of EAN and frailty are cross-sectional in nature. As such, it is difficult to establish a causal relationship between risk factors and elder abuse (Yunus et al., 2019). Although there have been a few large-scale longitudinal studies within the EAN research (Roberto & Teaster, 2017), more will be needed to improve the cultural sensitivity, validity, reliability, and applicability of screening instruments (Xinqi Dong, 2014). Longitudinal studies will help increase understanding of the settings, relationships, and contexts which victim and perpetrator characteristics interact and

help researchers and practitioners to develop time effective evidence-based interventions. The research fields of intimate partner violence and child abuse have demonstrated the feasibility of completing long-term cohort studies to assess victim and perpetrator characteristics (Roberto & Teaster, 2017). However, there are several factors specific to older adult research that would need to be considered. Attrition due to cognitive impairment, physical incapacitation, non-response due to lower education, and death are well recognised and have been noted to increase bias in older adult research (Brilleman, Pachana, & Dobson, 2010; D. Feng, Silverstein, Giarrusso, McArdle, & Bengtson, 2006). This will be particularly salient to both frailty and EAN research as both result in an increased likelihood of early mortality.

Implications for future research and Clinical Implications

Frailty and EAN are associated with several severe negative health outcomes for the older adult population. Although both areas have garnered more interest and have growing evidence bases, concepts still lack a standardised measure and definition. Schofield's, (2017) recommendations for future research include: the development of elder abuse screening measures in line with theory, that can be adapted to produce shorter and more reliable version. The researcher also notes that this can be addressed by using rigorously designed longitudinal research over different cultures and populations. In their review of frailty measurement in clinical practice, Dent et al., (2016) echoes the above notions and adds that frailty measures should be based on biological theory, be able to identify frailty, and be able to predict patient outcomes and potential interventions and/or treatments.

Currently, given the global problem of EAN, the most urgent need is for evidence-based interventions to help prevent and reduce mistreatment. However, there are currently very few studies that have been conducted with questionable methods and marginal results (Pillemer et al., 2016). Ploeg, Fear, Hutchison, MacMillan, & Bolan, (2009), noted that common methodological limitations included: poor experimental designs, poor descriptions of methods to control for bias and/or confounding variables, underrepresentation of populations, lack of rigorous psychometric outcomes, and uncertainty when considering how data was collected and handled. Despite these original methodological inconsistences, due to the growing problem of elder abuse countries have begun to investigate preventative measures. Future research should review interventions that revolve around interventions for caregivers, multidisciplinary teams, and targeted interventions for exploitation (Fearing, Sheppard, McDonald, Beaulieu, & Hitzig, 2017). In addition, given the professional driven nature of EAN research, interventions should be developed whilst ensuring that older adults experiences and

viewpoints are included to increase self-efficacy. Psychologists, as healthcare professionals, will be ideally placed to facilitate this

Conclusion

As the world's population continues to age, aiming to do it gracefully, geriatric syndromes like frailty and EAN will become more prevalent and place an increasing burden on society. This review reveals preliminary evidence that there is a relationship between frailty and increased EAN, as they share several negative health outcomes, and how identified risk factors may overlap. It has also highlighted the need for standardised definitions and screening measures in each evidence base and methodological considerations for future research. Longitudinal studies are required for prospective research in EAN and frailty and that these should be replicated cross-culturally to establish consistency amongst findings and causality. In addition, specific interest should be given to intervention studies as they are currently lacking in this vulnerable population, with a focus on capturing older adult experiences.

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Chapter 2. Empirical Project

A cross-sectional study exploring frailty in older people and the possible inter-relationship with early adverse childhood experiences

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Abstract

Objective: Frailty is often perceived as a medical construct; psychosocial research is needed**.** This study aimed to assess the potential relationship between adverse childhood experiences (ACEs) and frailty in people who are older and whether resilience and/or gender have a moderating role between the two variables

Method: A cross-sectional questionnaire design from a community-based frailty service. Outcomes were measured using the Edmonton Frail Scale (EFS), ACEs questionnaire, and Resilience Scale for Adults (RSA). Relationships between variables were analysed using correlational and multiple regression analysis.

Results: A total of 43 participants were recruited. Correlation analysis revealed an association between number of social connections and the perception of self and social competence subscales of the RSA. There was no association detected between the number of ACEs and the total level of frailty. A multiple regression analysis indicated that number of social connections and perception of self, explained 31% of the variance in total frailty scores; social competence was no longer a significant predictor. Including established predictors such as age, gender, ethnicity, level of education, marital status, level of exercise, and number social networks and relationships only explained the variance by a further 9%.

Conclusion: Social connections and a positive perception of self are associated with a lower overall frailty score. Clinicals and researchers should prioritise developing preventative treatments for frailty that incorporate systemic and biological approaches. In addition, these will need to be sensitive to the current distancing guidelines currently imposed by COVID-19.

Word count: 238

Introduction

Due to advancements in medical science, social living, and reductions in inequality, the world population is set to rise to 9.8 billion by 2050. However, due to lower fertility rates and higher life expectancy worldwide, the fastest growing age group is 60 years and over, with those aged 80 years and over expected to triple from 137 million to 425 million by 2050 (United Nations, 2019). As a result of this, geriatric syndromes such as cognitive impairment, depression, incontinence, delirium, falls, and frailty are increasing (Carlson, Merel, & Yukawa, 2015). Frailty is often the consequence and/or predictor of a combination of these syndromes and is often quantified as the decline in reserves across multiple key physiologic systems which help maintain and support the body (Rockwood & Howlett, 2018). The current global prevalence of frailty in the community is estimated to range between 3.9% to 51.4%, with its incidence being 43.3 cases per 1000 people (Ofori-Asenso et al., 2019; Siriwardhana et al., 2018). Frailty is associated with several negative health outcomes such as increased institutionalisation, falls, disability, dementia, and premature mortality (Cheng & Chang, 2017; Dent & Hoogendijk, 2014; Kojima, 2017, 2018; Kojima, Taniguchi, Iliffe, & Walters, 2016; Piña-Escudero et al., 2017). This has huge implications for healthcare systems as many are designed to focus on one disease and organ-specific issue at a time and are not well prepared to manage the complex aetiological presentation of frailty (Hoogendijk et al., 2019). As a result of this, individuals diagnosed with frailty are reported to cost healthcare systems several times more than their non-frail counterparts (Hajek et al., 2018). In response to this, Scotland's Living Well in Communities (LWiC) resources have helped improve support for people living with frailty and maximised preventative care to reduce burden on hospital and community services and carers (Healthcare Improvement Scotland, 2019).

There is currently no international consensus on a gold standard definition of frailty, the most common conceptual models used are the **Frailty Phenotype** (L. Fried et al., 2001) and the **Frailty Index** (Rockwood et al., 2005). The Frailty Phenotype measures frailty based on five physical components: self-reported exhaustion, weakness, unintended weight loss, slow walking speed, and reduced and/or low activity. An individual is considered frail if they meet three of these criteria and prefrail when they meet one or two (L. Fried et al., 2001). The Frailty Index, on the other hand, views frailty as the accumulation of health deficits over an individual's lifetime, with a higher amount more likely to result in frailty. The Frailty Index is scored on a continuous scale of up to 40, with a binary format of 0 (no) or 1 (yes) for each deficit, a person's score represents the number of deficits detected divided by the total number possible. The higher the number of identified deficits the more likely they are to be frail (Rockwood et al., 2005). Both the frailty phenotype and cumulative models demonstrate statistical convergence

and overlap when identifying frailty (Cigolle, Ofstedal, Tian, & Blaum, 2009). The development of frailty is thought to be the result from changes in several key systems that maintain homeostasis in the body such as the hormone, endocrine, immune, and nervous system (Clegg, Young, Iliffe, Rikkert, & Rockwood, 2013a). Although these changes are often part of normal aging, several risk factors have been identified which can lead to increased stress on these systems resulting in frailty: sociodemographic factors such as poverty, living alone, deprivation, and lower educational attainment, psychological factors comprising anxiety and depression, comorbidity, and identified diseases as cancer, dementia, and endocrine disorders, and being female (Dent & Hoogendijk, 2014; Espinoza et al., 2018; Gutiérrez-Valencia et al., 2018; Hoogendijk et al., 2014; Monin et al., 2016; Poli et al., 2017; Semba et al., 2006; Vaughan et al., 2015). However, despite a growing evidence base on later life factors that contribute to frailty, knowledge on potential early life determinants is sparse (Haapanen et al., 2018). It has been suggested that this is due to lack of follow-up data within frailty research; thus, it is not certain what risk factors affect progression as well as incidence (Niederstrasser, Rogers, & Bandelow, 2019).

Since Anda et al's., (1998) original study, a growing body of research has continued to link adverse childhood experiences (ACEs) with negative health outcomes in adulthood. The World Health Organisation (WHO) defines ACEs as the most intense and frequent occurring sources of stress a child can suffer in early life comprising of physical, emotional, and sexual abuse, emotional and physical neglect, familial and community violence, and household dysfunction such as alcohol and substance misuse (M. Dong et al., 2004). It is estimated that over one billion children a year (aged 12 – 17) are victims of abuse (Hillis, Mercy, Amobi, & Kress, 2016). A recent systematic review and meta-analysis by Hughes et al., (2017) revealed that individuals who had experienced four or more ACEs were more at risk from 23 identified negative health outcomes including obesity, diabetes, unhelpful health behaviours such as smoking, alcohol and drug misuse, and sexual risk taking, poorer mental health, and increased chance of cancer, heart, and respiratory disease, compared to those with none. These outcomes were also reported in a UK longitudinal study, which revealed that men and women who reported two or more ACEs had an 80% and 57% increase of early mortality respectively (Kelly-Irving et al., 2013). As a result of these outcomes, and costs to health and social departments, ACEs have become a priority for many countries such as England, Wales, and Scotland (Public Health Wales, 2015; Quigg, Butler, & Wallis, 2018; The Scottish Government, 2018).

Over the last two decades, epidemiological researchers have begun to explore potential biological pathways that can provide a framework when considering how chronic stress (ACEs) may lead to dysregulation and lifelong disease in people who are older (Tampubolon

& Maharani, 2018). This theory often refers to the concept of allostasis, a process which relies upon the body's ability to detect changes in its internal and external environments and activate appropriate systems in response to stress. This includes maintaining body temperature, appropriate autoimmune response, sleep cycles, and blood composition (Danese & McEwen, 2012). If consistently activated over a prolonged period of time, these intercorrelated systems (endocrine, immune, and nervous) may become overloaded (allostatic overload); predisposing them to dysregulation and disease (Schiamberg et al., 2012). In this manner, allostatic load (AL) refers to the embedded "wear and tear" on the body and brain due to the continual strain of adapting to chronic and prolonged stress. Conceptually, AL is different from frailty as it has commonly been applied to studies reviewing childhood through to adulthood, rather than the older adult population, even though there is considerable overlap when considering the intercorrelated systems involved that underpin both presentations (Gale, Booth, Starr, & Deary, 2016). As such, early dysregulation in multiple systems may lead to a biological predisposition for frailty (Gruenewald, Seeman, Karlamangla, & Sarkisian, 2009). Therefore, the impact of AL in childhood may be not be apparent until older age as frailty.

Gender and other socioeconomic variables

Studies have now started to explore the potential link between the two phenomena. Solís et al., (2015) reviewed data from the 1958 National Child Development Study (NCDS) and showed that those with one (0.24, $p < 0.01$) or two or more (0.42, $p < 0.01$) recorded ACES had a higher AL score in midlife than those with no ACES. However, this was mediated by later life variables such as health behaviours (smoking), education, and wealth. Haapanen et al., (2018) reviewed whether early life stress (ELS), because of wartime parental separation, would be associated with frailty in older age. They found that those separated had an increased relative risk ratio of frailty (RRR 3.93, 95% CI 1.02, 15.11) as compared to those who were not due to increased stressors. When reviewing whether greater socioeconomic disadvantage and lower intelligence increased the risk of higher allostatic load and frailty in a Lothian Birth cohort, Gale et al., (2016) found significant associations between greater socioeconomic disadvantage, lower intelligence, and increased frailty and allostatic load. Finally, Van Der Linden et al., (2020) when reviewing childhood misfortune (poor socioeconomic conditions, adverse experiences, and poor health) with projected trajectories of frailty, found that those with higher childhood misfortune had higher odds of being frail and pre-frail at the age of 50. However, within these studies, there will be outliers; people who despite multiple ACEs did not develop physical, emotional, or psychological dysregulation, and/or frailty. As such, resilience and the factors that lead to it are also areas of interest for limiting the unhelpful outcomes of both ACEs and frailty (Mark A. Bellis et al., 2018; Hale, Shah, & Clegg, 2019). However, factors such as gender will also be important to consider, as

although women live longer than men they often do so with higher comorbidity and disability. Yang & Kozloski, (2011) noted that allostatic load is higher in females in older age leaving them at a disadvantage despite living longer. Indeed, the Hertfordshire Cohort Study revealed that the prevalence of frailty was 8.5% for women and 4.1% for men which may be due to higher allostatic load for women at an older age (Syddall et al., 2009).

Resilience and Frailty

The American Psychological Association (APA) defines resilience as "*the process of adapting well in the face of adversity, trauma, tragedy, threats, or significant sources of stress, or bouncing back from difficult experiences"* (Southwick, Bonanno, Masten, Panter-Brick, & Yehuda, 2014, p. 2). Research views resilience as a dynamic developmental process, rather than a fixed personality trait, which individuals have capacity to build over time in the response to life experiences and adversities (van Kessel, 2013). A large proportion of resilience research has focused on adolescents, at risk children, and military personal who have all experienced prolonged stressors and difficult sociodemographic situations (J. L. Smith & Hollinger-Smith, 2015). Nonetheless, with an aging population a greater interest in increasing resilience amongst older adults has emerged, often referred to as successful aging (SA) (D. Rolfson, 2018). However, this term has been criticised for being a state achievable only by socioeconomically advantaged individuals and was not a term that older adults aligned themselves to (Pruchno & Carr, 2017). Therefore, the term healthy ageing is seen as more appropriate, as, like resilience, it is seen as a developmental process which can be built upon over time that is not merely the absence of geriatric syndromes like frailty but thriving despite them (Cosco, Howse, & Brayne, 2017). In a recent report, WHO have prioritised a decade of healthy ageing which promises to bring governments together to make this an achievable goal for all people who are older (World Health Organisation, 2020).

Common individual characteristics of resilience in older adults include optimism and hopefulness (Gooding, Hurst, Johnson, & Tarrier, 2012), good social support and access to services (Lamond et al., 2009), being physically active, and positive emotions developed through adaptive coping strategies (Bonanno, 2005; Childs & de Wit, 2014). Whereas, environmental factors comprised access to care, availability of resources, and positive social and community networks (MacLeod, Musich, Hawkins, Alsgaard, & Wicker, 2016). In both ACE and frailty research, studies are now reviewing how resilience can be improved to increase positive health outcomes and wellbeing (Mark A. Bellis et al., 2018; Hale et al., 2019).

Aims

The current study aims: 1) to assess whether there is a potential relationship between ACEs and frailty in people who are 65 years old or over; 2) to examine whether resilience and/or gender have a moderating role between ACEs and the level of frailty ; 3) to establish whether predictors such as age, gender, ethnicity, level of education, marital status, level of exercise, and number social networks and relationships also have an impact on the level of frailty.

Hypotheses:

1) **A higher incidence of ACEs will be associated with a higher level of frailty in people who are older**
2) **If a relationship does exist, resilience will moderate the relationship between ACEs and the level of frailty in people who are older**
3) **There will be observable gender differences between ACEs and the level of frailty in people who are older**

Method

Design

A cross-sectional questionnaire design was used. Ethical approval was granted from The University of Edinburgh, School of Health and Social Sciences, the Fife Health and Social Care Partnership Research and Development Committee, and the West Scotland Research Ethics Committee (19/WS/0073).

Participants

Participants were recruited from Community Wellbeing Hubs (CWHs) based at NHS Fife. The CWHs were run out of day hospitals to support frail individuals within the community. Inclusion criteria: 65 years old or over individuals, had been identified as frail, could read, write, and speak English, and had capacity to provide consent. Participants' exclusion criteria: dementia diagnosis, lacked capacity to consent, had a severe mental health condition which would limit ability to complete the materials presented, or if they were accessing a mental health crisis service.

Procedure

All participants were recruited from the CWHs in Fife. The researcher reviewed patient files and discussed potential participants with the wider multi-disciplinary team before approaching individuals. This was to ensure no exclusion criteria were present. Once these had been ruled out, participants were approached directly and were given an Easy Read brochure before being offered a participant information sheet (PIS). All participants were given a minimum of 24-hours to read and consider the PIS before being approached to sign a consent form. Participants were then asked to complete a demographic questionnaire and questionnaires measuring resilience, frailty, and ACEs. Once consent was given, all questionnaires were administered through face-to-face verbal interviews in a private setting. After completing the interview, participants were given the chance to ask questions and offered debriefing materials to take away with them.

Measures

Participants were asked to complete a demographic questionnaire comprising information on age, gender, ethnicity, level of education, marital status, employment status, level of physical exercise, number of social networks and relationships, and level of income.

The following standardised questionnaires were also included to measure specific variables:

1. Frailty

The Edmonton Frail Scale (EFS) is a 11-itam measure of frailty originally developed for use in hospital settings (D. B. D. B. Rolfson, Majumdar, Tsuyuki, Tahir, & Rockwood, 2006). The EFS contains 9 components which are scored for a total of 17. The components comprise: cognition, self-reported health, general health status, social support, functional independence, polypharmacy, incontinence status, mood, and a timed “get up and go” functional performance test. All items are scored on either a Likert-scale, ranging from 0 to 2, or a yes/ no response. Once completed, scores are summed and the following cut-off scores are applied to classify an individual’s frailty: not frail (0 – 5), vulnerability to frailty (6-7), mildly frail (8-9), moderately frail (10-11), and severely frail (12-17). Due to having only nine components and simple extraction, the EFS is being increasingly used in both clinical and acute settings and has been adapted for several clinical populations (Dent et al., 2016; Graham et al., 2013). Furthermore, it has good validity, reliability, with an initial Crohnbach’s alpha ($\alpha = 0.62$), and has been validated in several cross-cultural studies (Aygör, Fadıloğlu, Şahin, Aykar, & Akçiçek, 2018; Fabrício-Wehbe et al., 2013; Jankowska-Polańska et al., 2019).

2. ACEs

ACEs were measured using Felitti et al's., (1998) original measure. The ACE questionnaire assesses 10 individual ACEs that cover three domains: abuse (emotional, physical and sexual), neglect (emotional and physical), and house dysfunction (household substance misuse, parental separation and divorce, violence against main caregiver, incarceration of a primary house-hold member, and household mental illness). All questions are answered in a binary yes or no format, scores are then summed with a maximum score of 10. In the original study, a score of 4 or more indicated severe trauma and was associated with several negative health outcomes. Although there is not an older adult specific ACEs questionnaire, Dong et al., (2004) reported excellent reliability when assessing ACEs during adulthood and moderate to substantial test-retest reliability (k = .46 to .86). In addition, Wingenfeld et al., (2011) reviewed the ACE questionnaires validity and reliability for retrospective assessments and found it to be a good measure over time. The ACEs questionnaire has also been tested in several large scale studies (Anda, Butchart, Felitti, & Brown, 2010).

3. Resilience

The Resilience Scale for Adults (RSA) has gone through several iterations since its original development (Hjemdal, Friborg, Martinussen, & Rosenvinge, 2001). This refinement process involved a period of factor analysis to identify central underpinnings and then confirmation analysis to establish validity and reliability (Friborg, Hjemdal, Martinussen, & Rosenvinge, 2009; Hjemdal, Martinussen, Friborg, Rosenvinge Jan, & Barlaug, 2005). The current version of the RSA comprises 33-items which are all answered on a Likert-scale, ranging from strongly disagree to strongly agree. To reduce acquiescence-biases, half of the items are reversed scored. The RSA covers six factors: perception of self (Cronbach alpha α = .74), planned future (α = .73), social competence (α = .83), structured style (α = .80), family cohesion (α = .80), and social resources (α = .74) (Hjemdal et al., 2005; Hjemdal, Roazzi, Dias, & Friborg, 2015). The first four factors review protective factors at a personal level whereas the last two assess factors at the social and familial level; only the RSA looks at these two factors when considering resilience. Perception of self and future (combined) measure an individual's confidence in their abilities, judgements, and self-efficacy; social competence measures characteristics such as social warmth, use of humour, flexibility, and ability to establish friendships; structured style reviews preferences for being organised, having clear goals and routines; social resources reviews availability of social support, within and outwith the family, and if they have someone who can help them in times of need and finally; family cohesions assesses whether values are shared throughout the family and whether they are loyal towards one another, enjoy spending time together, and feel there is a mutual appreciation of their qualities (Hjemdal et al., 2011). As such, it is thought to be the most stable resilience scale with a strong sensitivity to clinical change, suitable for a wide range of ages and populations (Windle, Bennett, & Noyes, 2011).

Statistical Analysis

An a prior power calculation was completed using G*Power (3.1) (Erdfelder, Faul, & Buchner, 1996) set for a large effect size ($f^2 = 0.35$), with a power of 0.8, and α = .05, indicated a sample size of 54 participants. However, with the same set of predictors, Cohen (1992), suggests a sample size of 48 participants is adequate. Statistical analysis was complete using Statistical Package for the Social Sciences 25 (SPSS v.25). First, descriptive statistical analysis was carried out on key sociodemographic features of the sample. Then, a correlations analysis was completed to identify any significant associations between variables. As a significant relationship was not identified between key variables, a mediation analysis was not feasible. Hence, a multiple linear regression was conducted to explore the relationship between significant variables when controlling for potential confounding covariates. All variables that were not either continuous or dichotomous in nature were either collapsed or recoded as dummy variables to be included in the analysis.

Results

A total of 44 participants were recruited and completed all questionnaires between October 2019 to March 2020. A participant wished to be removed from the study, as such their data was removed from the analysis and destroyed. Hence, only 43 participants were included in the analysis. Demographic information (Table 1) showed that 76.7% (33) of the sample were female with the biggest age group being 81 to 84 (30.2%), with 5 males and 10 females. Approximately 65.1% of participants had received a qualification from either school, college, or university, ranging from the equivalent of nationals (ordinary grades) to a master's degree. 48.8% of participants were married and a significant proportion were retired (88.4%). In terms of activity levels, over half of the sample were moderately active (53.5%), selecting two to three times a week. Number of social connections ranged from 2 (11.6%) to 6 (7%), with the most common being five connections (32.6%). The most identified social connections were children (88.4%), grandchildren (72.1%), friends (72.1%), neighbours (55.8%), and spouses (51.2%). Siblings (30.2%) and club members (25.6%) were less identified. Weekly income ranged from 0 (7%) to 500 pounds, with the most common answer being 100 to 199 pounds (39.5%), 16.3% did not wish to disclose their income.

In terms of reported frailty, 58.2% of participants were classed as frail (Table 2), with 41.9% being mildly frail, 9.3% moderately frail, and 7% severely frail. This is inline with a recent report reviewing frailty in Scotland, which stated that the percentage of mild, moderate, and severe frailty in the over 65 population is 35%, 15%, and 5% respectively (Healthcare Improvement Scotland, 2019). However, estimates throughout the UK will vary depending on the measure used (R. M. Collard, Boter, Schoevers, & Oude Voshaar, 2012). When splitting total frailty scores by gender, mean scores were 8.00 and 7.52 for males and females, respectively. Reported ACEs ranged from 0 to 5, 30.2% reported no ACEs, 48.8% reported one to three ACEs, and 21% reported four or more.

When comparing the participants' means by frail versus non-frail (table 2), there was a noticeable difference in resilience and social totals when comparing frail and non-frail individuals.

Table 1 Demographics characteristics of participants

Gender	**Male**	**10**	**23.3%**
	Female	33	76.7%
Age group	65-70	4	9.3%
	71-75	5	20.9%
	76-80	10	23.3%
	81-84	13	30.2%
	85+	11	25.6%
Ethnicity	White – Scottish	24	55.8%
	White – British	16	37.2%
	White – Irish	3	7%
Highest Level of education	Unsure	1	2.3%
	No qualifications	14	32.6%
	Nations (ordinary grades)	16	37.2%
	Highers	5	11.6%
	Degree or equivalent	4	9.3%
	Master's degree or equivalent	3	7%
Marital status	Single	1	2.3%
	Married or domestic partnership	21	48.8%
	Widow or Widower	17	39.5%
	Divorced	4	9.3%
Employment Status	Part-time	1	2.3%
	Volunteer	3	7%
	Student	1	2.3%
	Retired	38	88.4%
Activity level	None	7	16.3%
	Low (once a week)	6	14%
	Moderate (2-3 times a week)	23	53.5%
	High (4-7 times a week)	7	16.3%
Social Connections*	2	5	11.6%
	3	12	27.9%
	4	9	20.9%
	5	14	32.6%
	6	3	7%
Income	£0	3	7%
	£1-99	2	4.7%
	£100-199	17	39.5%
	£200-299	9	20.9%
	£300-399	2	4.7%
	£400-499	2	4.7%
	£500+	1	2.3%
	Prefer not to disclose	7	16.3%
***Social connections included: spouse, friends, club members, neighbours, siblings and other relatives, children, and other.**			

Correlation Analyses

After reviewing descriptive statistics and scatterplots to assess potential relationships between predictor variables, a Pearson's R correlation analysis was conducted on outcomes variables, covariates, and the total number of social connections reported by participants (Table 3). Preliminary analyses were performed to ensure assumptions of linearity and normality were met. All subscales of the RSA were included in the correlation. Two subscales from the RSA were found to be negatively associated with total frailty score: perception of self (r = -.401, two-tailed *p* = .008) and social competence (r = -.316, *p* = .039). The number of total social connections was also negatively associated with total frailty score (r = -.414, *p* = .006). All RSA subscales were associated with a higher resilience score; perception of self (r = .526, *p* = .001); perception of future (r = .650, *p* = .001); structured style (r = .476, *p* = .001); social competence (r = .596, *p* = .001); family cohesion (r = .606, *p* = .001); and social resources (r = .474, *p* = .001). **Hypothesis one was not met**, as there was no association reported between the number of ACEs and total frailty. There were also no associations reported between age, gender, ethnicity, level of education, marital status, employment status, activity level, or level of income, and frailty. **As such, hypotheses three was not met**.

Table 2. Means, ranges, and grouped scores of outcome measures

		Potential Range	Lowest recorded score	Highest recorded score	Mean (SD)
Outcome measures					
EFS		0 - 17	2	13	7.63 (2.34)
ACE		0 - 10	0	5	1.88 (1.693)
RSA Total		33 - 165	92	163	129.28 (15.89)
RSA Subscales					
Perception of self		6 - 30	12	29	23.16 (4.39)
Perception of future		4 - 20	4	20	13.58 (4.03)
Structured style		4 - 20	5	20	12.79 (3.52)
Social competence		6 - 30	11	30	23.63 (5.72)
Family cohesion		6 - 30	10	30	25.42 (4.41)
Social Resources		7 - 35	20	35	29.93 (3.17)
Grouped scores					
Edmonton Frail Scale	No Frailty	Vulnerability	Mild Frailty	Moderate Frailty	Severe Frailty
	13.9%	27.9	41.9%	9.3%	7%
Adverse Childhood Experiences	0	1-3	4+		
	30.2%	48.8%	21%		
Comparison of means	Frail		Non-frail		
ACE Total	1.84		1.94		
Resilience Total	125.08		135.11		
Social Total	3.72		4.28		

Table 3. Pearson Correlation Analysis Between Measures of Frailty, Resilience Total and Subscales, and ACEs

Scale	1	2	3	4	5	6	7	8	9	10
1. Social Connections	-									
2. Perception of self (RSA)	.260 (-0.48 - .543)	-								
3. Perception of Future (RSA)	.021 (-.245 - .290)	.463** (-.245 - .290)	-							
4. Structured Style (RSA)	.170 (-.191 - .455)	.216 (-.076 - .470)	.219 (-.036 - .452)	-						
5. Social Competence (RSA)	.150 (-.158 - .411)	.162 (-.175 - .482)	.239 (-.064 - .533)	.152 (-.117 - .394)	-					
6. Family Cohesion (RSA)	-.088 (-.332 - .242)	.225 (-.143 - .505)	.312* (-.016 - .543)	.015 (-.248 - .229)	.141 (-.176 - .500)	-				
7. Social Resources (RSA)	-.112 (-.334 - .242)	-.097 -(.345 - .228)	.133 (-.155 - .307)	.229 (-.198 - .483)	.163 (-.068 - .546)	.381* (.178 - .787)	-			
8. Resilience Total (RSA)	.105 (-.207 - .433)	.529** (.212 - .725)	.650** (.498 - .774)	.476** (.271 - .650)	.596** (.334 - .784)	.606** (.318 – 794)	.572** (.347 - .738)	-		
9. Frailty Total (EFS)	-.414** (-.671 - -.135)	-.401** (-.652 - -.092)	.071 (-.249 - .354)	-.102 (-.480 - .290)	-.316* (-.533 - .037)	-.199 (-.412 - .016)	-.013 (-.429 - .232)	-.289 (-.555 - .020)	-	
10. ACEs Total	.172 (-.118 - .416)	-.100 (-.411 - .168)	-.084 (-.373 - .250)	.221 (-103 – .496)	.255 (.001 - .511)	-.092 (-.369 - .211)	.257 (-.105 - .504)	.156 (-.142 - .450)	-.145 (-.473 - .228)	-

***. Correlation is significant at the 0. 01 level (two-tailed hypotheses).*
**. Correlation is significant at the 0. 05 level (two-tailed hypotheses).*

Multiple Linear Regression Analysis

Due to a nonsignificant result between ACEs and the level of recorded frailty, a moderation analysis could not be performed to assess whether resilience had a moderating on the relationship between ACEs and frailty; **therefore hypotheses two was not met**. Instead, a regression analysis was completed to see if age, gender, level of education, marital status, level of exercise, and number of social networks have an impact on the level of frailty in people who are older.

Assumptions for the regression analysis were checked to ensure they had been met. Standard residuals were checked and no indication of outliers was presented with none being below or above -3.3/ 3.3 respectively (Tabachnick & Fidell, 2013). Normality, homoscedasticity, and linearity were checked by reviewing histogram of standardised residuals, scatterplots, and normal P-P plot of regression standardized residuals. Collinearity tests also confirmed that multicollinearity was not a concern, as the tolerance and VIF (variance inflation factor) were above 0.1 and below 10 respectively (Pallant, 2020). Finally, all regression met the assumption of independent errors with the Durban-Watson statistic being close to 2.

Due to its high correlation with its subscales, total resilience score was not included in the regression analysis. Furthermore, due to the large incidence of recorded retirement and lack of diversity in ethnicity both were removed from the analysis. Perception of self, social competence, and total social connections were entered at step 1, explaining 31% of the variance in total frailty scores with a large effect size F (3, 39) = 5.89, p = .002, f^2 > 0.35). After entering age, gender, level of education, marital status, and level of exercise the model explained 40% of the variance, R^2 change = .9. However, the model was not significant but had a large effect size (F change (8, 34) =1.90, p = .078, f^2 > 0.35). Nonetheless, in the final model, the variables found to be statistically significant in predicting total frailty scores were perception of self (β -.378, p = .022) and total number of social connections (β -.344, p = .043).

Table 4. Hierarchical Multiple Regression Analysis Summary Predicting Frailty with Total Social Connections, Social Competence (subscale), Perception of Self (subscale), Age, Education, Marital Status, Activity Levels, and Income

Step and predictor variable	***B***	***SE B***	**Beta**	***sr***	**Change in R^2**	***R^2***	***f^2***
Step 1					.31**	.31	.45
Constant	15.720	2.03					
Social connections total	-.61	.27	-.31*	-.29			
Social competence	-.92	.06	-.24	-.25			
Perception of self	-.15	.07	-.29*	-.27			
Step 2					.09	.40	.67
Constant	20.746	4.119					
Social connections total	-.69	.33	-.34*	-.29			
Social competence	-.03	.07	-.08	-.06			
Perception of self	-.20	.08	-.38*	-.33			
Gender	.02	.93	.03	.02			
Age	-.09	.84	-.02	-.15			
Education	.54	.76	.11	.10			
Marital Status	-.28	.81	-.06	-.05			
Activity level	1.0	.85	.20	.16			
Income	-.99	.81	.20	-.17			

**Note. sr = semipatrial correlation coefficient; both Social competence & Perception of self are subscales on the RSA*
*** p < .01*
**. p < .05 .*

Discussion

The aims set out in this study were to investigate whether greater levels of ACEs in childhood were associated with a greater level of frailty in older age and, if an association did exist, whether resilience had a moderating role. The results did not support the hypotheses set out in this study, which is at odds with the literature discussed previously (Gale et al., 2016; Haapanen et al., 2018; Solís et al., 2015; Van Der Linden et al., 2020). This may be to do with the sociodemographic and lifestyle factors captured within this sample. A considerable number of the sample were well educated, were receiving a state and/or workplace pension and were moderately to highly active. In a systematic review of longitudinal studies, assessing the risk and protective factors associated with increased frailty, Feng et al., (2017) noted that a higher income, better education, and less sedentary behaviour were negatively correlated with frailty. In addition, this sample had a high proportion of individuals aged 80 and over (55.8%). It has been noted that adults in the oldest-old category often have the same and/or a greater capacity for resilience than their younger counterparts (Gooding et al., 2012; Netuveli, Wiggins, Montgomery, Hildon, & Blane, 2008). It has been suggested that this is due to a unique balance, specific to the oldest-old, based on experience, autonomy, and emotion-focused coping strategies whereby new adversities are incorporated to promote functional independence and healthy ageing (Hayman, Kerse, & Consedine, 2017). However, this process is still specific to having had access to favourable socioeconomic positions and support groups which are characterised by this sample. Furthermore, there were no detectable differences between males and females in this study. This finding is also at odds with previous research suggesting that although women live longer, they do so with a greater level of disability and frailty; often referred to as the health-survival paradox (Oksuzyan, Juel, Vaupel, & Christensen, 2008).

Although age, gender, level of education, marital status, activity level, and level of income, were not associated with total frailty in the correlation analysis, and added only 9% of the explained variance in the multiple linear regression model, a large effect size was reported. This suggest that there is a relationship which was not shown as significant. This could be the attributed to how different variables were collapsed into dichotomous groups for the analysis, for example: active/ not active; qualifications/ no qualifications; low-income/ high-income etc. Although cut off points for each variable were based on previous research and sensitivity to maximise equal groups in each category, there is a chance that power to detect bivariate relationship may have been lost (Altman & Royston, 2006; Maccallum, Zhang, Preacher, & Rucker, 2002).

Still, even though there was not a relationship found between ACEs and the level of frailty in older adults, the correlation analysis did demonstrate an association between frailty, number of social connections, and the RSA subscales of “perception of self” and “social competence”. As scores on social connections and the RSA subscales increased, total frailty scores decreased. In addition, of all the predictor variables entered in the multiple regression analysis, the number of social connections and higher scores on perception of self-efficacy accounted for the most amount of variance within the model. This is in line with previous research, Hladek et al., (2019) found that higher self-efficacy, as a measure of an individual’s ability to problem-solve, was associated with a 92% decreased odds of frailty and pre-frailty even after controlling for age, sex, ethnicity, comorbidities, heart rate, and body mass index. Furthermore, in a recent longitudinal cohort study, social frailty, defined as a loss of social networks and social activity, was associated with an increase of physical frailty at a four-year follow-up (Makizako et al., 2018). These findings were also echoed by the English longitudinal study of aging, which identified both isolation and loneliness as frisk factors for frailty (Gale, Westbury, & Cooper, 2018).

Limitations and Strengths

This study utilised a cross-sectional design, with all data being collected at a single time point. As such, causality cannot be inferred. Therefore, future research should adopt a longitudinal design, ideally beginning in early adulthood (18 years of age) and ending in older age. Additionally, due to the complex aetiology of frailty, several health and social variables would need to be considered such as smoking habits, alcohol consumption, and socioeconomic backgrounds (Chamberlain et al., 2016). Due to the COVID-19 outbreak, data collection had to be stopped prematurely due to the threat posed to the 65 and over population. As such, the sample size was below the a priori power calculation’s suggested number. Therefore, any results generated should be interpreted with caution and generalisability should only be established with a follow-up study.

There are also potential avenues of sampling bias within this study. Firstly, a high level of ACEs in childhood is associated with early mortality in adulthood. In a large cohort study, Brown et al., (2009) reported that individuals with six or more ACEs died up-to 20 years earlier than those without (60.6 years. 95% CI = 1.06, 2.83). It is possible that this study did not capture a specific subset of individuals due to premature death. Attrition in older adult studies is well established and due to the health implications associated with ACEs, it is possible that this will be even more pronounced (Brilleman et al., 2010). Second, many of the behaviours associated with healthy aging such as engaging with healthcare, having strong social networks, and positive emotional responses such as optimism may mean the sample is biased

towards participants who are functioning well. As such, it may have been prudent for the researcher to contact homebound frail individuals who were unable or unwilling to attend the clinic as they often have a higher incidence of severe frailty. Third, this study also did not recruit individuals who were accessing mental health crisis services due to severe and enduring mental health conditions and/or had a diagnosis of cognitive impairment. Although this was to reduce potential confounding factors, both these phenomena have been associated with higher incidence of frailty (Z. Feng et al., 2017; Grande et al., 2019). This may have been another factor contributing to the homogeneity of the sample. Furthermore, both these conditions are associated with a higher incidence of severe frailty, which may explain the higher occurrence of moderate frailty within this sample. Lastly, 100% of participants in this study identified with a white ethnic group. This may be a reflection of Scotland's population as a whole, as 84% of Scotland's population reported their ethnicity as White Scottish in a census (National Records of Scotland, 2011). Still, it has been reported that frailty rates are higher in Black, Asian, and minority ethnic (BAME) groups (Griffin, Mode, Ejiogu, Zonderman, & Evans, 2018; Pradhananga et al., 2019). However, this is also often associated with a lower socioeconomic position of BAME groups when compared to white ethnic groups. Nonetheless, this is an important factor to consider when thinking about generalisability of results.

Another methodological consideration is the potential relationship between depression and frailty in older adults. In a recent systematic review and meta-analysis, Soysal et al., (2017), demonstrated that individuals diagnosed with depression had increased odds of having frailty (OR = 4.07, 95% CI 1.93-8.55, k=8) and that this had a reciprocal relationship; with each condition associated with an increased prevalence and incidence of the other. Although the EFS enquires about mood (do you often feel sad or depressed?) it is only in a binary yes or no format. Therefore, using a measure as the geriatric depression scale (Yesavage, 1988) may have been more appropriate in order to control for depression as a potential confounding variable. It also became apparent whilst completing interviews that several participants had lived through the blitz. Although a reliable and validated measure, the original ACEs questionnaire does not contain any questions that capture this childhood stressor. Consequently, it may have been pertinent to use the adverse childhood experiences international questionnaire (ACE-IQ) developed by WHO (World Health Organisation, 2018). This questionnaire covers 13 potential domains of adverse experiences comprising physical, emotional, and sexual abuse, emotional and physical neglect, peer violence (bullying), witnessing community violence, and exposure to war/ collective violence.

Directions for future research

Due to the complex aetiological nature of frailty, risk factors comprise both individual and community factors (Hoogendijk et al., 2019). Future research could ask about health behaviours such as smoking, alcohol consumption, and gain more detail on physical activity across the lifespan as they have been shown to mediate the relationship between ACEs and allostatic load/ frailty in older age (Solís et al., 2015). Furthermore, future research should also aim to use longitudinal designs whilst attempting to control for potential confounding covariates like smoking, alcohol use, and activity levels. Smaller-N designs may be useful in refining the application of larger research findings to individual participants, providing a deeper level of understanding for potential outliers (Smith & Little, 2018).

Implications for practice

At a service level, there is increasing evidence for interventions for both preventing and reducing the impact of frailty and ACEs. Interestingly, protective factors for both ACEs and frailty revolve around establishing and maintaining positive relationships and social connections and engaging in meaningful and valued activities (Carver, Beamish, & Phillips, 2018; Domhardt, Münzer, Fegert, & Goldbeck, 2015). Indeed, this will require a paradigm shift in the way we currently view and discuss frailty with people who are 65+; moving beyond the current problem-based deficit model, which locates frailty within the individual, to a salutogenic one which incorporates both personal and systemic factors (Nicholson, Morrow, Hicks, & Fitzpatrick, 2017). Current treatment of frailty largely addresses biological aspects such physical activity, nutrition planning, home modifications, and a comprehensive geriatric assessment (Puts et al., 2017). Preventative measures should ensure that people are not just living longer but more fulfilled lives. Therefore, healthcare professional working with frail older adults should prioritise interventions that also include increasing quantity and quality of social interactions, as this can improve quality of life by reducing frailty (Davidson & Rossall, 2015). Finally, it also became apparent that several of the older adults associated the term frail with several negative connotations such as functional dependency, age related decline, and end-of-life care. The label of frailty is often resisted by people who are older, even when they are exhibiting symptoms, due to unhelpful connotations above and the perceived irreversibility of it (Warmoth et al., 2016). This can lead to an internalisation, by people who are older, that frailty is inevitable which leads to further suffering (Nicholson, Gordon, & Tinker, 2017). Health care professionals are ideally placed to challenge this discourse and foster an environment of health and wellbeing; which fits well with the Governments “no decision about me, without me” framework (Secretary of State for Health Liberating, 2011).

In addition, due to the current social and physical distancing measures due to COVID-19, this is an ideal time to trial virtual treatments with people who are older. Age UK have noted that the use of technology can increase feelings of control, reduce loneliness and isolation, facilitate independent living, and improve participation and contributions (AGE UK, 2018). In a focus group study based in Edinburgh, Vaportzis, Clausen, & Gow, (2017), noted that older adults aged 65-76 years were keen to develop their technological skills but identified lack of clarity in instructions, feelings of apprehension and inadequacy when compared to younger generations, health related factors and costs as barriers to increasing the use of technology. Healthcare professionals, specifically psychologists, are ideally placed to help remediate these barriers. The use of selection, optimisation, and compensation may be well placed to help promote the use of technological interventions moving forward.

Conclusion

Although the original hypotheses of this study were not met, it provides some evidence towards the factors that influence frailty in people who are 65+ and over. In line with previous research, perception of self (self-efficacy) and social connections were associated with a lower level of frailty in people who are older. The findings suggest that clinicians and researchers are ideally placed to develop preventive measures which include both physical and systemic factors. It is also essential that future research should also include older adult's opinions and beliefs to change the discourse around how frailty is viewed and treated.

In addition, the research highlights the need for an older adult specific measure of ACEs which can be used in longitudinal studies and captures the quality of relationships and early attachments. This may help to explain how ACEs and early attaches can aid the development resilience and increase the number of positive connections in older age. This will help to build towards current evidence that suggests there are links between ACEs, attachment styles, and Scotland early and excess mortality in adults and older adult (Smith, Williamson, Walsh, & McCartney, 2016). Clinical services are ideally placed to not only reduce and prevent the impact of ACEs and frailty but also to begin developing the necessary materials to advance our understanding in this research area.

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Appendices

Appendix A – Methodological Appraisal Tool

Cross-sectional Analytical Studies

Are inclusion and exclusion criteria clearly defined?

Yes (1)	No (0)	Unclear (0.5)	Not applicable
Inclusion/exclusion criteria are clearly defined and appropriate for the study and its location.	No information is given about inclusion or exclusion criteria.	Inclusion/exclusion criteria are partially defined for the study.	

Were the study subjects and the setting described in detail?

Yes (1)	No (0)	Unclear (0.5)	Not applicable
Key demographics of participants (minimum of age, gender, health status – both physical and mental) and study setting described in detail.	No demographics of participants or the study setting are given.	Information about demographics and study setting are given but no breakdown provided and/or information missing.	

Was the exposure measured in a valid and reliable way?

Yes (1)	No (0)	Unclear (0.5)	Not applicable
Detailed information is given about measure's validity and reliability and they are of a "gold standard" If multiple exposures are used, this will be based on the main exposure of interest.	No information given about measurement given or unreliable measure used. OR Measure used have been created for the study but quality assessment not available.	Partial information about measure's given AND/OR some validity and reliability established	

Were objective, standard criteria used for measurement of the condition?

Yes (1)	No (0)	Unclear (0.5)	Not applicable
Detailed information given about participants and specific sampling method used. If matched, clear information given about specific	None to very little information given about participants or sampling method.	Partial information given about participant information and sampling method.	

diagnostic methods or definitions used to establish key characteristics.			

Were confounding variables identified?

Yes (1)	No (0)	Unclear (0.5)	Not applicable
Bias (selection bias and information bias) and confounding variables have been identified and strategies	No identification of bias or confounding variables noted or strategies to reduce and/or ameliorate them.	Partial information is available about potential bias and confounding variables and/or statistical analyses.	

Were strategies to deal with confounding variables stated?

Yes (1)	No (0)	Unclear (0.5)	Not applicable
Bias and confounding variables have been identified appropriate methods such as randomisation, restriction, and matching and been implemented. In addition, appropriate statistical analysis has been used to reduce confounding variables.	No indication of methods used to reduce bias or confounding variables has been used.	Partial information is given regarding bias and confounding variables and if appropriate statistical analysis has been used to reduce them.	

Were outcomes measured in a valid and reliable way?

Yes (1)	No (0)	Unclear (0.5)	Not applicable
Outcomes were measured in a valid and reliable way (based on existing definitions or diagnostic criteria) and those administering and/or collecting the data keep fidelity to the protocol and are similar in their characteristics.	Outcomes were not measured in a clear and reliable way potentially leading to an increase of confounding variables and or information bias.	Partial information given regards to outcome measurement and/or model or methods used to collect the data.	

Was appropriate statistical analysis used?

Yes (1)	No (0)	Unclear (0.5)	Not applicable
Robust and appropriate statistical analysis has been used in the study to reduce confounding such as stratification, multivariate models, logistical and liner regression, and analysis of covariance.	Incorrect and or insufficient statistical analysis used in the study.	Partial information given about statistical method.	

Appendix B - Instructions for authors

International Psychogeriatrics

Please read these instructions carefully before submitting articles. Articles which are not prepared in accordance with these guidelines will be returned to authors unreviewed.

Scope and contributions

International Psychogeriatrics is written by and for those doing clinical, teaching, and research work concerning mental health of older people. It is the official journal of the International Psychogeriatric Association (IPA) and is published by Cambridge University Press. Although it is concerned primarily with psychogeriatrics, the journal welcomes contributions from all concerned with the field of mental health and aging. Original research papers are particularly sought.

Contributions include original research articles, reviews of the literature, brief reports, letters to the editor, and invited commentaries and guest editorials. Apart from commentaries and editorials, which are commissioned, contributions to *International Psychogeriatrics* are prepared and submitted by authors. Papers that are not rejected after initial review by the Editor-in-Chief or his representative, are reviewed by at least two expert reviewers selected by the Editor-in Chief. The journal is published twelve times per annum. Submission of a paper implies that it is neither under consideration for publication elsewhere, nor previously published. Manuscripts must be formatted double-spaced with ample margins on all sides and the pages should be numbered. Please leave a spare line between paragraphs to enable typesetters to identify paragraph breaks without ambiguity. *International Psychogeriatrics* uses the spelling of American English. Manuscripts written by those whose primary language is not English should be edited carefully for language prior to submission.

The journal does not publish papers whose sole focus is the validation of translated instruments that have previously been well assessed and validated in English or another language. These articles are better placed in a relevant National, rather than an International, journal. (A rare exception may be when social or cultural issues of international significance are clearly involved.) Case reports may be considered for publication only as Letters to the Editor.

Special Note:

Since this is *International Psychogeriatrics*, the authors should seek to highlight international significance of their article in terms of clinical practice, training, or research in different parts of the world. The authors are also advised to go over recent issues of *International Psychogeriatrics* to review papers on related topics, and add how their new submission advances the field further.

Submission of manuscripts

It is not acceptable to submit an article to the journal that has been previously published or is being submitted simultaneously elsewhere. Authors are required to assert that they have not submitted their article elsewhere upon submission to *International Psychogeriatrics*.

Manuscripts should be submitted online via our manuscript submission and tracking site, http://mc.manuscriptcentral.com/ipg. Full instructions for electronic submission are available directly from this site. If you are unsure of the suitability of your manuscript, please e-mail the abstract to the Journal Office before submitting online: ipaj-ed@cambridge.org.

To facilitate rapid reviewing, communications for peer review will be electronic and authors will need to supply a current e-mail address when registering to use the system.

When submitting your manuscript you will need to supply each of the following:

- A cover letter
- The manuscript as a text file in MS Word format (font Arial, minimum size 11)
- Up to 5 suggested reviewers, including their names, institutions, email addresses, and the reason for their appropriateness as reviewers for your article
- All figures in TIFF or JPEG format.

If the paper reports the results of a randomized controlled trial please ensure that it conforms to our requirements listed below under the heading 'Submission of randomized clinical trials' section of these instructions. If the research was paid for by a funding organization, the cover letter must contain the following three statements (this information does not have to be included in the manuscript itself but only in the cover letter). If the research was not paid for by a funding organization only the third statement is required:

- That the authors have not entered into an agreement with the funding organization that has limited their ability to complete the research as planned and publish the results.
- That the authors have had full control of all the primary data.
- That the authors are willing to allow the journal to review their data if requested.

Submission of a manuscript will be taken to imply that all listed authors have seen the final version and approved it.

All papers judged to be appropriate for further review will be assessed by two or more reviewers**.** The Editor-in-Chief's decision to accept, reject or request revision of the paper for publication will be final. The abstract and author details will be seen by prospective reviewers of the manuscript. Authors should suggest the names and contact information of experts qualified to review the work, but the Editor-in-Chief is not obliged to follow these suggestions. Papers must bear the authors' names, titles (e.g., Dr, Professor, etc.), affiliation(s), and address(es). This information will be seen

by reviewers. Reviewers' names will not be supplied to authors unless a reviewer asks to be so identified. Authors will be provided with a copyright transfer form to sign after acceptance of the manuscript, consenting to publication of the paper in *International Psychogeriatrics*.

All submissions are acknowledged electronically upon receipt. Most authors can expect to receive an initial decision regarding their paper together with referees' reports within 8 to 10 weeks of submission. Authors who have received no further communication 90 days after acknowledgment of receipt of their article should contact ipaj-ed@cambridge.org.

Article Types

Regular Research Articles: Regular Research Articles are original papers demonstrating the results of scientific studies, based on empirical data. The text of the article should contain no more than 5,000 words, in addition to an abstract of 300 words and up to 60 references. This word count includes only the main body of text (i.e., not abstract, references, tables, or figures).

Brief Reports: This category allows for articles that are shorter than original research but have the same style and may be used to report new and innovative research and/or significant (hot topics). Brief reports are also peer reviewed. They should be of 2,000 words or less and include no more than two figures or tables, no more than 10 references, and have an abstract of no more than 250 words, **without** structured sub-headings.

Reviews of the Literature: Authors intending to submit a literature review should check recent issues of *International Psychogeriatrics* to ensure that no review of the topic they propose to discuss has been published in the journal in recent times. Review articles should be of 6,000 words or less, have an abstract of up to 300 words, and may have up to 80 relevant references. Authors contemplating the submission of a literature review article are welcome to contact the editor to discuss the appropriateness of the topic prior to submission (ipaj-ed@cambridge.org). Literature reviews should have an abstract.

Letters to the Editor: Reader's letters will be considered for publication. Letters should be no longer than 750 words, with no more than 1 table or figure, and no more than 10 references. No abstract is required.

Guest Editorials and *Invited Commentaries* are commissioned by the editor.

Organization and style of manuscripts

Title page and corresponding author: Each article must have a title page with the title of the article, a list of all authors and their titles, affiliations and addresses. Each author must select only ONE country as their location. Author qualifications should not be listed as these are not published in the journal. The title page should explicitly identify the author to whom correspondence about the study should be addressed and that author's email address, telephone number, fax number and postal address must be clearly stated.

Abstract (Structured): Abstracts for original research and reviews should be structured and incorporate the following headings: Objectives, Design, Setting, Participants, Intervention (if any), Measurements, Results, and Conclusions. Abstracts should communicate the primary findings and significance of the research. They should not exceed 300 words in length. Abstracts for brief reports should not exceed 300 words and should **not** be structured with sub-headings.

Keywords: Under this heading and beneath the abstract, please list up to 8 words for the purpose of indexing.

Running title: This should contain no more than 50 characters including spaces.

Introduction: Briefly state the relevant background to the study to provide the necessary information and context to enable non-specialists to appreciate the objectives and significance of the paper. Most introductions to articles received for review are too long.

Methods: Materials and procedures should be described in sufficient detail to enable replication. Any statistical procedures used should be outlined and their use should be justified here. Results should not be included in the Method(s) section. If statistical procedures are used, they should be described here in adequate detail. Choice of statistical technique should be justified including some indication of the appropriateness of the data for the technique chosen. Adequacy of the sample size for the statistical technique(s) used must be addressed. If appropriate, a description of the statistical power of the study should be provided. If multiple univariate significant tests are used, probability values (p-values) should be adjusted for multiple comparisons, or alternatively a multivariate test should be considered. Significance results (p values) must be presented with accompanying statistics.

Further advice about statistics and *International Psychogeriatrics* can be found in the following article: Chibnall, J. (2000) Some basic issues for clinicians concerning things statistical. *International Psychogeriatrics*, 12, 3-7. The following article may also be of assistance to intending contributors: Chibnall J.T. (2004). Statistical audit of original research articles in *International Psychogeriatrics* for the year 2003. *International Psychogeriatrics* 16, 389-396. Both of these are available at the *International Psychogeriatrics* website by following the above links.

Results: This section may contain subheadings. Authors should avoid mixing discussion with the results. Sample sizes should be delineated clearly for all analyses. Some indicator of variability or sampling error should be incorporated into the reporting of statistical results (e.g. standard deviation). Wherever possible an indicator of effect size (e.g. Cohens d, η^2, Cramers V, 95% confidence interval) should be reported in addition to p values. If multiple univariate statistical tests are used p values should be adjusted for multiple comparisons or alternatively a multivariate test should be used. Obtained statistical values for tests should be reported with degrees of freedom (e.g. t, F, χ^2). Terms such as prevalence, population, or control group, should be used appropriately in the scientific sense.

Discussion: Interpretation of the results with respect to the hypothesis(es) and their significance to the field should be discussed here. Results should be interpreted in

the light of the size of the effect found and the power of the study to detect differences. Any methodological and other weaknesses of the study should be outlined, including limitations imposed by sample size. Careful consideration of the conclusion(s) for accuracy and alternative interpretation, and possible conflicts or resolution of conflicts in the field is encouraged. Limited speculation and directions for future research can be included.

Conflict of interest declaration: **This section must be completed**. This should follow the discussion and precede the references. Where there is no conflict of interest perceived to be present the heading Conflict of Interest should be included with the single word "none" underneath it. For full details see below.

Description of authors' roles: **This section must be completed if the paper has two or more authors**. It should contain a very brief description of the contribution of each author to the research. Their roles in formulating the research question(s), designing the study, carrying it out, analysing the data and writing the article should be made plain. For example: H. Crun designed the study, supervised the data collection and wrote the paper. M. Bannister collected the data and assisted with writing the article. N. Seagoon was responsible for the statistical design of the study and for carrying out the statistical analysis.

Acknowledgements: Any acknowledgements other than conflict of interest declarations in regard to sponsorship should be listed briefly here. Acknowledgements imply that the person/s mentioned have approved the citation of their name/s in the paper.

References: For review papers, no more than 75 articles that have been published or are in press should be cited; for regular research articles no more than 60 references, for brief reports no more than 10 references, for commentaries and editorials no more than 10 references, and for letters no more than 10 references. Unpublished data, personal communications, and manuscripts submitted for publication should be cited in the text and the supporting material submitted with the manuscript. *International Psychogeriatrics* uses the Harvard referencing system. Within the text of each paper journal articles should be cited in the style (Smith and Jones, 1999). Where an article quoted in the body of the text has more than two authors the term "et al." should be employed, i.e., (Smith et al., 1999). Text citations of multiple articles should be separated by semicolons, i.e., (Smith and Jones, 1999; Smith et al., 1999). At the end of each paper, all cited references should be listed alphabetically in the style indicated below. If the Digital Object Identifier (doi) is known, it should be added to the reference.

Reference examples:

For a journal article: **Smith, J., Jones, W. I. and Doe, J. T.** (1996). Psychogeriatrics for pleasure and profit: an expanding field. International Journal of Unreproducible Results, 3, 240–242. doi:12.3456/S123456789.

For a book: **Smith, J.A., Brown, P.Q., Jones, H.A. and Robinson, D.V.** (2001). Acute Confusional States. New York: Cambridge University Press. For a book chapter. **Park, K., Tiger, B. and Runn, F.** (1999). Psychogeriatrics in context. In

G.Verdi and A. Boito, (Eds.) New Medical Specialties (pp. 240–260). Cambridge: Cambridge University Press.

Where an article or book chapter has more than six authors only the first author's name should be given followed by the words "***et al***.".

For further examples of reference style see papers in recent issues of *International Psychogeriatrics*.

Figures/Tables: The manuscript should contain no more than five figures or tables (no more than two figures or tables for brief reports). The copies submitted with the manuscript must be of sufficient quality to enable reviewers to evaluate the data. The journal has a small budget to permit some color to be printed in come issues but authors wishing to publish figures requiring color to communicate the data may be required to pay some or all the additional cost.

Figure/Table legends: Each caption should begin with a brief description of the conclusion or observation provided in the figure. These should be submitted as a separate section after the References.

Supplementary material: *International Psychogeriatrics* has the facility to include supplementary materials (figures, tables, appendices, any non-English sections, and other material not suitable for inclusion in the print version of the journal) with the electronic version of individual papers at https://www.cambridge.org/core/journals/international-psychogeriatrics. This renders such supplementary material accessible without clogging the journal with materials that will be of interest to only a small minority of readers.

If submitting such supplementary material please follow the instructions below. If referring to supplementary material in a paper the following form of words should be used "see table S1/figure S1/appendix A1 published as supplementary material online attached to the electronic version of this paper at https://www.cambridge.org/core/journals/international-psychogeriatrics".

There will normally be one of the following reasons for you to be supplying supplementary material to accompany the online version of your article:

- You wish to link to additional information which due to its nature does not lend itself to print media (examples- full data sets, movie or sounds files etc.)
- The Editor of the Journal has requested that you extract certain information from the original article in order to allow for space constraints of the print version.
- You have requested additional material to be available to accompany an article that does not normally allow such material to be included (examples – sections not written in the English language, tables to accompany a correspondence article).

N.B. Please note that no copyediting or quality assurance measures will be undertaken on supplementary material (other than to ensure that the file is intact). The authors therefore warrant that the supplementary material that they submit is in

a suitable format for publication in this manner. The material shall be published online in exactly the form that it is supplied.

Submitting Supplementary Material

Please follow these instructions to submit supplementary material:

- Each supplementary file must be supplied as a separate file. Do not supply this material as part of the file destined for publication in the print journal.
- Each supplementary file must have a clear title (for example, Supplementary Figure 1).
- Provide a text summary for each file of no more than 50 words. The summary should describe the contents of the file. Descriptions of individual figures or tables should be provided if these items are submitted as separate files. If a group of figures is submitted together in one file, the description should indicate how many figures are contained within the file and provide a general description of what the figures collectively show.
- The file type and file size in parentheses.
- Ensure that each piece of supplementary material is clearly referred to at least once in the print version of the paper at an appropriate point in the text, and is also listed at the end of the paper before the reference section.

Word limits: The text of Review articles should not exceed 6,000 words, Regular research articles 5,000 words, brief reports 2000 words, and letters to the editor 750 words. The text excludes title page, abstract, acknowledgements, references, tables, and figures. Articles may contain supplementary material which is published online only.

Format and file size: File sizes should be as small as possible in order to ensure that users can download them quickly.

Images should be a maximum size of 640 x 480 pixels at a resolution of 72 pixels per inch.

Authors should limit the number of files to under ten, with a total size not normally exceeding 3 MB. Sound/movie files may be up to 10 MB per file; color PDFs/PowerPoint may be up to 5 MB per file; all other general file types may be up to 2 MB per file but most files should be much smaller.

We accept files in any of the following formats (if in doubt please enquire first):

MS Word document (.doc) , Adobe Acrobat (.pdf), Plain ASCII text (.txt), Rich Text Format (.rtf), WordPerfect document (.wpd), HTML document (.htm), MS Excel spreadsheet (.xls), GIF image (.gif), JPEG image (.jpg), TIFF image (.tif), MS PowerPoint slide (.ppt), QuickTime movie (.mov), Audio file (.wav), Audio file (.mp3), MPEG/MPG animation (.mpg)

If your file sizes exceed these limits or if you cannot submit in these formats, please seek advice from the editor handling your manuscript.

Submission of papers reporting randomized controlled trials

In order to ensure the public availability of the results of randomized controlled trials, the International Committee of Medical Journal Editors has suggested that all such trials should be registered. In common with many leading medical journals *International Psychogeriatrics* has decided to follow this policy. We will not review any paper submitted to us reporting a randomized clinical trial unless the trial was registered in a public trial registry from the date it commenced recruitment.

All manuscripts reporting randomized controlled trials should have the following sent with them or they will be returned to the authors.

- A check list and flow chart in accordance with the CONSORT guidelines which can be found at http://www.consort-statement.org. Please send in the checklist as a supplementary file and include the flow chart as Figure 1 in the manuscript.
- The trial protocol is to be submitted as a supplementary file. This will not be published but it is needed to appraise and peer review the paper. If the protocol is already published, a copy of that paper should be submitted.
- The registration number of the trial and the name of the trial registry in which it was registered. Please add these to the last line of the paper's structured abstract. Trials must have been registered in a public trials registry at or before the onset of enrolment to be considered for publication in *International Psychogeriatrics*. Our criteria for a suitable public trial registry are: free to access; searchable; identification of trials by unique number; free or minimal cost for registration; validation of registered information; inclusion of details to identify the trial and the investigator within the registered entry (including the status of the trial); research question; methodology; intervention; and funding and sponsorship disclosed.

Conflict of Interest

Conflict of interest occurs when authors have interests that **might** influence their judgement inappropriately, regardless of whether that judgement is influenced inappropriately or not. *International Psychogeriatrics* aims to conform to the policies of the World Association of Medical Editors in regard to conflict of interest. For full details please see the website http://www.wame.org/wamestmt.htm#fundres. To this end all authors must disclose potential conflicts of interest so that others may be aware of their possible effects. Specifically, under the heading conflict of interest, all articles must detail:

The source(s) of financial support for the research (if none, write "none").

A description of any sponsor's role(s) in the research (e.g., formulation of research question(s), choice of study design, data collection, data analysis and decision to publish).

Information about any financial relationship between any author and any organization with a vested interest in the conduct and reporting of the study. For example, in a study on the effects of a drug made by Bigpharma which directly competes with another drug made by Megadrug a declaration might say "Jane Smith has received research support and speaker's honoraria from Bigpharma and has received financial assistance from Megadrug to enable her attend conferences."

Open Access

Authors in *International Psychogeriatrics* have the option to publish their paper under a fully Open Access agreement, upon payment of a one-off Article Processing Charge (APC). In this case, the final published Version of Record will be made freely available to all in perpetuity under a Creative Commons license, enabling its reuse and re-distribution. This Open Access option is only offered to authors upon acceptance of an article for publication.

Authors choosing the Open Access option are required to complete the Open Access Transfer of Copyright form, which can be found here. More information about Open Access in *International Psychogeriatrics* can be found here.

The current APC for *International Psychogeriatrics* is $2980 / £1870.

Please note: APC collection is managed on behalf of Cambridge University Press by RightsLink, who will contact authors following acceptance of their paper.

Author Language Services

Cambridge recommends that authors have their manuscripts checked by an English language native speaker before submission; this will ensure that submissions are judged at peer review exclusively on academic merit. Authors can enlist the help of a third-party services specializing in language editing and / or translation (http://www.cambridge.org/acade...), and suggest that authors contact as appropriate. Use of these services is voluntary, and at the author's own expense.

Supply of author-generated artwork

Monochrome line subject illustrations supplied in digital form

Macromedia Freehand, Adobe Illustrator and Adobe Photoshop are the preferred graphics packages. Before submitting your artwork, please do the following:

Where possible, please supply illustrations as TIFF or EPS files (300 dpi). When submitting EPS files you must convert your text within the file to artwork/outlines. If your EPS file contains a scanned image, you must ensure that you supply a full EPS, i.e. binary data. Do not supply PostScript files. PostScript files cannot be included within our integrated page make-up system, or worked on in any way. For best results please save your files as TIFF or EPS files. If files cannot be supplied in this way other formats can be handled (although we do not guarantee to use them).

Draw or scan line artwork to finished size with appropriate line weights and typefaces.

Indicate the file format (e.g. TIFF or EPS), the graphics software that you have used in originating the artwork files (e.g. Freehand 7.0, Illustrator 8.0, etc.) and the computer operating system used (e.g. Mac OS 8.6, Windows NT).

Supply a laser print of all figures. List the name and version of the artwork package used and the names and libraries of fonts used in the artwork or EPS files.

Pattern fills and tints

Artwork packages do not always generate pattern fills for output on image/platesetters. Imagesetters will interpret them differently from your Mac or PC and the result often looks pixelated or blocked. Where possible, use PostScript fills, custom fills and conventional tints. 9

PostScript fills frequently do not display well on screen but they do print out correctly. It is best to avoid the use of complex or very detailed tints, patterns and symbols. These seldom reproduce satisfactorily when reduced to fit the page and when used in a caption or legend may be completely illegible when represented on a screen (for example during page make-up, or on the Web) or when output on low-quality CUP artwork instructions.doc 2 laser printers. Supplying as TIFF or EPS files (see above) alleviates this problem.

Please therefore:

- Use only the tints, patterns and symbols shown here.
- Use conventional fills: solids, tints, lines or cross-hatching.
- Use a PostScript fill if possible.
- Do not use a screen value above 133 lpi. Generally, 100 lpi is better (even when scanned at high resolution finer tints do not reproduce satisfactorily when reduced).
- If possible, use just one kind of screen (line angle or dot shape) and one screen value throughout the document.
- Do not use pattern fills from a graphics program, as these are usually bitmap patterns, which do not output adequately to plate/image setters.
- Do not use color tints, even if the figure is intended for monochrome printing; use black/white/greyscale.
- Do not use .hairline. line widths in graphics packages.

Monochrome halftone subjects

Figures composed of (hard copy) photographs should be unscreened glossy prints presented at publication scale; each component part should be named with a lower-case letter. Photographic artwork is numbered as part of the sequence of figures, not as separate plates.

If supplying these in digital form, your repro house should follow these instructions:

- Scanning: Scan at a resolution that is around twice the intended screen value; for example scan at 300 dpi for 133 or 150 screen.
- Dot range (halftones only): This is the term we use to describe the highlight/white area and shadow/black areas within a printed image. To prevent the heavy or dark areas of your halftones from filling in or the light areas being washed out we specify a dot range that allows for gains or losses during the process to lithographic printing. Pre-set the dot range at 1% highlight to 96% shadow where possible, we will check your files before outputting as a safeguard.

- Data files: Supply data as TIFF files; if you wish to compress them, use lossless compression software such as the LZW compression package.
- Laser proofs: Supply a good quality laser proof of all figures. List the name and version of the artwork package used and the names and libraries of fonts used in the artwork. If we are unable to use your electronic file, we can scan in the laser proof as an alternative until a revised file can be supplied.
- Line & tone combination: Files scanned as line & tone combination should be scanned at a higher resolution than a standard halftone to ensure better type/line quality, for example, 600 dpi.

Color halftone or line subjects

Do not submit line subject drawings with colored tints unless the figure is required as a color plate; use only black/white/greyscale.

If supplying color subjects in digital form, submit as TIFF or EPS files and choose CMYK color mode when saving your scans. If you supply files as RGB we need to convert them to the CMYK printing process before we can print, this usually results in a slight change of the color values; therefore all color correction must be carried out in CMYK mode on your machine.

General notes

Following acceptance of a manuscript the contact author should receive proofs within 1-12 weeks. They also will be required to complete and forward a copyright form and authors' checklist both of which will be forwarded to the corresponding author by email when the article is accepted.

The average time from an article being accepted to being e-published ahead of print as a First View article is 35 days, provided authors return proofs promptly. E-publication generates a doi number and counts as full publication for citation purposes.

Editorials and commentaries are commissioned by the editor.

Reviewers who reviewed papers in the previous calendar year will be acknowledged in the journal each year. *International Psychogeriatrics* no longer publishes an annual index as modern computerised search techniques have rendered annual hard copy indices obsolete.

Contributors should refer to recent issues of the journal for examples of formatting (abstracts, headings, references, tables, etc.).

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Appendix C – Ethical Approval

WoSRES
West of Scotland Research Ethics Service

NHS
Greater Glasgow and Clyde

West of Scotland REC 5
West of Scotland Research Ethics Service
West Glasgow Ambulatory Care Hospital
Dalnair Street
Glasgow
G3 8SJ

Date 21 May 2019

Direct line 0141 232 1809
E-mail WoSREC5@ggc.scot.nhs.uk

Mr David Snoddy
Trainee Clinical Psychologist
NHS Fife
Clinical Psychology Department
Lynebank Hospital
Dunfermline
KY11 4UW

Dear Mr Snoddy

Study title: **A cross-sectional study exploring frailty in older people and the possible inter-relationship with early adverse childhood experiences.**
REC reference: **19/WS/0073**
Protocol number: **CAHSS1901/05**
IRAS project ID: **251273**

The Research Ethics Committee reviewed the above application at the meeting held on 15 May 2019. Thank you for attending to discuss the application by telephone.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this favourable opinion letter. The expectation is that this information will be published for all studies that receive an ethical opinion but should you wish to provide a substitute contact point, wish to make a request to defer, or require further information, please contact hra.studyregistration@nhs.net outlining the reasons for your request. Under very limited circumstances (e.g. for student research which has received an unfavourable opinion), it may be possible to grant an exemption to the publication of the study.

Ethical opinion

The members of the Committee present gave a favourable ethical opinion of the above research on the basis described in the application form, protocol and supporting documentation, subject to the conditions specified below. .

Conditions of the favourable opinion

The REC favourable opinion is subject to the following conditions being met prior to the start of the study.

Number	Condition
1	In page 2 of the Participant Information sheet, spelling errors should be corrected in paragraph 3 and 4 ("The Demographic Questionnaire will *as* you questions.." and "The questions will *as* you about.."). Also in paragraph 4 of page 2 of the PIS, the sentence "The researcher will complete this questionnaire with you" should be changed to "The researcher will *assist you in completing the questionnaire, if you wish.*"

2	A copy of the Data Protection Information Sheet, as mentioned on page 3 of the PIS, should be submitted for our records.
3	In the Debrief Sheet, the full web address for each of the websites should be typed out in full, rather than showing hyperlinks.
4	In page 4 of the PIS, the name of the reviewing REC should be changed as appropriate.

You should notify the REC once all conditions have been met (except for site approvals from host organisations) and provide copies of any revised documentation with updated version numbers. Revised documents should be submitted to the REC electronically from IRAS. The REC will acknowledge receipt and provide a final list of the approved documentation for the study, which you can make available to host organisations to facilitate their permission for the study. Failure to provide the final versions to the REC may cause delay in obtaining permissions.

Management permission must be obtained from each host organisation prior to the start of the study at the site concerned.

Management permission should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements. Each NHS organisation must confirm through the signing of agreements and/or other documents that it has given permission for the research to proceed (except where explicitly specified otherwise).

Guidance on applying for HRA and HCRW Approval (England and Wales)/ NHS permission for research is available in the Integrated Research Application System, at www.hra.nhs.uk or at http://www.rdforum.nhs.uk.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of management permissions from host organisations.

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publically accessible database. This should be before the first participant is recruited but no later than 6 weeks after recruitment of the first participant.

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g. when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non-clinical trials this is not currently mandatory.

If a sponsor wishes to request a deferral for study registration within the required timeframe, they should contact hra.studyregistration@nhs.net. The expectation is that all clinical trials will be registered, however, in exceptional circumstances non registration may be permissible with prior agreement from the HRA. Guidance on where to register is provided on the HRA website.

It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Ethical review of research sites

NHS Sites

The favourable opinion applies to all NHS sites taking part in the study taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Approved documents

The documents reviewed and approved at the meeting were:

Document	*Version*	*Date*
GP/consultant information sheets or letters [GP Letter, V1, 07 March 2019]	Version 1	07 March 2019
IRAS Application Form [IRAS_Form_17042019]		17 April 2019
Participant consent form [Consent Form, V1, 07 March 2019]	Version 1	07 March 2019
Participant information sheet (PIS) [Information Sheet, V1, 07 March 2019]	Version 1	07 March 2019
Research protocol or project proposal [Research Protocol, V1, 07 March 2019]	Version 1	07 March 2019
Summary CV for Chief Investigator (CI) [CI CV (David Snoddy)]		12 October 2018
Summary CV for supervisor (student research) [Academic Supervisor CV (Guzman)]		05 November 2018
Summary CV for supervisor (student research) [Clinical Supervisor CV (Murray)]	Version 1	07 March 2019
Summary of any applicable exclusions to sponsor insurance (non-NHS sponsors only) [Sponsor Insurance Form]		31 July 2018
Summary of any applicable exclusions to sponsor insurance (non-NHS sponsors only) [Sponsor Insurance Form]		31 July 2019
Summary of any applicable exclusions to sponsor insurance (non-NHS sponsors only) [Sponsor Insurance Form]		24 July 2018
Summary of any applicable exclusions to sponsor insurance (non-NHS sponsors only) [Sponsor Insurance Form]		31 July 2018
Validated questionnaire [Questionnaire Pack, V1, 07 March 2019]	Version 1	07 March 2019

Membership of the Committee

The members of the Ethics Committee who were present at the meeting are listed on the attached sheet.

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

The attached document "After ethical review – guidance for researchers" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website: http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/

HRA Learning

We are pleased to welcome researchers and research staff to our HRA Learning Events and online learning opportunities– see details at: https://www.hra.nhs.uk/planning-and-improving-research/learning/

19/WS/0073	**Please quote this number on all correspondence**

With the Committee's best wishes for the success of this project.

Yours sincerely

for
Dr Stewart Campbell
Chair

Enclosures:	List of names and professions of members who were present at the meeting and those who submitted written comments
	"After ethical review – guidance for researchers"
Copy to:	Ms Charlotte Smith, The University of Edinburgh
	Scotland: nhsg.NRSPCC@nhs.net

West of Scotland REC 5

Attendance at Committee meeting on 15 May 2019

Committee Members:

Name	*Profession*	*Present*	*Notes*
Mrs Linda Boyle	Retired Company Secretary	Yes	
Dr Stewart Campbell	Consultant Physician & Gastroenterologist (CHAIR)	Yes	Chaired meeting
Dr James Curran	GP	Yes	
Dr James Dale	Consultant Rheumatologist	Yes	
Mrs Naomi Hickey	Research Nurse (Alternate Vice-Chair)	Yes	
Professor Eddie McKenzie	Statistician	Yes	
Canon Matt McManus	Retired Parish Priest (Vice-Chair)	Yes	
Dr Audrey Morrison	Research Practitioner	No	
Mrs Karen Mowbray	Health Records Manager	Yes	
Ms Janis Munro	Key Account Manager	No	
Mr Charles Sargent	Retired	Yes	
Dr Marcel Strauss	Consultant Radiologist	No	
Mr James Timmons	Retired IT Manager	No	

Also in attendance:

Name	*Position (or reason for attending)*
Dr Judith Godden	Scientific Officer/Manager
Mrs Sharon Macgregor	REC Manager

Appendix D – Further Amendment Approval(s)

WoSRES
West of Scotland Research Ethics Service

NHS
Greater Glasgow and Clyde

West of Scotland REC 5
West of Scotland Research Ethics Service
Ward 11, Dykebar Hospital
Grahamston Road
PAISLEY
PA2 7DE

Date 26 September 2019

Direct line 0141 314 0213
E-mail WoSREC5@ggc.scot.nhs.uk

Mr David Snoddy
Clinical Psychology Department
Lynebank Hospital
Dunfermline
KY11 4UW

Dear Mr Snoddy

Study title: **A cross-sectional study exploring frailty in older people and the possible inter-relationship with early adverse childhood experiences.**
REC reference: **19/WS/0073**
Protocol number: **CAHSS1901/05**
Amendment number: **AM02**
Amendment date: **25 September 2019**
IRAS project ID: **251273**

Thank you for your email of 25 September 2019, notifying the Committee of the above amendment.

The Committee does not consider this to be a "substantial amendment" as defined in the Standard Operating Procedures for Research Ethics Committees. The amendment does not therefore require an ethical opinion from the Committee and may be implemented immediately, provided that it does not affect the approval for the research given by the R&D office for the relevant NHS care organisation.

Documents received

The documents received were as follows:

Document	*Version*	*Date*
Notice of Non Substantial Amendment [email]		25 September 2019
Other [Study Brochure]	1.0	18 September 2019

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

19/WS/0073:	Please quote this number on all correspondence

Yours sincerely

Sharon Macgregor
REC Manager

Copy to: Charlotte Smith, University of Edinburgh

WoSRES
West of Scotland Research Ethics Service

NHS
Greater Glasgow and Clyde

Mr David Snoddy
Clinical Psychology Department
Lynebank Hospital
Dunfermline
KY11 4UW

West of Scotland REC 5
Research Ethics
Clinical Research and Development
Dykebar Hospital
Grahamston Road
Paisley PA2 7DE

Date 15 July 2019
Direct line 0141 314 0214
E-mail WoSREC5@ggc.scot.nhs.uk

Dear Mr Snoddy

Study title: **A cross-sectional study exploring frailty in older people and the possible inter-relationship with early adverse childhood experiences.**
REC reference: **19/WS/0073**
Protocol number: **CAHSS1901/05**
Amendment number: **(AM01)**
Amendment date: **10 July 2019**
IRAS project ID: **251273**

The above amendment was reviewed by the Sub-Committee in correspondence.

Ethical opinion
The members of the Committee taking part in the review gave a favourable ethical opinion of the amendment on the basis described in the notice of amendment form and supporting documentation.

Approved documents
The documents reviewed and approved at the meeting were:

Document	*Version*	*Date*
Non-validated questionnaire [Questionnaire pack (tracked)]	1.3	10 July 2019
Non-validated questionnaire [Questionnaire pack]	1.3	10 July 2019
Notice of Substantial Amendment (non-CTIMP)	(AM01)	10 July 2019

Membership of the Committee
The members of the Committee who took part in the review are listed on the attached sheet.

Working with NHS Care Organisations
Sponsors should ensure that they notify the R&D office for the relevant NHS care organisation of this amendment in line with the terms detailed in the categorisation email issued by the lead nation for the study.

Statement of Compliance
The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

HRA Learning
We are pleased to welcome researchers and research staff to our HRA Learning Events and online learning opportunities – see details at: https://www.hra.nhs.uk/planning-and-improving-research/learning/

19/WS/0073:	**Please quote this number on all correspondence**

Yours sincerely

For
Dr Stewart Campbell
Chair

Enclosures: *List of names and professions of members who took part in the review*

Copy to: *Mr David Snoddy*

West of Scotland REC 5

Attendance at Sub-Committee of the REC meeting on 31 July 2019

Committee Members:

Name	*Profession*	*Present*	*Notes*
Dr Stewart Campbell	Consultant Physician & Gastroenterologist (CHAIR)	In Correspondence	
Canon Matt McManus	Retired Parish Priest (Vice-Chair)	In Correspondence	

Also in attendance:

Name	*Position (or reason for attending)*
Mrs Sharon Macgregor	REC Manager

Appendix E – Local R&D Approval

Medical Director

Hayfield House
Hayfield Road
KIRKCALDY
KY2 5AH

NHS Fife

Mr David Snoddy
Clinical Psychology Dept
Lynebank Hospital
DUNFERMLINE

17 June 2019
Our Ref 19-034 251273
19/WS/0073
Enquiries to Aileen Yell
E-mail aileenyell@nhs.net
Telephone 01383 623623 Ext 20940
Website www.nhsfife.org

Dear Mr Snoddy

Project Title: A cross-sectional study exploring frailty in older people and the possible inter-relationship with early adverse childhood experiences

Thank you for your application to carry out the above project. Your project documentation (detailed below) has been reviewed for resource and financial implications for NHS Fife and I am happy to inform you that NHS permission for the above research has been granted on the basis described in the application form, protocol and supporting documentation. The documents reviewed were:

Document	Version	Date
IRAS R&D Form	5.11	17 April 2019
Protocol	1.0	7 March 2019
Informed Consent Form	1.0	7 March 2019
GP Letter	1.0	7 March 2019
Data Protection Information Sheet	1.0	7 March 2019
REC provisional favourable opinion letter		21 May 2019
Participant Information Sheet	1.2	12 June 2019
Questionnaire Pack	1.2	12 June 2019
REC final favourable opinion letter		13 June 2019

The terms of the approval state that you are the Principal Investigator authorised to undertake this study within NHS Fife, with assistance from Charlie Chung (Rehabilitation Manager - West Division) and Azmat Rashid (GP Fellow). I note that the favourable ethical opinion applies to all NHS sites taking part in the study therefore no separate Site Specific Review is required in this case.

The sponsors for this study are University of Edinburgh. Please note that it is the responsibility of the Sponsor to ensure that adequate and appropriate insurance is maintained throughout the course of the study.

Details of our participation in studies will be included in annual returns we are expected to complete as part of our agreement with the Chief Scientist Office. Regular reports of the study require to be submitted. Your first report should be submitted to Dr A Wood, R&D Manager, R&D Department, Queen Margaret Hospital, Whitefield Rd, Dunfermline, KY12 OSU (Amanda.wood3@nhs.net) in 12 months time and subsequently at yearly intervals until the work is completed. A Lay Summary will also be required upon completion of the project.

NHS
Fife

In addition, approval is granted subject to the following conditions:-

All research activity must comply with the standards detailed in the UK Policy Framework for Health and Social Care Research http://www.nhsresearchscotland.org.uk/uploads/tinymce/uk-policy-framework-health-social-care-research.pdf, health & safety regulations, data protection principles, other appropriate statutory legislation and in accordance with Good Clinical Practice (GCP).

Any amendments which may subsequently be made to the study should also be notified to Aileen Yell, R&D Research Coordinator (aileenyell@nhs.net) , as well as the appropriate regulatory authorities. Notification should also be given of any new research team members post approval and/or any changes to the status of the project.

This organisation is required to monitor research to ensure compliance with the Research Governance Framework and other legal and regulatory requirements. This is achieved by random audit of research. You will be required to assist with and provide information in regard to monitoring and study outcomes (including providing recruitment figures to the R&D office as and when required).

As custodian of the information collated during this research project you are responsible for ensuring the security of all personal information collected in line with NHS Scotland IT Security Policies, until the destruction of this data. Permission is only granted for the activities for which a favourable opinion has been given by the REC (and which have been authorised by the MHRA where appropriate).

The research sponsor or the Chief Investigator or local Principal Investigator at a research site may take appropriate urgent safety measures in order to protect research participants against any immediate hazard to their health or safety. The R&D office (aileenyell@nhs.net) should be notified that such measures have been taken. The notification should also include the reasons why the measures were taken and the plan for further action. The R&D office should be notified within the same time frame of notifying the REC and any other regulatory bodies.

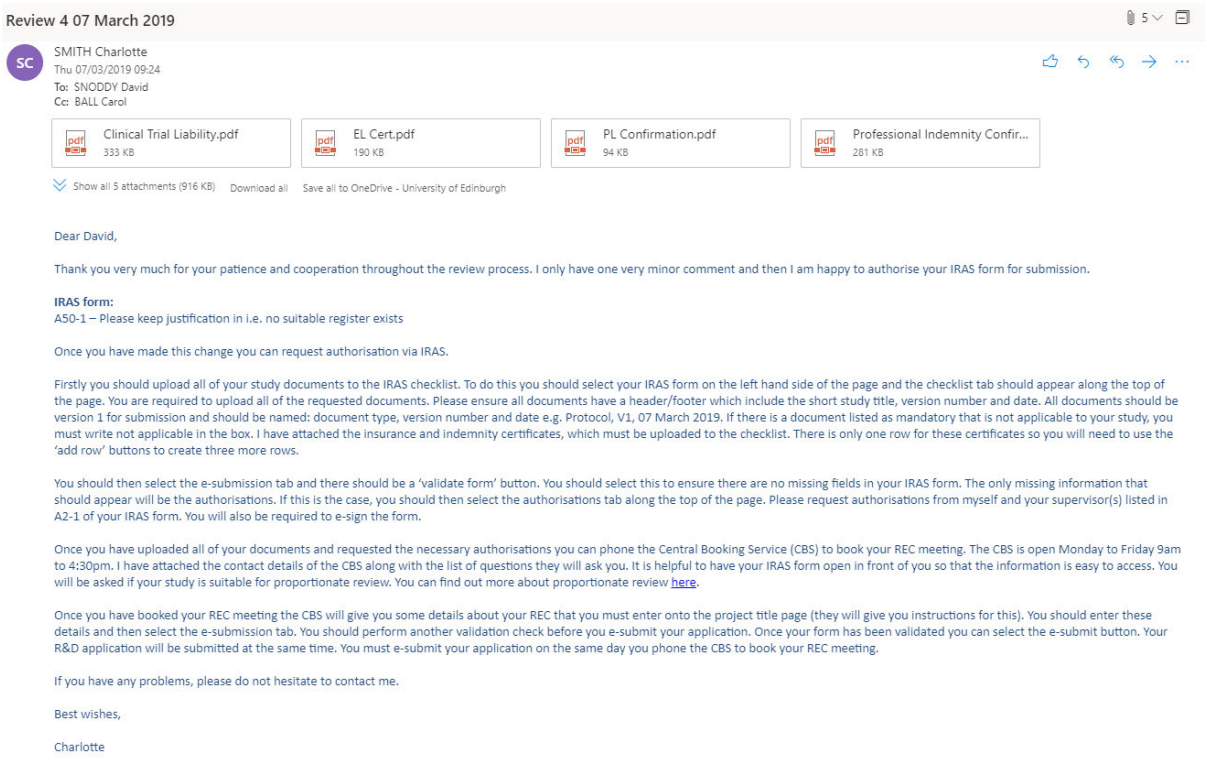
I would like to wish you every success with your study and look forward to receiving a summary of the findings for dissemination once the project is complete.

Yours sincerely

DR CHRIS MCKENNA
Medical Director
NHS Fife

Cc : Aileen Yell, R&D Research Coordinator, NHS Fife, Queen Margaret Hospital, Dunfermline

Appendix F – University Approval



Review 4 07 March 2019

SC

SMITH Charlotte
Thu 07/03/2019 09:24
To: SNODDY David
Cc: BALL Carol

Clinical Trial Liability.pdf 333 KB
EL Cert.pdf 190 KB
PL Confirmation.pdf 94 KB
Professional Indemnity Confir... 281 KB

Show all 5 attachments (916 KB) Download all Save all to OneDrive - University of Edinburgh

Dear David,

Thank you very much for your patience and cooperation throughout the review process. I only have one very minor comment and then I am happy to authorise your IRAS form for submission.

IRAS form:
A50-1 – Please keep justification in i.e. no suitable register exists

Once you have made this change you can request authorisation via IRAS.

Firstly you should upload all of your study documents to the IRAS checklist. To do this you should select your IRAS form on the left hand side of the page and the checklist tab should appear along the top of the page. You are required to upload all of the requested documents. Please ensure all documents have a header/footer which include the short study title, version number and date. All documents should be version 1 for submission and should be named: document type, version number and date e.g. Protocol, V1, 07 March 2019. If there is a document listed as mandatory that is not applicable to your study, you must write not applicable in the box. I have attached the insurance and indemnity certificates, which must be uploaded to the checklist. There is only one row for these certificates so you will need to use the 'add row' buttons to create three more rows.

You should then select the e-submission tab and there should be a 'validate form' button. You should select this to ensure there are no missing fields in your IRAS form. The only missing information that should appear will be the authorisations. If this is the case, you should then select the authorisations tab along the top of the page. Please request authorisations from myself and your supervisor(s) listed in A2-1 of your IRAS form. You will also be required to e-sign the form.

Once you have uploaded all of your documents and requested the necessary authorisations you can phone the Central Booking Service (CBS) to book your REC meeting. The CBS is open Monday to Friday 9am to 4:30pm. I have attached the contact details of the CBS along with the list of questions they will ask you. It is helpful to have your IRAS form open in front of you so that the information is easy to access. You will be asked if your study is suitable for proportionate review. You can find out more about proportionate review here.

Once you have booked your REC meeting the CBS will give you some details about your REC that you must enter onto the project title page (they will give you instructions for this). You should enter these details and then select the e-submission tab. You should perform another validation check before you e-submit your application. Once your form has been validated you can select the e-submit button. Your R&D application will be submitted at the same time. You must e-submit your application on the same day you phone the CBS to book your REC meeting.

If you have any problems, please do not hesitate to contact me.

Best wishes,

Charlotte

Appendix G – Participant Information Sheet

THE UNIVERSITY of EDINBURGH

NHS Fife

Project Title: Exploring frailty and adverse childhood experiences (ACEs) in people who are older.

Information Sheet

What is the purpose of the study?

This study's aims are to discover whether a relationship exists between Adverse Childhood Experiences (ACEs) and the level of frailty in people who are older. ACEs are defined as any form of physical or emotional abuse, neglect, and witnessing violence in the home or community as a child. Furthermore, this study hopes to assess whether there is a potential helpful role of resilience.

Why have I been invited?

You have been invited to take part in this study as you are aged 65 years or older and have been identified as frail by a medical professional.

Do I have to take part?

No, it is up to you to decide whether to take part. If you decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time and without giving a reason. Deciding not to take part or withdrawing from the study will not affect the healthcare that you receive or your legal rights.

What will happen if I take part?

After reading this information sheet, the researcher will answer any questions that you may have about the research. You will be given as much time as you need to consider whether you wish to take part or not.

If you decide to take part in the study, you will be contacted by the researcher and asked to sign a consent form. If you have consented to continue with the study, you will be asked to complete 4 questionnaires in this order:

- A Demographics Questionnaire
- The Edmonton Frail Scale Questionnaire
- The Resilience Scale for Adults
- The Adverse Childhood Experiences Questionnaire

The Demographic Questionnaire will ask you questions about your gender, age, ethnicity, level of education, marital status, employment status, level of exercise, and social networks.

The Edmonton Frail Scale will require you to answer 7 questions and complete 2 tasks; drawing a diagram and a physical task ("get up and go" task). The questions will ask you about your health, independence, social support, medication usage, nutrition, mood, continence, and physical performance. The physical task will involve standing up from a chair, walking a short distance, and then returning to the chair. If you feel unable to complete either of these tasks, please let the researcher know. The researcher will assist you in completing the questionnaire, if you wish.

The Resilience Scale for Adults is made up of 25 questions, please let the researcher know if you are unsure of any of the questions. The researcher will assist you in completing the questionnaire, if you wish.

The Adverse Childhood Experience questionnaire is made up of 10 questions, please let the researcher know if you are unsure of any of the questions. The nature of these questions could be potentially upsetting as they will be asking you about physical, emotional, and sexual abuse you may or may not have experienced during childhood. If you feel, at any point, that you are unable to continue please let the researcher know. The researcher will assist you in completing the questionnaire, if you wish.

Once you have completed these questionnaires the researcher will give you a debriefing sheet and will answer any questions that you may have.

What are the possible benefits of taking part?
You may not receive a direct benefit from taking part in this study; however, there is a possibility that the findings reported from this study may be used to further research, aid understanding, and help with develop future interventions for frailty.

What are the possible risks of taking part?

As noted previously, some of the questions within the ACE questionnaire may be distressing. If you become upset during or after you have completed this questionnaire support will be available to you through NHS psychological services. Furthermore, a list of appropriate services has been attached to the end of this pack which you can take away with you.

Whilst completing the physical "get up and go" task there will be a small chance of falling; the researcher will set-up the task to minimise this and support will be provided immediately in case of a fall.

Will my taking part in this study be kept confidential?
Yes. All information collected about you during this research will be kept confidential in line with strict laws which safeguard your privacy. All your information will be anonymised and stored at a secure location. Your information will only be accessed by those directly involved with the research. Any information which leaves the research setting will have your name and any identifying details removed. For more information about how we will use your data please see the Data Protection Information Sheet.

With your consent, we will inform your General Practitioner (GP) that you are taking part in this study.

There are some situations where **will we have to break your confidentiality:** if you disclose to us that you are at risk of harm, pose a threat to another individual, or disclose a serious crime (past and present), we will need to take the relevant action to keep you and others safe.

What will happen to the results of the research study?
The findings of this study will be published in medical and scientific journals to allow other researchers around the world to understand how your needs can be used. You and other participants would not be identifiable as a participant on any such scientific publication, public or academic presentation.

A 1-page feedback sheet will also be created on the results of the study which can be sent to you; please indicate to the researcher whether this is something you would be interested in and they will let the care team know to circulate a copy to you once the study is complete.

Who is organising the research?
This study is part of David Snoddy's thesis in partial fulfilment of the doctorate in clinical psychology programme.

Who has reviewed the study?
The study proposal has been reviewed by the Clinical Psychology Department, Ethics Review Committee at School of Health in Social Science at the University of Edinburgh. All research in the NHS is looked at by an independent group of people called a Research Ethics Committee. A favourable ethical opinion has been obtained from the West Scotland Research Ethics Committee. NHS Management Approval has also been obtained.

What happens once I have completed the study?
Once you have completed the study you will have the chance to ask the researcher any questions or concerns that are important to you. Furthermore, if you have become distressed at any point during this study please do not hesitate to let the researcher know and they will support you. Again, a list of appropriate services has been attached to the end of this pack which you can take away with you.

If you have any further questions about this study, please contact David Snoddy at:

David Snoddy
Trainee Clinical Psychologist

Clinical Psychology Department, Lynebank Hospital, Halbeath Road, Dunfermline, KY114UW
Email:
Telephone: 01383 565393

OR

Dr Azucena Guzmán
Clinical Psychologist and Academic Supervisor
Lecturer in Health & Ageing
Clinical Psychology Department, School of Health in Social Science, The University of Edinburgh
Email:

If you would like to discuss this study with someone independent of the study team, please contact: Dr Angus Macbeth on (0) 131 650 3893 or email:

If you wish to make a complaint about the study please contact the **Patient Relations Department** between 9am to 5pm, Monday to Friday:

Telephone: 01592 648153

Email: Patientrelations.fife@nhs.net This mail box is manned twice a day (Monday to Friday). NHS Fife will acknowledged receipt of your email.

Or by post at:

Patient Relations Department
Fife NHS Board
Room 104
Hayfield House
Hayfield Road
Kirkcaldy
KY2 5AH

Thank you for reading this information sheet.

Appendix H – Consent Form

THE UNIVERSITY of EDINBURGH

NHS Fife

Exploring frailty and adverse childhood experiences in people who are older

Consent Form

Name of Researcher: David Snoddy **Participant ID Number:**
University Email: s1794255@ed.ac.uk

Please initial boxes

1. I confirm that I have read and understood the information sheet, version 1.2 dated 07/03/2019 and the Data Protection Information Sheet (V1, 07/03/2019), for the above study. I have had the opportunity to consider the information, ask questions and have any questions answered to my satisfaction. ☐
2. I understand that My participation is voluntary and that I am free to withdraw at any time, without giving any reason and without my medical care being affected. ☐
3. I understand that if I made a criminal or other disclosure during this study, relevant action will be taken, ☐
4. I understand that relevant sections of my medical notes and data collected during the study may be looked at by individuals from the regulatory authorities and from the Sponsor(s) (University of Edinburgh) or from the/other NHS Board(s) where it is relevant to my taking part in this research. I give permission for those individuals to have access to my records. ☐
5. I agree to my General Practitioner being informed of my Participation in this study ☐
6. I agree to take part in the above study. ☐

Name of Participant	Signature	Date
_____	_____	_____
Name of person taking consent	Signature	Date
_____	_____	_____

Original (x1) to be retained in site file. Copy (x1) to be included in patient notes. Copy (x1) to be retained by the participant

Appendix I – Study Protocol

Non-CTIMP Study Protocol

A cross-sectional study exploring frailty in older people and the possible inter-relationship with early adverse childhood experiences.

	The University of Edinburgh College of Arts, Humanities and Social Sciences, University of Edinburgh, George Square, EH8 9JU
Protocol authors	**David Snoddy**
Chief Investigator	**David Snoddy**
Sponsor number	CAHSS 1901/05
REC Number	**Insert REC number before finalisation**
Version Number and Date	**Version 1 07/03/2019**

LIST OF ABBREVIATIONS

ACCORD	Academic and Clinical Central Office for Research & Development - Joint office for The University of Edinburgh and Lothian Health Board
ACEs	Adverse Childhood Experiences
AL	Allostatic Load
CI	Chief Investigator
GCP	Good Clinical Practice
GP	General Practitioner
CWH	Community Wellbeing Hub
MDT	Multi-Disciplinary Team
OT	Occupational Therapist
PT	Physiotherapist
PI	Principal Investigator
QA	Quality Assurance
REC	Research Ethics Committee
WHO	World Health Organisation

INTRODUCTION

BACKGROUND

The World Health Organisation (WHO) has estimated that the population of people who are older will rise to around 2 billion by 2050, with the proportion of people who are 80 years and older identified as the fastest growing age group; with their incidence expected to triple between 2015 and 2050. This is of considerable concern to health services due to the health conditions associated with aging and the rising likelihood of frailty. It is reported that frailty ranges from 4% to 59%, increases with age, and is significantly higher in women than men (Collard & Schoevers, 2012).

People who are older that are identified as frail are more likely to experience falling, declined mobility, reductions in day-to-day activities of daily living, and an increased mortality rate (Boers & Cruz, 2015; Gordon et al., 2014). As such, frailty is extremely debilitating for both the individual and family members. As the population of people who are older continues to expand, so too will the number of frail individuals identified by health services. Therefore, health care services need to prepare to manage and ideally prevent frailty before it arises.

Although several factors such as reduced physical activity, weight loss, accumulation of diseases, depression, lack of meaningful relationships, low intelligence and socioeconomic status have been identified to contribute to and maintain frailty, there is a gap in the literature when considering Adverse Childhood Experiences (ACEs). (Freitag & Schmidt, 2016). WHO defines ACEs as the most intense and frequently occurring sources of stress that children can experience in their early life and development. These stressors can comprise multiple types of abuse in the form of violence between care givers, neglect, serious household dysfunctions, physical, sexual, and emotional abuse, and peer, community and collective violence (Dube et al., 2003).

There is a suggestion that ACEs can become embedded within the person if they happen at an early age, which will increase the wear-and-tear, allostatic load (AL), on their body and cause disruption to important health systems as a result (Gale, Booth, Starr, & Deary, 2015). AL refers to the overall physiological 'wear-and-tear' over the life course, which could be the result of ACEs. AL theory suggests that repeated activation of compensatory mechanisms in response to chronic toxic stress can lead to a dysregulation of neurobiological, metabolic, immune, and endocrine systems (Danese & McEwen, 2012; Solís et al., 2015). It is interesting that these systems are indicated in the development and maintenance of frailty (Dent et al., 2016; Levers et al., 2006; Puts et al., 2005).

Thus, the CI hopes to examine whether a link exists between ACEs and the level of frailty in people who are older. In the hopes that treatment options can be developed to prevent individuals who experience ACEs from acquiring frailty in later life.

RATIONALE FOR STUDY

The impact of frailty is huge and four large studies have demonstrated the links between frailty and several adverse health outcomes:

1) The 'Study of Osteoporotic Fractures' (SOF) compared 6701 women, 69 years of age or older, using the 'Cardiovascular Health Study Index (CHS index) and the SOF index to compare their values for predicting fractures, falls, disability, and death. The study reported that the women identified as frail had a higher age-adjusted risk of disability, recurrent falls, nonspine fracture, and death (P < .001 for all findings). They also found no significant differences for either measure when discriminating between these findings (Ensrud et al., 2008).

2) Bandeen-Roche et al., (2006) examined data on 1438 women aged between 65 to 79 years of age, collected by the 'Women's Health and Aging Studies' (WHAS), they revealed that frail women were 6 times more likely to die (6.03; 3.00, 12.08) 10 times more likely to experience an accident by falling (1.18; 0.63, 2.19) and were more likely to enter a nursing home (23.98; 4.45.129.2). However, it should be noted that these findings contradict those highlighted by Kingston et al., (2014).

3) The 'Canadian Study of Health and Aging' (CSHA) reviewed data on 9008 people aged 65 and above. They discovered that as age increased so did the incidence of frailty; 70 per 1000 in those aged 65 to 74 years, to 175 and 366 in 1000 in those aged 75 to 84 years and 85 and older respectively. Furthermore, as frailty increased so did comorbid illness (P < .0001), poor self-rated health (P < .0001), and living alone (P < .0001) (Rockwood, K., Howlett, S. E., MacKnight, C. et al. 2004).

4) The 'Cardiovascular Health Study' (CHS) reviewed 5137 people aged between 65 to 101 and found associations between frailty, falls, declined mobility, reductions in activities of daily living (ADL) (all at P < .001) and an increase in hospitalisation and death over a 3 to 7-year follow-up (P < .05) (L. P. Fried et al., 1991).

Although the studies above demonstrate several factors such as reduced physical activity, weight loss, accumulation of diseases, depression, lack of meaningful relationships, low intelligence and socioeconomic status have been identified to contribute to and maintain frailty (Auyeung et al., 2011; Clouston et al., 2013; Gale et al., 2015; R. J. J. Gobbens & van Assen, 2014; Robertson et al., 2014; Vaughan et al., 2015), there is a gap in the literature when considering adverse childhood experiences (ACEs). WHO defines ACEs as the most intense and frequently occurring sources of stress that children can experience in their early life and development. These stressors can comprise multiple types of abuse in the form of violence between caregivers, neglect, household dysfunctions, physical, sexual, and emotional abuse, and peer, community and collective violence (Dube et al., 2003). In the UK, a national survey found that 46.4% of individuals had experienced at least 1 ACE and that 8.3% had experienced 4 or more (M. A. Bellis, Lowey, Leckenby, Hughes, & Harrison, 2014).

Since the publication of the ACEs study (Anda et al., 1998) there has been an increasing body of research that links ACEs with negative health outcomes in adulthood. Individuals with at least 4 ACEs, are more likely to experience obesity, diabetes, heavy alcohol use, cancer, heart disease, be more likely to participate in risk taking behaviours, and experience drug use and self-harm (Hughes et al., 2017). Gale, Booth, et al., (2015) suggested that ACEs in early childhood become embedded into the skin which increases stress over the life time; resulting in 'wear-and-tear' over the life course, which could be the result of ACEs. Due to this wear-and-tear, an individual may experience damage to important systems in their body, which if continually activated, can cause frailty in later life. It is evident that early ACEs are being

increasingly linked to a higher levels of wear-and-tear and negative health outcomes in later life (Danese & McEwen, 2012; Solís et al., 2015). However, it has been commented that despite the empirical findings on health and theoretical links with frailty, the association of traumatic life events on frailty has not yet been investigated (Freitag & Schmidt, 2016).

STUDY OBJECTIVES

OBJECTIVES

Primary Objective

- To investigate the relationship between ACEs and frailty in people who are older, for the development of assessment and early interventions to improve procedures when attending NHS services, to inform health care professionals, and to potentially assist with development of assessment and early intervention.

Secondary Objectives

- To examine whether **resilience** has a moderating role between ACEs and the level of frailty in people who are older.

- To examine whether gender differences have a moderating role between ACEs and the level of frailty in people who are older.

STUDY DESIGN

This study aims to use a within-subjects, cross-sectional quantitative design to assess whether experiences of ACEs are associated with higher levels of frailty in people who are older. This study is projected to last from April 2019 to May 2020 and will be carried out in an NHS setting. Participants will be drawn from 'Community Wellbeing Hubs' (CWH) in Fife, Scotland. Please see section 5.1 and appendix 1.1 and 1.2 for referral pathways.

Due to the nature of frailty, if participants will be offered as many sessions as they need to complete the questionnaires, they will also be offered a location of their choice with which to complete the survey if needed. This will be a GP practice, psychology clinic location, or a suitable location within a hospital.

All participants will be fully briefed about the research project and the nature of the questions therein. Informed written consent will be gained from each participant. If inclusion criteria have been met, a battery of questionnaires will be administered which should take no longer than 60 minutes. After completion of the questionnaires, participants will be debriefed and will be asked about their participation in the study.

Outcome Measures:

Demographic Questionnaire – the demographic questionnaire is a self-report measure and asks questions about 8 domains: gender, age, ethnicity, level of education, marital status, employment status, level of exercise, and information about social networks and relationships.

The Adverse Childhood Experience (ACE) Questionnaire (Anda et al., 1998) is a 10 item self-report measure. The ACE assess five personal domains of abuse: physical, verbal, sexual, physical neglect, and emotional neglect, and five family and/or guardian related domains: parent/ guardian who is an alcoholic, domestic violence, family members are incarcerated, mental illness with the family, and disappearance through abandonment, death, or divorce. Each question is marked as either a 0 or a 1, with 1 denoting an experience of trauma in that domain. Participants can score between 0 to 10, with 4 or more predicting a higher chance of disease, social and emotional problems.

Edmonton Frail Scale (EFS) (D. B. Rolfson, Majumdar, Tsuyuki, Tahir, & Rockwood, 2006)) is designed to identify frailty in clinical settings and can be administered in approximately five minutes. It has nine domains: cognition, general health status, functional independence, social support, medication use, nutrition, mood, continence, and functional performance. These are tested over 11 items, coded either as a 0 (frailty absent), 1 (minor errors/ mild to moderate impairment), or 2 (important errors or severe impairment). Participants can score between 0 to 17 points; with 0 to 3 indicating no frailty, 4 or 5 indicating prefrailty, 6 to 8 indicating frailty, and 9 to 17 indicating severe frailty.

The Resilience Scale for Adults (RSA) (Wagnild & Young, 1993) is a 25-item measure and was developed. The RSA is written at a 12 to 13-year old reading level and can be completed in 5 to 10 minutes. The questionnaire reflects 5 characteristics of resilience; self-reliance, equanimity, perseverance, a meaningful life, and existential aloneness. Each statement is marked on a 7-point Likert scale with total scores ranging from 25 to 175; scores greater than 145 indicate a moderately high to high resilience, 125 to 144 indicate a moderately low to moderate level of resilience, and scores of 120 and below indicates low resilience. The use of the RSA has been used in various older populations such as community-dwelling comprising rural, urban, and suburban settings, nursing homes and acute settings.

STUDY POPULATION

NUMBER OF PARTICIPANTS

See section 9.1 for power calculation. This study will recruit 54 participants; recruitment will be from 'Community Wellbeing Hubs' (CWH) based in Fife. These hubs have been designed to support individuals who have been identified as frail and comprise physio therapists, occupational therapists, doctors, nurses, volunteers/ third sector workers, and psychologists. Participants are referred into a CWH by a GP and/or current health professional.

INCLUSION CRITERIA

- Individuals aged 65 years old and over
- Individuals who have been identified as frail by the Community Wellbeing Hub, as assessed by the frailty team
- Individuals who can write, read, and speak in English
- Individuals with capacity to consent and who can provide written consent, this will have been assessed by the CWH

EXCLUSION CRITERIA

- Individuals who have a learning disability
- Individuals who have a diagnosis of a dementia related syndrome

- Individuals who lack capacity to consent
- Individuals diagnosed with a severe mental health condition which would impair their ability to complete the materials presented
- Individuals who are currently accessing crisis services

PARTICIPANT SELECTION AND ENROLMENT

IDENTIFYING PARTICIPANTS

Once referred into a CWH, a meeting is held, referred to as a 'huddle' to discuss the most appropriate service moving forward. Huddles are comprised of the health professionals named above. After the huddle is complete, participants will be moved to one of several different pathways: community occupational therapy, a mental health assessment, third sector services, or to a multidisciplinary assessment day at Whitefield Day Hospital. Any participants referred to community occupational therapy, mental health assessments, and third sector services will not be invited to this study.

It has been agreed that the CI will run a clinic at Whitefield Day Hospital and Glenrothes Day Hospital, alongside the other health professionals at assessment day(s), in order to carry out their research. It is the preference of this study that participants will have been approached by the direct care team about the research before attending the assessment day. Participants will then meet with the CI, at the assessment day(s), to be given both the information and consent form which they will be able to read and consider. The following week they will be invited back to the clinic to complete a battery of questionnaires with the CI (see appendix 1.1 and 1.2). The CI's clinic(s) will continue to run until the desired number of participants has been met. The recruitment period is projected to last from April 2019 to November 2019.

As the CI will also be completing an 18-month placement with an older adult psychology service based in Fife, potential participants will also be drawn from here. In the incidence that participants are drawn from this service, the procedures will be the same as those outlined above.

CONSENTING PARTICIPANTS

All participants' consent will be sought by the CI after they have been provided information about the study, have had time (minimum of 24 hours) to consider this and ask any questions they may have. Participants will be given as long as they need to consider the information and consent sheets before signing relevant documents.
Withdrawal of Study Participants

Participants are free to withdraw from the study at any point or a participant can be withdrawn by the CI. If withdrawal occurs, the primary reason for withdrawal will be documented in the participant's case report form, if possible. The participant will have the option of withdrawal from:

(i) all aspects of the study but continued use of data collected up to that point

(ii) all aspects of the study with removal of all previously collected data.

STUDY ASSESSMENTS

All outcome measures described below, will be administered on 1 time point. The information and consent form will have been provided to the participant before this to allow for at least 24 hours of consideration. It should take participants no longer than 60 minutes to complete all the forms presented. The table below breaks down the potential time frame:

Assessment/ Questions	Descriptions of task	Time to administer	Who will administer the task and where
Information sheet	The participant will be asked to read and consider all of the information about the study.	A minimum of 24 hours for consideration	CI at frailty day clinic or participant's chosen location
Consent Sheet	The participant will be asked to read and consider the consent form and will be asked to sign it should they wish to continue.	A minimum of 24 hours for consideration	CI at frailty day clinic or participant's chosen location
Demographic Questionnaire	The participant will be asked to complete a questionnaire about various demographic information.	15 minutes	CI at frailty day clinic or participant's chosen location
Edmonton Frail Scale	The participant will be asked to complete the Edmonton Frail Scale, this will involve a 'timed get up and go' test and a drawing activity.	15 minutes	CI at frailty day clinic or participant's chosen location
The Resilience Scale for Adults (RSA)	The participant will be asked to complete all questions on the RSA	10 minutes	CI at frailty day clinic or participant's chosen location
Adverse Childhood Experiences (ACES) Questionnaire	The participant will be reminded of the nature of the questionnaire before continuing. The participant will then be asked to complete all questions therein.	15 minutes (extra time allowed due to potential distressing nature)	CI at frailty day clinic or participant's chosen location

DATA COLLECTION

All data is projected to be collected between April to November 2019. There will be only 1 time point for collecting data, with each participant, due to the cross-sectional design of the study. All data will be collected by the CI; all data will be collected in a face-to-face format, as such it is unlikely that any data will be missing as the CI will review the data at the time of collection.

DATA MANAGEMENT

Personal Data

The following personal data will be collected as part of the research:

All participants will be assigned a participation number and questionnaires will be anonymised with a corresponding number. All forms and consent forms will be stored in a secure NHS psychology department in a locked cabinet separate from participant data. The data will be transcribed into Microsoft Excel and will be stored on an encrypted folder within an NHS network. All identifiable information will be stored in a separate file from this one, within a secure NHS network, and only individuals with a 'need to know' basis will have access to identifiable information (the chief investigator and project monitors). Once the research has been completed and the CI has fulfilled all their academic requirements, the digital version of the data will be deleted, and the hard copies will be stored and destroyed according to NHS guidelines.

Transfer of Data

Data collected or generated by the study (including personal data) will not be transferred to any external individuals or organisations outside of the Sponsoring organisation(s).

Data Controller

A data controller is an organisation that determines the purposes for which, and the manner in which, any personal data are processed.

The University of Edinburgh and NHS Fife are joint data controllers along with any other entities involved in delivering the study that may be a data controller in accordance with applicable laws (e.g. the site)

Data Breaches

Any data breaches will be reported to the University of Edinburgh and NHS Fife Data Protection Officers who will onward report to the relevant authority according to the appropriate timelines if required.

STATISTICS AND DATA ANALYSIS

SAMPLE SIZE CALCULATION

A power analysis was conducted using the G*Power program (3.1) for a linear multiple regression: random model. An alpha of 0.05 was selected, a power of 0.80, and a large effect size (*f2* = .035). Based on these assumptions and accounting for a potential of 9 predictors,

the total sample size for this study is **48** (J. Cohen, 1992). However, Green (1991) states that the sample size needed, using the assumptions above, with 9 predictors would be **54.**

PROPOSED ANALYSES

Detail the variables to be used for assessment and how these will be reported (e.g. means, standard deviations, medians etc.) Write detailed plans for analyses of primary and secondary outcome measures including:

The data collected by the CI will be analysed using IBM SPSS V25. A linear multiple regression: random model will be completed using the *PROCESS* command, with and without control for gender, age, ethnicity, level of education, marital status, employment status, level of exercise, and contact with others (Hayes & Matthes, 2009; Preacher & Hayes, 2008).

Once a linear multiple regression: random model has been completed to see if relationships exists between ACEs and the level of frailty in people who are older, the CI will complete a moderation analysis to see if resilience moderates the level of frailty in people who are older. If the moderation is shown to be significant, the CI will also complete a simple slopes analysis to test the nature of the effect of resilience (Aiken et al., 1991; Rogosa, 1981).

RISKS

There is a low to medium chance that participants will experience distress due to the nature of the ACE questionnaire. The CI will ensure there is a comprehensive debrief protocol and that participants have relevant information to contact services if they need to. The CI will also ensure that there is a minimal risk for causing distress by briefing the patient to the nature of the research beforehand. If distress is caused, the CI will inform the participant's GP and complete a referral to a relevant service.

There is also a low risk that participants may fall during the "get up and go" task on the Edmonton Frail Scale. This task will be set up to minimise this risk and support will be available immediately in case of a fall.

OVERSIGHT ARRANGEMENTS

INSPECTION OF RECORDS

Investigators and institutions involved in the study will permit trial related monitoring and audits on behalf of the sponsor, REC review, and regulatory inspection(s). In the event of audit or monitoring, the Investigator agrees to allow the representatives of the sponsor direct access to all study records and source documentation. In the event of regulatory inspection, the Investigator agrees to allow inspectors direct access to all study records and source documentation.

STUDY MONITORING AND AUDIT

The ACCORD Sponsor Representative will assess the study to determine if an independent risk assessment is required. If required, the independent risk assessment will be carried out by the ACCORD Quality Assurance Group to determine if an audit should be performed before/during/after the study and, if so, at what frequency.

Risk assessment, if required, will determine if audit by the ACCORD QA group is required. Should audit be required, details will be captured in an audit plan. Audit of Investigator sites, study management activities and study collaborative units, facilities and 3rd parties may be performed.

GOOD CLINICAL PRACTICE

ETHICAL CONDUCT

The study will be conducted in accordance with the principles of the International Conference on Harmonisation Tripartite Guideline for Good Clinical Practice (ICH GCP).

Before the study can commence, all required approvals will be obtained and any conditions of approvals will be met.

INVESTIGATOR RESPONSIBILITIES

The Investigator is responsible for the overall conduct of the study at the site and compliance with the protocol and any protocol amendments. In accordance with the principles of ICH GCP, the following areas listed in this section are also the responsibility of the Investigator. Responsibilities may be delegated to an appropriate member of study site staff.

Informed Consent

The Investigator is responsible for ensuring informed consent is obtained before any protocol specific procedures are carried out. The decision of a participant to participate in clinical research is voluntary and should be based on a clear understanding of what is involved.

Participants must receive adequate oral and written information – appropriate Participant Information and Informed Consent Forms will be provided. The oral explanation to the participant will be performed by the Investigator or qualified delegated person and must cover all the elements specified in the Participant Information Sheet and Consent Form.

The participant must be given every opportunity to clarify any points they do not understand and, if necessary, ask for more information. The participant must be given sufficient time to consider the information provided. It should be emphasised that the participant may withdraw their consent to participate at any time without loss of benefits to which they otherwise would be entitled.

The participant will be informed and agree to their medical records being inspected by regulatory authorities and representatives of the sponsor.

The Investigator or delegated member of the trial team and the participant will sign and date the Informed Consent Form to confirm that consent has been obtained. The participant will receive a copy of this document and a copy filed in the Investigator Site File (ISF) and participant's medical notes (if applicable).

Study Site Staff

The Investigator must be familiar with the protocol and the study requirements. It is the Investigator's responsibility to ensure that all staff assisting with the study are adequately informed about the protocol and their trial related duties.

Data Recording

The Principal Investigator is responsible for the quality of the data recorded in the CRF at each Investigator Site.

Investigator Documentation

- The Principal Investigator will ensure that the required documentation is available in local Investigator Site files ISFs.

GCP Training

For non-CTIMP (i.e. non-drug) studies all researchers are encouraged to undertake GCP training in order to understand the principles of GCP. However, this is not a mandatory requirement unless deemed so by the sponsor. GCP training status for all investigators should be indicated in their respective CVs.

Confidentiality

All, reports, and other records must be identified in a manner designed to maintain participant confidentiality. All records must be kept in a secure storage area with limited access. Clinical information will not be released without the written permission of the participant. The Investigator and study site staff involved with this study may not disclose or use for any purpose other than performance of the study, any data, record, or other unpublished information, which is confidential or identifiable, and has been disclosed to those individuals for the purpose of the study. Prior written agreement from the sponsor or its designee must be obtained for the disclosure of any said confidential information to other parties.

Data Protection

All Investigators and study site staff involved with this study must comply with the requirements of the appropriate data protection legislation (including the General Data Protection Regulation and Data Protection Act) with regard to the collection, storage, processing and disclosure of personal information.

Computers used to collate the data will have limited access measures via user names and passwords.

Published results will not contain any personal data and be of a form where individuals are not identified, and re-identification is not likely to take place

STUDY CONDUCT RESPONSIBILITIES

PROTOCOL AMENDMENTS

Any changes in research activity, except those necessary to remove an apparent, immediate hazard to the participant in the case of an urgent safety measure, must be reviewed and approved by the Chief Investigator.

Amendments will be submitted to a sponsor representative for review and authorisation before being submitted in writing to the appropriate REC, and local R&D for approval prior to participants being enrolled into an amended protocol.

MANAGEMENT OF PROTOCOL NON-COMPLIANCE

Prospective protocol deviations, i.e. protocol waivers, will not be approved by the sponsors and therefore will not be implemented, except where necessary to eliminate an immediate hazard to study participants. If this necessitates a subsequent protocol amendment, this should be submitted to the REC, and local R&D for review and approval if appropriate.

Protocol deviations will be recorded in a protocol deviation log and logs will be submitted to the sponsors every 3 months. Each protocol violation will be reported to the sponsor within 3 days of becoming aware of the violation. All protocol deviation logs and violation forms should be emailed to QA@accord.scot

Deviations and violations are non-compliance events discovered after the event has occurred. Deviation logs will be maintained for each site in multi-centre studies. An alternative frequency of deviation log submission to the sponsors may be agreed in writing with the sponsors.

SERIOUS BREACH REQUIREMENTS

A serious breach is a breach which is likely to effect to a significant degree:

(a) the safety or physical or mental integrity of the participants of the trial; or

(b) the scientific value of the trial.

If a potential serious breach is identified by the Chief investigator, Principal Investigator or delegates, the co-sponsors (seriousbreach@accord.scot) must be notified within 24 hours. It is the responsibility of the co-sponsors to assess the impact of the breach on the scientific value of the trial, to determine whether the incident constitutes a serious breach and report to research ethics committees as necessary.

STUDY RECORD RETENTION

All study documentation will be kept for a minimum of 3 years from the protocol defined end of study point. When the minimum retention period has elapsed, study documentation will not be destroyed without permission from the sponsor.

END OF STUDY

The end of study is defined as the last participant's last visit.

The Investigators or the co-sponsor(s) have the right at any time to terminate the study for clinical or administrative reasons.

The end of the study will be reported to the REC, and R+D Office(s) and co-sponsors within 90 days, or 15 days if the study is terminated prematurely. The Investigators will inform participants of the premature study closure and ensure that the appropriate follow up is arranged for all participants involved. End of study notification will be reported to the co-sponsors via email to resgov@accord.scot

A summary report of the study will be provided to the REC within 1 year of the end of the study.

INSURANCE AND INDEMNITY

The co-sponsors are responsible for ensuring proper provision has been made for insurance or indemnity to cover their liability and the liability of the Chief Investigator and staff.

The following arrangements are in place to fulfil the co-sponsors' responsibilities:

- The Protocol has been designed by the Chief Investigator and researchers employed by the University and collaborators. The University has insurance in place (which includes no-fault compensation) for negligent harm caused by poor protocol design by the Chief Investigator and researchers employed by the University.
- Sites participating in the study will be liable for clinical negligence and other negligent harm to individuals taking part in the study and covered by the duty of care owed to them by the sites concerned. The co-sponsors require individual sites participating in the study to arrange for their own insurance or indemnity in respect of these liabilities.
- Sites which are part of the United Kingdom's National Health Service will have the benefit of NHS Indemnity.
- Sites out with the United Kingdom will be responsible for arranging their own indemnity or insurance for their participation in the study, as well as for compliance with local law applicable to their participation in the study.

REPORTING, PUBLICATIONS AND NOTIFICATION OF RESULTS

AUTHORSHIP POLICY

Ownership of the data arising from this study resides with the study team.

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