

A FEASIBILITY STUDY OF AN INVESTIGATION INTO THE FACTORS
OF FRAILITY

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Authors Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of the University of South Wales/Prifysgol De Cymru. The work is original except where acknowledged or indicated by special reference in the text. No part of this thesis has been submitted for any other degree.

Any views expressed in the thesis are those of the author and in no way represent those of the University of South Wales/Prifysgol De Cymru.

The thesis has not been presented to any other university for examination in the United Kingdom or overseas.

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Date:

Abstract

The population of the World is living longer, making health and social care provision for older people a critical issue. Frail people are described by means of their limited functional reserve, or failure to integrate responses in the face of stress when confronted with minor health issues (Rockwood & Hubbard, 2004). A universally acceptable clinical definition of frailty has not been established to date: remaining elusive and is in need of description and analysis (Karunanathan et al, 2009).

This feasibility study explored the ability to examine the physical, social and cognitive factors of frailty in two cohorts (non-frail and frail) over the age of 18 years within a South Wales community to enhance existing knowledge. The study used a two phase explanatory mixed methods design: follow-up explanations model. Case control method was used to examine 30 non-frail and 30 frail people's documented health and social care data to inform the design of phase two. This involved a single qualitative, idiographic case study, semi-structured interview using Interpretive Phenomenological Analysis (IPA) developing an understanding of the lived experience of frailty.

The results: phase one provided evidence that most of the physiological health care components of frailty were not statistically significant and was shared between non-frail and frail people alike. However, all social care determinants were statistically significant except wheelchair use. Phase two developed five themes; life purpose and support, trust and faith, coping with vacillation, acquiescence of fate, and consequential incident. The major finding of this study was that future frailty tools need greater specificity and sensitivity, and that frailty was experienced as day to day coping with physiological and psychological stressors. In order to achieve self efficacy the frail person needs intrinsic locus of control to combat their day to day challenges. The disability blue badge scheme is an area where future annual risk assessment could be possible when integrated into the application process.

Related Publication (Appendix G)

Winner of best student prize 2012

Jones, G. Wallace, C. Kenkre, J. Khanna, P. Prossor, M. (2012) '*Pilot Study Protocol: Developing a Frailty Index. An Investigation to Define the Physiological, Cognitive and Social Factors Associated with Pre-frail and Frail People*', Global Science and Technology Forum (GSTF): Journal of Biosciences, 2 (1), pp 98-103

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Definitions

Concept: *“Something conceived in the mind, thought, notion or an abstract or generic idea generalised from particular instances.”*

Delimitations: *“Characteristics that limit the scope of the inquiry as determined by the exclusionary and inclusionary decisions that are made throughout the development of the study: what the study is meant to accomplish and what it does not cover.”* (Creswell, 2009).

Limitations: *“Characteristics of the design or methodology: set parameters on the application or interpretation of the results of the study.”* (Creswell, 2009).

Theory: *“A set interrelated constructs (concepts), definitions and propositions that present a systemic view of phenomena by specifying relations among variables, with the purpose of explaining and predicting the phenomena.”* (Kerlinger cited in Curzon, 2004 p18).

Life purpose: *“is about why you are here on the planet. Who is it that you are moved to be and what is it that you are moved to create? It is an essence statement that serves as a reminder of who you are and the impact you naturally create in the world.”* (Fukui et al, 2012).

Support: *“To give help or assistance to (someone or something).”* (Miller, 2013).

Consequential: *“Following as an effect, result, or conclusion; consequent.”* (Pattison, 2010).

Incident: *“Tending to arise or occur as a result or accompaniment.”* (Merriam-Webster, 1993).

Acquiescence: *“The reluctant acceptance of something without protest.”* (Merriam-Webster, 1993).

Fate: *“The development of events outside a person's control, regarded as predetermined by a supernatural power.”* (Razavi-Newman, 2008).

Cope: *“To deal with and attempt to overcome problems and difficulties.”* (Lazenbatt et al, 2013).

Vacillation: *“The inability to decide between different opinions or actions; indecision.”* (Merriam-Webster, 1993).

Trust: *“Belief that someone or something is reliable, good, honest, effective.”* (Achtemeier et al, 1996).

Faith: *“Belief in the existence of God: strong religious feelings or beliefs.”* (Achtemeier et al, 1996).

Spirituality: *“a relationship with god, or whatever is held to be the ultimate that forsters a sense of meaning, purpose, and mission in life.”* (Hodge, 2001).

Stress: *“....a state of psychological and physical tension produced, according to the transactional model, when there is a mismatch between the perceived demands of a situation*

(stressor) and the individual's perceived ability to cope. The consequent state of tension can be adaptive (eustress) or maladaptive (distress).” (Statt, 2003; p150).

Abbreviations

ADL- Activities of Daily Living

ADSSC -Association of Directors for Social Services Cymru

BADL -Basic Activities of Daily Living

BPS- Biological-Psychological-Social

CAB- Citizens Advice Bureau

CI- Chief Investigator

CIFA -Canadian Initiative on Frailty and Aging

CRT- Community Resource Teams

EIPAHA -European Innovation Partnership on Active Healthy Ageing

EU -European Union

FI-Frailty Index

GFS -Gwent Frailty Service

GFTT -Geriatric Failure To Thrive

GP -General Practitioner

IADL- Instrumental Activities of Daily Living

IHP- Interpretive Hermeneutic Phenomenology

IPA -Interpretive Phenomenological Analysis

R&D -Research and Development

REC -Research Ethics Committee

MMSE- Mini Mental State Examination

NHS -National Health Service

SS -Social Services

US -United States

UK- United Kingdom

WG- Welsh Government

WHO- World Health Organisation

Chapter 1 - Introduction

1.0 Introduction

Increased longevity has been described as medicine's greatest success story of the 20th century, '*a triumph over unnecessary death*' (Stephens & Flick, 2011; Bagley et al, 2011). Predictive scenarios indicate that the proportion of older people in developed countries will increase as more people will live into their 90s beyond previous expectations (World Health Organisation, 2011; McCuller-Varner, 2009). Ageing successfully and evading frailty even with the associated accumulation of morbidity with respect to health and well-being brings great challenges for older people. Frailty is described by geriatricians' as a '*geriatric syndrome*' due to multisystem reduction in reserve capacity, which confers a high risk of adverse outcomes (Gill et al, 2011). The term describes the state of '*limited functional reserve*' or '*failure to integrate responses in the face of stress*' where a catastrophic loss of function is the outcome following a minor insult (Bergman et al, 2007; Bandeen-Roche et al, 2006; Rockwood & Hubbard, 2004). That is to say that it is distinct from functional decline, disability, age, cumulative chronic disease and co-morbidity (Walston et al, 2006; Conroy, 2009; Gill et al, 2011). It is clear that frailty expedites individuals to long term health and social care provision, hospitalization, institutionalization, personal suffering, caregiver burden / dependence and eventual mortality (Studenski et al, 2004; Melis et al, 2005; Kulminski et al, 2007; Heppenstall et al, 2009; Lekan, 2009; Fairhall et al, 2011).

1.1 Background

Two major frailty models have been proposed to date to quantify the syndrome. The first model; the phenotype of frailty has been defined as a distinct clinical syndrome when three or more out of five criteria have been met (i.e. weakness, slowness, lack of physical activity, self reported exhaustion and unintentional weight loss) (Fried et al, 2001). The second model; the

index approach counts the number of cumulative deficits (i.e. signs, symptoms and physical manifestations), in simple terms the number of things a person has wrong with them (Rockwood et al, 2004). However, neither the phenotype nor the index considers the homeostatic pathways of the underlying biological basis for frailty or its multidimensional nature to differentiate it from the concepts of disability and comorbidity (Chalcraft, 2010).

Recent advances in the pathogenesis of frailty have been made, highlighting chronic inflammation as a key component of the direct and indirect pathophysiologic processes through intermediate bio-physiological systems. This includes the musculoskeletal, endocrine, and hematologic systems (Chen et al, 2014; Ferrucci et al, 2008). Homeodynamics in particular has shown promise; it refers to the biological systems that do not actively command homeostasis. Homeodynamics dynamically reset points of balance in response to intrinsic and extrinsic variations to maintain a system's functional capacity across time (Fedarko, 2011). For example, the relationship between the rennin / aldosterone / angiotensin cascade involved in the maintenance and control of blood pressure which becomes compromised as a person becomes older, which is often controlled with medication to reduce the risk of an adverse outcome occurring e.g. Myocardial Infarction (MI) and stroke (Lilly, 2011). However, these hemoedynamic relationships are not yet clearly understood in relation to individual health and social care problems (Bergman et al, 2007).

Frailty is associated with a greater number of chronic health problems that increase with age (multi-morbidity) and links have been proposed with an unhealthy lifestyle rather than advancing old age itself (Thio and Taylor, 2012). This is further compounded with the increasing rate of urbanisation and upward trend in the levels of obesity which has been linked to decreasing levels of physical activity (Woo et al, 2000). This phenomenon is

particularly evident within communities comprising low socioeconomic and educational demographics (Fried et al, 2001).

Factors such as race, ethnicity, and educational attainment have been shown to negatively impact on cognitive and functional status and increasing frailty, with poverty being the strongest predictor of ill health (Thio and Taylor, 2012; Lekan, 2009). Further compounding social issues have been identified, in the form of lifestyle restrictions as a response to environmental barriers. Further, psychosocial factors such as fear of falling, anxiety, loneliness, and depression can lead to deterioration in physical function, progressive muscle de-conditioning, functional losses, and increasing frailty (Lekan, 2009; Fried et al, 2001). Additional modifiable psychosocial factors that can be targeted for intervention have been predictive of frailty and death in older people (Cameron et al, 2015; Woodhouse & O'Mahony, 1997). These include depression poor housing conditions and inadequate caregiving provision (Alvarado et al, 2008; Sarkisian & Lachs, 1996; Tsuji et al, 1995; Zhao et al, 1993). Age has been posited as a predictor of physical frailty, whereas, life events predicted psychological frailty. Further, being a woman predicted social frailty because older women have a higher probability of living alone, having little contact with relatives, and do not participate in community / religious activities (Gobbens et al, 2010; Woo et al, 2005). Thus, to increase life expectancy it is essential that formal and informal health and social care services, including third sector organisations proactively promote healthy living to reduce depression, improve mental health and enhance social support for frail older people (Markle-Reid et al, 2006).

Developing effective interventions to delay or prevent frailty is a public health system priority for developed countries (Frost et al, 2012; Ferrucci et al 2004; Subra et al, 2004). Although age alone is not a determinant of frailty status and the need for high health and

social care support, it has proven a useful guide to predict a considerable rise in the numbers of frail older people requiring such support (Falkingham et al, 2010). Research has demonstrated that poor health, disability and dependency are not necessarily a consequence of ageing and are even reversible (European Innovation Partnership on Active Healthy Ageing, 2012) (EIPAHA, 2012). Furthermore, frailty is generally agreed to be a pre-disability state, with the potential for intervention (Abellan Van-Kan et al, 2008). Hamer et al (2014) in The English Longitudinal Study of Ageing: wave 6 (ELSA) found that older people over the age of 65 years who participate in sustained and frequent exercise, even if they had never exercised before, were seven times more likely to transition into healthy ageing compared with those who remained consistently inactive. However, determining a person's frailty status to establish suitability for such exercise intervention has proven to be problematic. Moreover, a universally acceptable clinical definition of frailty status has not been established to date: remaining elusive and is in need of description and analysis (Fried et al, 2001; Gillick, 2001; Karunanathan et al, 2009). This is due to the complex nature of the syndrome itself, and the multidimensional approach required in its management. The Joint Strategic Needs Assessment for Long Term Conditions state that there is a need for:

“the development of local management templates for patient pathways and guidelines away from the current disease-specific protocols towards more generic approaches around a patient's presenting problems, for example “disability” or “breathlessness” (JSNALTCMC, 2013 p 32-33)”.

Many studies have proposed to define frailty to provide a solution to this dilemma in an attempt to assist health and social care professionals to stratify the syndrome.

A response to the ageing population has been produced by the World Health Organisation (2009) (WHO, 2009) to implement appropriate measures to reduce future health and social care expenditure, and with their “Active Ageing” policy framework to support independent living for older people (WHO, 2002). Public Health England (2013) (PHE, 2013) in ‘our

priorities for 2013/14 prioritised the need to help people live longer and healthier lives by taking early action by implementing National Health Service (NHS) health checks to 15 million eligible people. Therefore, effective, comprehensive primary care plays a crucial role as the front-line service of the NHS, as it improves not only health but also quality of life and well-being (Welsh Government, 2010 p6) (WG, 2010). This is achievable through established integrated multimodal, coordinated multi-disciplinary and multiagency approaches, delivered in an integrated health and social care system (EIPAAHA, 2012). These services endeavour to promote well-being, increased quality of life, functional independence and autonomy (Ferrucci et al, 2004; Hébert et al, 2008). This is thought to be attainable and sustainable through promoting targeted primary health care support, community care and community based interventions facilitated through local government and the third sector (WG, 2003; 2005; 2009a).

1.2 Age and Ageing Trends

Living successfully to more advanced ages with few socio-environmental and health challenges is not universal. It is common for older people to acquire age related disease that effect their long term quality of life and well-being (Bagley et al, 2011).

The World Health Organisation (2004) defined an older person as:

“A person who has reached a certain age that varies among countries but is often associated with the age of normal retirement” (WHO 2004 p42).

In recent years many people have elected to retire early at the age of 55 years rather than at the national retirement age, this has prompted the United States (US) and others to adopt the use of the term *“older population”* to define this group (Andreopoulos & Hogness, 1989 p194). WHO have sought to categorise the *“oldest old”* as:

“Persons aged 85 years and over in a categorization of “young old” (60-74) and “old old” (75-84)” (WHO, 2004 p42).

The World Health Organisation (2011) (WHO, 2011 p4) estimate a rise in the global population of older people over 65 years of age to increase from 8% in 2010 to 16% in 2050. By 2036 within the European Union (EU) the number of older people aged 80 and over is predicted to treble (Stephens and Flick, 2011). Within the United Kingdom (UK) by 2031 a 77% increase is expected in the number of people aged 75 years and over, and a 131% increase in people aged 85 years and over (Bayliss & Sly, 2010). This increase in the older populations of the UK with assumed unchanged dependency rates, project a growth in the number of dependent older people to expand from three million in 2000 to 6.4 million by 2051 (Wittenberg et al, 2004). The overall number of frail people 75 years and over is approximately 9% in the UK (NHS England, 2014 p6). These statistics imply that the frailty syndrome is common in older people and is said to represent:

“An age related decrease in physiological reserve that leads to susceptibility to adverse health outcomes” (Fried et al, 2001).

The perceptions of frailty are conflicting; some studies have inferred that ageing and frailty are closely intertwined. Rockwood (2005b) suggests, at some point within the ageing continuum a person will become frail. However, the frailty syndrome is not just a disease of older age, people of all ages by this definition can be described as frail (Bortz, 2002). Parameters for age with regard to frailty do not exist this is due to its relation to biological age rather than chronological age and should not be dismissed as a concern in younger populations or research (Rodrigues-Mañas et al, 2013; Ortuno et al, 2010). That is to say: that there is a relationship between frailty and older age, however, this is causal rather than a correlation. Therefore, frailty is not age dependent and may begin to manifest with increased intellectual or physical disabilities, obesity, drug abuse and alcoholism earlier in life (Brehmer & Weber, 2010; The Swedish National Institute of Public Health, 2007 p113). For instance, it has been reported that the prevalence of at-risk levels of alcohol consumption

among older adults with co-morbidities and multiple medications is associated with adverse events and injuries, particularly among males (Immonen et al, 2011).

1.3 Justification

Due to the growing trend in the older population developing assessment / risk tools to identify the increase in the number of frail people is desirable. Frailty status identification could ameliorate individualised preventative or supportive interventions that could be implemented early, so that older people may continue to contribute to society in as many ways and as long as possible, for example, volunteering and informal working (carers) (Armstrong et al, 2010; WHO, 2011 p20). This has promoted the UK government to increase state pensionable / retirement age to increase taxation income and delay pension provision making it vital that older people transition into healthy ageing to be able to continue working longer. This is due partly due to the current financial climate together with the declining working age population that will generate markedly reduced income for the health and pension system (WHO, 2009). Markle-Reid & Brown (2003) suggest early risk factor identification when combined with evidence from further studies could reduce hospital admissions; facilitate prolonged independent living thereby increasing quality of life and well-being. Subsequently by reducing hospital admissions and prolonging independent living funds could be released across secondary care, care homes, social services, community support nurses and community organisations (Kehusmaa et al, 2012). To a certain extent terms such as '*being frail*', '*being old*' and '*infirm*' are socially constructed, with a variety of different subjective meanings and usages (Brunk, 2007 p5-6). Without appropriate definitions and valid assessment tools patient specific needs cannot be identified and addressed appropriately. A universally acceptable assessment tool / index would ameliorate possible early identification and management of vulnerable people within the frailty spectrum with an

increased risk of further progression (Searle et al, 2008). There are a number of frailty indices in existence, i.e. the Survey of Healthy Ageing and Retirement in Europe (SHARE) (Ortuno et al, 2010). The SHARE index uses self reported information which is problematic due to cognitive ability, has no validity within secondary care settings and was developed with significant missing mortality data. The Tilburg frailty indicator (Gobbens et al, 2010a) measures the physical, psychological and social domains of frailty, however the cohort chosen was over 75 years of age and the questionnaire took 14 minutes on average to complete and has no clear cut-off between frail and non-frail: hence the need for further research into this field.

1.4 Contribution of this Study

The study was undertaken to test the feasibility to collect data to inform future research designs. This feasibility study has been designed in a way in order to explore the concept of frailty as holistically as possible. The design was chosen to enhance the existing knowledge by attempting to gain an understanding of the health and social care factors associated with frail people alone. Furthermore, the voices of frail people are included to illuminate their lived experience and its social, physical and cognitive components. At present the inter-relationships of these components are poorly understood and under researched (Brunk, 2007).

In addition, this feasibility study will inform the areas that need to be targeted for a future larger study to add strength and understanding to the growing body of knowledge.

1.5 The Structure of the Thesis

This thesis presents a study that has sought to explore the new era of the changing and managing demographics of frailty and its increasing prevalence due to the rising population

of older people with high support needs in the United Kingdom (UK) (Falkingham et al, 2010).

The Research Question:

- What are the physical, social and cognitive factors of frailty?

The overarching aim of this feasibility study was to:

- Test the methods, methodologies and procedures to gather the information needed to develop an operational frailty index prior to applications for ethical approval for future study.

Objectives:

- Enable the researcher to assess the strengths and weaknesses of the recruitment and data collection process.
- Assess the ability to identify key factors to differentiate between frail and non-frail.
- Assess the average time taken for the data gathering process.
- Inform the development of questions for the semi-structured interview from the individual case notes.
- Identify the optimal operation of the recording equipment and the length of the interview process.

Originally this thesis was to include the literature review in the discussion following the data analysis recommended by Silverman (2005 p298-300). However, this approach seemed too radical as it meant combining appropriate literature as needed in the discussion chapter, not in a separate chapter. The final organisational structure of this thesis was based upon the suggestion by Dunleavy (2003) which suggest a separate chapter to review the available literature, and has been adapted for this thesis as follows:

Chapter One: provides introductory information, including background information.

Chapter Two: a literature review considering aspects of frailty and its evidence based assumptions.

Chapter Three: discusses the methodology used for the feasibility study.

Chapter Four: details the methods used in this study.

Chapter Five: provides the feasibility study data analysis and results process using case control and IPA presenting annotated and empirical findings.

Chapter Six: discussion drawing together the quantitative and qualitative findings.

Chapter Seven: presents the conclusion and further research.

1.6 Chapter Summary

This chapter introduced the need to explore frailty as holistically as possible; it neither aimed to provide an exhaustive account of the history of frailty or to offer lengthy explanations of the social determinants relating to it. The introduction and background outlined the concept of frailty in relation to its bio-physiological and bio-psycho-social determinants, including the contribution of social factors in increased life expectancy. The rationale for conducting the study was presented and justified. Age and ageing trends were then discussed, followed by the research design, and the structure of the thesis.

Frailty has traditionally been described in association with increasing age, morbidity, mortality, institutionalisation, hospitalisation and social care provision. Frailty research has failed to establish a working clinical definition that could enable the identification of people who are frail or at risk of becoming frail and its relative level. This is in part due to the difficulty to differentiate frailty from concepts such as disability and comorbidity. Evidence suggest that identification of people who are frail, or at risk of frailty and its relative level

could provide health and social care professionals with an opportunity to target appropriate individually designed community rehabilitation interventions early, preventing or retarding frailty itself. It is evident that the predicted future increase in the numbers of older people requiring health and social care provision makes identification and defining people who are frail imperative. The aim and objectives of this feasibility study were to identify alternative approaches to understand the physical, social and cognitive factors of frailty. The outcome from the new knowledge gained from this study was to provide an alternative perspective / approach to defining frailty: to target / focus future research activity within areas that have not previously been fully explored. Creating a frailty instrument was not the intent of this research.

The following chapter includes a comprehensive review of subject specific literature.

Chapter Two – Literature

2.0 Introduction

This chapter aims to review the current literature available from various sources to form a comprehensive view of frailty, and its proposed determinants. The relationship between the biological, physiological, social, and psychological components of frailty and its individual outcome measures will be explored. The Canadian Initiative on Frailty and Aging (2007) (CIFA, 2007) proposed some fundamental questions surrounding frailty:

- What are the biological and physiological determinants of frailty?
- How are social factors related to frailty over the life course?
- What risk factors have been shown to predict frailty?

Despite the development of a number of indices these questions remain largely unanswered requiring further research to develop a functional definition of frailty (Bergman et al, 2007).

A review of the literature is essential having formulated a preliminary research question and has a number of functions. These are; to identify:

- (1) And refine the research question.
- (2) How the proposed research can add to the body of knowledge.
- (3) Gaps in the body of evidence that exists.
- (4) Suitable conceptual frameworks, methodology and data collection/analysis method that have previously been used to research frailty (Polit & Beck, 2008).

The purpose of this chapter is to:

- Demonstrate understanding of the historical and current contemporary literature surrounding frailty.
- Demonstrate how this knowledge has been used / linked previously to define frailty as a concept.

- Identify the gaps in the existing knowledge that justifies the need for this research.

2.0.1 Defining Frailty

To aid understanding and highlight the very different ways in which the term frailty is used it is necessary to provide some useful definitions. The following definitions of '*frail*' and '*frailty*' are provided.

People who are extremely debilitated and vulnerable to the adverse effects of ageing have in the last three decades been designated as '*frail*' (Walston et al, 2006). The term '*frailty*' is frequently used within the fields of health and social care to describe the accumulation of adverse health conditions that challenge older people. The vernacular term '*frail*' has a varied clinical meaning (e.g. easily broken or destroyed; likely to fail or die quickly; unusually susceptible to disease or other infirmities; lacking normal strength or force, weak, tenuous, thin and slight) (Walston et al, 2006; Lekan, 2009). The subjective term "*frailty*" has also been commonly associated with older people suffering co-morbid conditions, including physical limitations and cognitive impairment. However, frailty can be applied to others, for example, a premature infant dependant on intubation for life sustaining oxygen or an anorexic teenager receiving total parenteral nutrition in hospital to overcome life threatening malnutrition (Tennstedt & McKinlay, 1994).

Within the healthcare professions '*frailty*' has been adopted as a medical term to suggest increased morbidity and impending mortality in older people. That is to say it relates to physiological decline and dysfunction. However, traditionally the terms '*frail*' and '*frailty*' suggested something more sociological, often referring to a person's moral character. For example, the Merriam-Webster (1993) definition of '*frail*' states that the term is:

"...the quality or state of being frail, a fault due to weakness especially of moral character.

Similarly, the Chancellor Dictionary (1996) definition of the term frail suggests that being frail:

“...relates to being morally weak, unable to resist temptation and character weakness.”

It is possible to describe constituent parts of *'frailty'* subjectively, but not the underlying cause (Conroy, 2009). Indeed, the term *'frailty'* is shrouded in contradiction, confusion, and ambiguity and often defies definition (Ferrucci et al, 2006). A definition must be sensitive enough to account for the many specific conditions or difficulties experienced by people, but at the same time enable the categorisation of the relative level of an individual's frailty. These proposed definitions need to be considered, and understood in relation to the needs of older people and their transferability to clinical practice and service development strategies. Obviously such ethically informed definitions are of little clinical and medical meaning for today's health and social care professionals.

Having no universally accepted definition renders these terms open to individual interpretations. Clearly then the use of the terms *'frail'* and *'frailty'* within health and social care professions is subjective, has differing meanings and is of questionable clinical value. The central question then is just how useful is the term *'frailty'*?

Clearly the term *"frailty"* and *"frail"* lends itself to concept analysis, which is a framework that enables the ongoing emergence of nursing theory and knowledge. However, concept development is rigorous and time consuming (Finfgeld-Connett, 2006). Further, little evidence exists that conducting concept analysis via a framework provides the required depth, rigor and replicability to enable meaningful nursing theory development (Beckwith et al, 2008). Therefore, due to the limiting time frame for this study it was not possible to include a concept analysis, although it is an interesting subject for future consideration.

2.0.2 Frailty Concept

Within the fields of health and social care the concept of frailty is problematic and is still controversial (Karunanathan et al, 2009). The majority of the available studies investigating frailty have been conducted in China and North America which are not representative of the population of the UK due to its industrial past (coal mining and steel production). Studies within the European Union have been sporadic and limited. Levers et al (2006) conducted a literature review on the factors contributing to frailty. Many definitions of frailty (n=17) were identified, and from these the authors were able to differentiate common contributing factors (physical, cognitive, psychological, nutritional and social). These studies all focused on the domains associated with frailty, sex differences and risk stratification of profoundly frail and older participants that fail to address the issue of understanding the full spectrum of frailty, such as, socioeconomic and psychological factors.

Frailty has predominantly been researched from a biomedical model viewpoint that emphasised the absence of disease and the maintenance of physical and mental functioning (Bowling & Dieppe, 2005). This perfect view of successful ageing is unrealistic with the alternative introduction of the Biological-Psychological-Social model (BPS) which emphasises life satisfaction, social participation, psychological functioning with personal growth (Bowling & Dieppe, 2005). Philosophically, it is a way of understanding how suffering, disease, and illness are affected from the societal to the molecular basis. In essence it is a practical way of understanding a frail person's subjective experience as an essential contributor to accurate diagnosis, health outcomes, and humane care (Borrell-Carrió et al, 2004).

Whitson et al (2007) characterised two types of frailty: physiologic frailty (Ph-frailty) and Full frailty (F-frailty). Ph-frailty was portrayed by a state of intact physical and cognitive function with physiological vulnerability. F-frailty was portrayed by observable and measurable clinical signs consistent with full-blown functional frailty meaning: weakness, slowness, lack of physical activity, self reported exhaustion and unintentional weight loss (Fried et al, 2001). Frailty has also become associated with advancing age as disease and disability accumulation increases, outcomes include functional impairment, morbidity, disability and mortality (Lekan, 2009; Ferrucci et al, 2006). Mobility risk factors contributing to functional decline have been documented including; disturbances in gait/balance, lower limb weakness, orthostatic hypotension, impaired vision/hearing, dementia, and depression (Andreopoulos & Hogness, 1989 p129). These functional losses create the heavy burden of care on families and society (Andreopoulos & Hogness, 1989 p128). Even so, there is still no universally accepted definition of frailty (Walston et al, 2006; Rockwood et al, 2005a; Butler, 2000). Pijpers et al, (2012) evaluated the sensitivity and specificity of available frailty instruments to determine if they are of use in daily practice beyond research. The authors conclude that major medical decisions on care could not be made due to the high number of false positives results. Buchner & Wagner (1992) proposed to define frailty as:

'A state of reduced physiological reserve associated with increased susceptibility to disability' (Buckner & Wagner, 1992 p1).

More recent international studies measuring frailty employed a frailty index, which counts health deficits (clinical symptoms, signs, disability and disease). The rationale for counting deficit accumulation for any individual is straight forward, the greater number of deficits present the greater the risk of adverse health outcomes (Rockwood & Mitnitski, 2011; Lacas & Rockwood, 2012). The criterion for a health deficit to be included in a frailty index is that it increases with age, covers several organ systems, has a prevalence of >1 % with < 5%

missing data, and be related to an adverse outcome (Rockwood & Mitnitski, 2011). However, many degenerative genetic conditions do not follow these criteria, for example Duchenne Muscular Dystrophy (DMD) which effects muscle integrity and has an onset in early childhood, progressing rapidly (NHS Choices, 2013).

The frailty syndrome is a predictor of increased susceptibility to falls, decreased mobility and problems with meeting the demands of managing Activities of Daily Living (ADLs) (Sousa et al, 2012). However, the most common causes of functional decline (disability) leading to frailty within the population of older people differ from groups of conditions that cause mortality, such as: arthritis, dementia and peripheral vascular disease (Andreopoulos & Hogness, 1989 p128). Gealey (1997) found that despite disease processes preceding frailty, impaired functional status was said to be the strongest predictor of frailty whether physical or mental and the extent to which the disease process compromises a person's functional status appears to better categorise frailty.

Notably, Geriatric Failure To Thrive (GFTT) (a concept that was adapted from paediatrics in the 1970s pre-frailty) describes a syndrome / range of circumstances including physical and mental deterioration, abuse and neglect (Woolley, 2004). Patients also often display multifactorial impaired physical functioning, chronic concurrent disease, diminished capacity for life and a process of functional decline (giving up) that is often difficult to explain (Townsend-Rocchiccioli & Tanner-Sanford, 2009; Palmer, 1990). The syndrome is diagnosed if evidence of impaired physical function, malnutrition, depression, cognitive impairment, ADL changes, and anorexia are present (Townsend-Rocchiccioli & Tanner-Sanford, 2009; Hildebrand et al, 1997; Osato et al, 1993; Palmer, 1990). Initial assessment should include information on physical, psychological status, functional ability, socioenvironmental factors, biochemistry, and nutrition (Robertson & Montagnini, 2004;

Verdery, 1997). It is estimated to affect between five and 35 % of community dwelling older people in the US (Robertson & Montagnini, 2004). The assessment measures of physical performance are almost identical to the phenotype of frailty developed by Fried and colleagues' (2001): the ADL's and IADL's are also measured similarly to the index proposed by Rockwood et al (2004). There has been little substantive research on GFTT definition or validated assessment tools. However, GFTT has an International Classification of Disease-version 9 (ICD-9) code, whereas, frailty does not appear in the ICD-10 or the Diagnostic and Statistical Manual of Mental Disorders (DSM)-V (Strandberg et al, 2011). This prompts the obvious question for future research, is GFTT synonymous with F-frailty?

It is accepted that frailty indices should include health deficits, impairment and disability (Rockwood & Mitnitski, 2011; Abellen van Kan et al, 2009; Fried et al, 2004). Figure 2.1 shows the relationship between frailty, co-morbidity and disability. Disability can be measured by the number of Basic Activities of Daily Living (BADL) (basic self care tasks), and Instrumental Activities of Daily Living (IADL) (household management tasks).

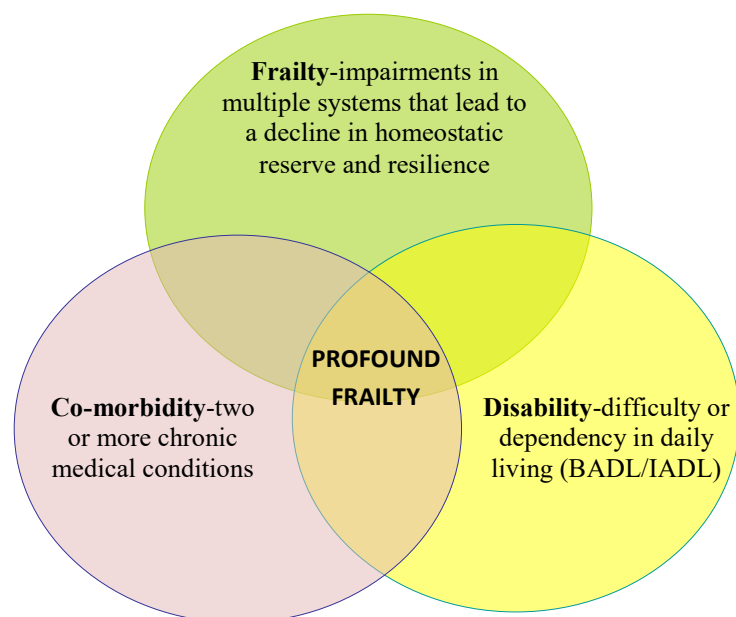
Recent studies have alluded to the predictive strength of measuring levels of IADL disability with increased frailty status (Takata et al, 2013) revealing powerful unexpected relationships between cognition and physical ability (Mather, 2010). One study has further drawn attention to the psychological, cognitive aspects of frailty which has been termed by Fillit & Butler (2009) as the "Frailty identity crisis", defined as:

'To characterise a psychological syndrome that may accompany the transition from independence and robust status to frailty status, which can be adaptive or maladaptive' (Fillit & Butler, 2009 p249).

Further studies have found that social cognitive deficits impact on behaviour, degradation of emotional recognition and social comprehension (Shani-Ur & Rankin, 2011). Ávilla-Funes et al, 2009) evaluated cognitive function concluding that stratification of frailty risk was increased with the addition of cognitive assessment.

Associations between socially constructed disease in frail adults and community socioeconomic deprivation have previously been identified (Rockwood et al, 2000; Lang et al, 2009). Wales has some of the most disadvantaged communities in Europe (Longley, 2004), with death rates in the most deprived fifth of wards almost a third higher than those in the least deprived fifth. The most deprived fifth are in the south Wales valleys, north east Wales and parts of Cardiff, Newport and Swansea (WG, 2009b).

Figure 2.1 - Overlap between Frailty, Co-morbidity and Disability. Adapted from Daniel et al (2008)



2.0.3 Health and Wellbeing

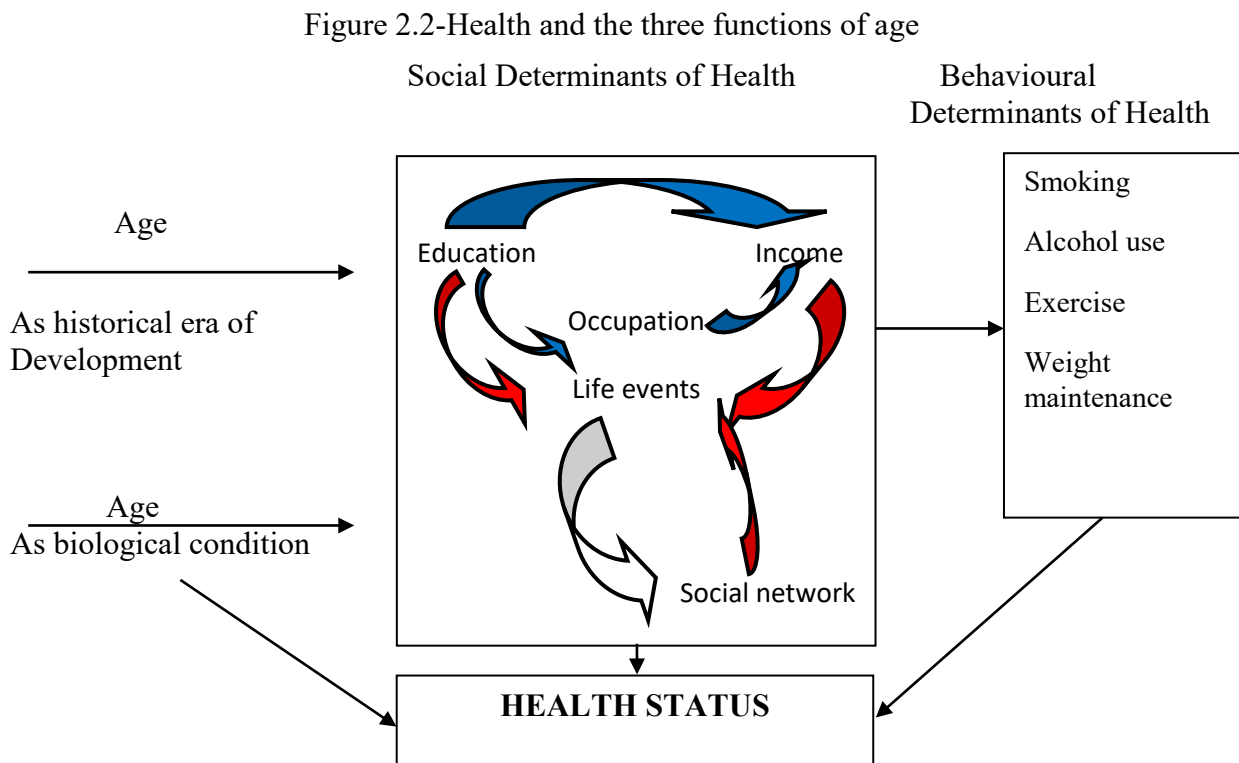
Contemporary Welsh Government policy has acknowledged the need to improve the health and wellbeing of older people within society. The Welsh Government's (2003) groundbreaking strategy for older people in Wales featured issues strongly related to the health and wellbeing of older people. This was a first step in the recognition that older people deserve an effective and responsive health and social care service in Wales. Health promotion activity has attempted to squeeze morbidity and mortality to the waning years of our biological life course to maintain active functioning to improve quality of life years (WHO, 2009). Many diseases through the life course are preventable, and health promotion has an important role in ensuring healthy ageing. Health promotion can potentially ensure that people with chronic conditions and disabilities can remain active and independent, preventing institutionalisation and declining health (The Swedish National Institute of Public Health, 2007 p18).

Psychologists have demonstrated the importance of understanding people's perceptions of health and wellbeing to inform the design of healthcare and health and well-being promotion activities such as physical activity (Swami et al, 2009; Milburn, 1996). The social, biological and behavioural paths through which health status and age are influenced are shown in the health and the three functions of age figure 2.2.

The three functions of age are not independent variables to each other. The importance of considering the meaning of age and its influence on health status is crucial. Age as:

- (1) Maturation or biological condition
- (2) Cohort or historical location
- (3) Life course or set of age-related social roles through which an individual passes

However, this does not show the reciprocal relationships due to the complexity of the social and behavioural determinants of health (Andreopoulos & Hogness, 1989 p141).



Source-(Andreopoulos & Hogness, 1989 p.141).

The meanings of health and well-being are highly contested inter-related concepts. Health is generally applied to physical and mental contexts. Yet wellbeing has a much wider meaning and many more domains to address. Until recently wellbeing has not been given equal consideration. Therefore, little research has been undertaken in this area (Schickler, 2005).

Although the World Health Organization (WHO, 1948) defined health as:

‘A state of complete, social and mental wellbeing, and not merely the absence of disease or infirmity’ (WHO, 1948).

The definition of health excludes those in the diseased state. WHO (1948) definition of health includes the term well-being. However, WHO up to this point in time have not defined wellbeing. This definition is predominantly viewed from a medical standpoint and fails to

encompass the full complexity of wellbeing. Statham & Chase (2010 p2) further offer a more complete understanding, and define wellbeing in relation to the population of the UK as:

‘A dynamic state that is enhanced when people can fulfil their personal and social goals. It is understood both in relation to objective measures, such as household income, educational resources and health status; and subjective indicators such as happiness, perceptions of quality of life and life satisfaction’ (Statham & Chase, 2010 p2).

It has to be realised that living successfully to more advanced ages with few socio-environmental and health challenges is not universal. An anticipated increase in ageing populations together with an associated decreased health and wellbeing will produce a higher prevalence of frailty within communities.

2.0.4 Life Course

Heppenstall et al (2009) comprehensive literature review suggested frailty is becoming better defined with physical, cognitive and socioeconomic factors contributing. However, they conclude that there is a lack of evidence regarding which group should be screened for frailty, proposing a model for frailty should incorporate predisposing life course factors.

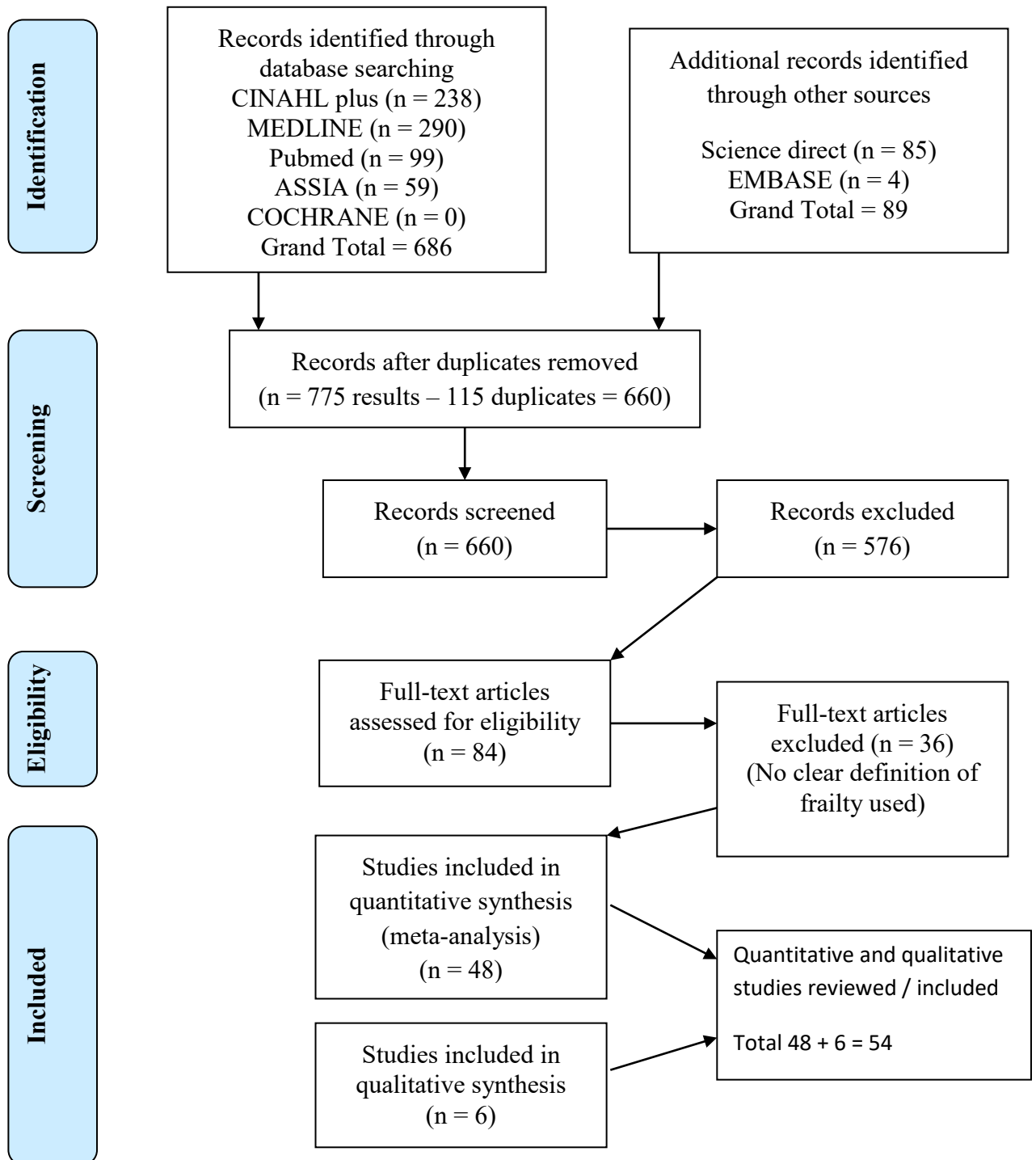
Kuh (2007) focussed on life course approach to determining frailty status. One advantage suggested by Kuh (2007) was that birth cohort studies allow exploration of the interaction of biological, psychological and socioeconomic risk factor trajectories acting across the individual’s life course. This understanding would, from a policy perspective, identify prior life origins culminating in the untimely onset of frailty, and the opportunity to begin preventative therapies early. Kuh (2007) concludes that life course approaches have potential to identify when and how to intervene during an individual’s life stage to maximise healthy ageing.

2.1 Search Strategy

An adaptation of the PICO/PECO framework was used to formulate the question and key concepts (Rees, 2010). The literature review will be revisited within the thesis discussion following data analysis and results placing the context and originality of the researcher's contribution to the body of existing knowledge.

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) a four phase flow chart / framework (fig 2.3) was used. PRISMA is a 27 item check list that improves consistency when reporting on systematic reviews and meta analysis, it is useful tool for critical appraisal of published research (Liberati et al, 2009).

Figure 2.3 - PRISMA Flow Diagram of Studies Identifying to Elicit the Relationship between Pre-Frail and Frailty Indices



Adapted from - Liberati et al (2009)

In order to define the selection of available documents which are pertinent to this research study a CINAHL plus with full text (238), MEDLINE (290), Pubmed (99), ASSIA (59) and COCHRANE (0) database search was conducted, using a search strategy for systematic reviews, controlled clinical trials and meta analysis. Using population categories ('frailty' OR 'frail' and 'elders' OR 'old people' OR 'adult' OR 'old*' OR 'older person') combined with intervention key words; MeSH terms, aged 18 and over, ageing physiology and frail elders. The review was restricted to human articles published for the period from January 1991 to January 2014 and limited to English language, '*frailty and index*' in the title or abstract.

The search methodology was repeated for other themes identified (physiological, social, cognitive, psychological). During the 1980s frailty was first acknowledged by the medical profession appearing in popular scientific publications, and in 1995 publications were indexed in MEDLINE under the MeSH term '*frail*' or '*frailty*' (Hogan et al, 2003).

The search engines Pubmed (MeSH option), Science Direct and EMBASE were added and searches repeated to identify further articles. The initial terms '*frailty and index*' database search produced (660) documents after all duplicates were removed.

The abstracts were read and research articles were selected by descriptions of the study topic in the abstract. All abstracts that mentioned frailty were retrieved electronically and manually from the library. Of these (78) studies only (48) (Appendix E: tables 2.1 and 2.2) met the inclusion criteria of identifying to elicit the relationship between pre-frail and frailty indices. The main exclusion was due to the absence of a clear definition of frailty or the contributing factors associated with frailty. Much of the literature on frailty indices have focussed on the process of identifying the stages of non-frail, pre-frail and frail older people, only a small number consider cumulative aetiologies to any extent.

The observational studies comprised cross sectional and longitudinal studies of the determinants of frailty and its contributing factors. All used operational and theoretical definitions for frailty.

2.2 Phenotype of Frailty

Early investigations to develop a frailty index were conducted by Speechley and Tinetti (1991). This early endeavour attempted to identify the frequency and circumstances of falls in three groups: frail, vigorous and transition. This was achieved through constructing a typology based on differences and characteristics of frail and vigorous people. They emphasise that constructing their typology was the lack of a definition of frail and vigour. Observations included patterns of clustering among demographic, physical and psychological variables. This enabled the development of an index with 18 deficits. This index proved useful for predicting type and severity of falls in all groups identified. Results demonstrated that all groups had suffered falls and these falls were dependant on displacing activities and environmental hazards. However, the vigorous group had less falls, although these falls resulted in more serious injury. This index is not validated for frailty but it has proven useful for differentiating targeted intervention for older people at greater risk of falls.

A decade later the first US landmark study by Fried et al (2001) defined frailty as a phenotype or cluster of traits (physical manifestations) and not a single syndrome. They developed an operational definition, framework/working screening tool of the phenotype of frailty (measurable physical deficits) to diagnose frailty constructed from data collected from the cardiovascular health study. They proposed through multiple physical indicators (deficits) based on five physical domains/markers; the following screening tool for determining frailty and its relative level (Fried et al, 2001):

'(1) Unintentional weight loss (10 lbs in past year), (2) self-reported exhaustion, (3) weakness (grip strength), (4) slow walking speed, and (5) low physical activity' (Fried et al, 2001 m146).

The presence of frailty is classified if three or more of the criteria are present; two criteria classified as intermediate frailty, one pre-frail and no markers non-frail (robust). These criteria demonstrated predictive ability for frailty, risk of falls, hospitalisation, disability and death. They note that the first two stages are more likely to be reversible than the last. Fried et al (2001) proposed these collections of signs and symptoms to provide a basis for a simple inexpensive method of identifying and standardising a measure of frailty in clinical practice. This seems to be justified due to the large use of the frailty screening tool in a large proportion of studies concerned with the issue of evaluating frailty status.

Fairhall et al (2008) used the frailty index developed by Fried et al (2001) to evaluate both multiple and specific intervention tailored to the needs of the individual frail person, demonstrating that broader and individualised interventions may provide greater appropriate benefit for treatment of frailty. However, despite the numerous epidemiologic and cohort validation studies of the Fried frailty index exact replication of the results of the five criteria has been inconsistent. Hilmer et al (2009) used the reported Edmonton frailty scale to develop a measureable tool for frailty by non geriatricians of cognitive, co morbidity, function and inter-rater reliability. The authors concluded that it proved a valuable tool to assess prognosis and response to therapy.

2.2.1 Summary

The phenotype approach does identify vulnerable people to predict the endpoint of frailty, poor outcomes, institutionalisation and death (Woodhouse & O'Mahony, 1997). The Fried model has demonstrated clinical reproducibility and coherency. This approach is a unidimensional view of a multidimensional and complex concept described as frailty

(Hubbard et al, 2008). However, it does not separate frailty from disability and comorbidity or the undefined notion of loss of physiological reserve (Perera et al, 2010). This model simply assesses the physical manifestations ignoring the underlying social, physical and psychological causes. The clinical context of frailty clearly encompasses more than just weakness and wasting. The Fried approach concentrates on diminished strength and body mass: sarcopenia - weight loss, muscle weakness, poor endurance and reduced physical activity. This is confounded by the issue of obesity causing low physical activity, slowness and exhaustion (Rockwood, 2005). Therefore, any person with a BMI greater than 25 kg/m^2 cannot be assessed as frail by the phenotypical criteria despite the deleterious effect of obesity itself. The physiological, psychological and social effects of obesity have not been quantified. The ability of a person to perform daily activities of living are not assessed, neither is their personal psychological wellbeing. It is accepted that older people suffer greater drug reactions/interaction and their use has not been included and could be a useful category to review their toxic effects (Woodhouse & O'Mahony, 1997).

2.3 Frailty Index

Rockwood et al (2004) developed a frailty function scale to evaluate falls in frail people. This scale comprised four levels; Non-frail (no cognitive or functional impairment); mild frailty (mild cognitive impairment or 1 Activity of Daily Living (ADL) with normal cognitive function); moderate frailty (mild dementia or impairment in 1 ADL), and severe frailty (moderate or worse dementia or impairment of personal ADL). The researchers found greater social isolation, poor self rating of health and greater co-morbidity with the advancement along the frailty continuum. Physical fitness was a predictor for survival even at older age. Further work conducted by Rockwood et al (2005a) developed a seven point clinical frailty scale based on clinical judgment combining co-morbidity, cognitive impairment and

disability. Classifications made were; very fit-well (well with no co-morbid disease); apparently vulnerable (mildly frail); moderately frail; severely frail. They purported that clinical frailty scales have better predictive validity than the operational definition developed by Fried et al (2001). They further conclude that the clinical frailty scale is better at measuring death and institutionalisation than the phenotype.

Sarkisian et al (2008) aimed to identify frailty sub-divisions by studying 1180 high functioning participants over the age of 70 who completed the cardiovascular Health Study developed by Fried (2001) plus ten other variables. Sub-dimensions were assessed using regression models for disability and mortality. Two further cardiovascular health study phenotypes and four subdivisions of the expanded frailty phenotype were identified. They conclude that pathways to frailty differ and that sub-dimension adapted care may enhance care of frail older people. However, the authors state that the exclusion of cognitive, psychosocial factors associated with functional decline and disability have been under scrutinised and not included within frailty assessment tools despite its predictive strength. Rockwood et al (2007) similarly correlated directly, two definitions of frailty based on specific phenotype and index of accumulation of deficits and how they predict adverse changes in health. Results suggested considerable convergence between frailty index and phenotype supporting the view that no single definition of frailty is yet clear for universal adoption. Therefore, there is a need to develop a new universal frailty assessment tool for use within primary, secondary and community care.

The physical markers of the phenotype of frailty were used by Ottenbacher et al (2005); Ávilla-Funes et al (2009); Rockwood et al (2007). These studies used modified Fried criteria with the addition of cognitive components. Ávilla-Funes et al (2009) established that as cognitive decline increases so does the prediction in adverse events increase, so that the

domain of cognition should be included to the assessment of those at risk of becoming frail. Conclusions of these studies recommend the addition of cognitive elements to enhance the predictive value for adverse health conditions which are included within the Comprehensive Geriatric Assessment (CGA).

Jones et al (2004) collected data using the definition of the operational frailty index which is constructed with 10 areas of interest utilising the Comprehensive Geriatric Assessment (CGA), these are: cognition, mood and motivation, communication, mobility, balance, bowel function, bladder function, Instrumental Activities of Daily Living (IADL) and Basic Activities of Daily Living (ADL), nutrition and social aspects (Jones et al, 2004). The frailty index is calculated as the sum of the changes identified divided by the total number of items evaluated, providing construct of frailty as mild, moderate or severe. The CGA does not require specific equipment to calculate the frailty index, is a valuable tool in clinical practice. However, the CGA does not lend itself to primary / community care since it requires expert opinion and is time consuming to carry out. Bilota et al (2010) investigated the quality of life dimensions associated with frailty. This was achieved by combining the CGA and the older people's quality of life questionnaire, frailty status was assessed using the Study of Osteoporotic Fractures (SOF) scale. Results confirm the negative impact on the quality of life of frail older people living in the community and that consideration should be given to other aspects of quality of life not just health related domains.

The markers proposed by the frailty Index were used by Woo et al (2005); Mitnitski et al (2005); Faihall et al (2008). Woo et al (2005) sought to test the association between frailty index socioeconomic factors, lifestyle, and social support. They conclude that frailty has to be studied as a complex interplay of physical, psychological, social and environmental factors. The authors suggest frailty is susceptible to targeted treatment and is therefore potentially

reversible. Drey et al (2011) applied the Fried criteria for the recruitment process for randomised control trial into pre-frailty. Under the study conditions they observed good applicability for their needs. However they recommend refinement in three criteria, particularly exhaustion and physical activity to enhance clinical usefulness. Kulminski et al (2008) used both as a comparison of measurements to predict mortality; the phenotype of frailty underestimated the risk of mortality of 720 individuals from a cohort of 1073. However, the frailty index developed by Fried et al, (2001) underestimated 134 individuals from the same cohort. This seems to suggest that the frailty index is more reliable when predicting mortality due to the broader spectrum of disorders assessed. The study concluded that the integration of both approaches may produce greater sensitivity and specificity for identification of the most vulnerable.

The proportion of accumulated deficits in the Canadian population over ten years to develop a frailty index was investigated by Song et al (2010). Identification of 36 variables assessing health attitudes, medical conditions, symptoms and functional impairments were determined. The index developed had the advantage of not containing an age predictor which recognises the health of individuals will vary at comparable ages. Older people were classified as non-frail with <3/36 deficits, intermediate with 4/36-8/36 deficits and frail >9/36 deficits. This frailty index identified 2.6 times more people classified as frail when compared to the Fried criteria. This demonstrates that deficit accumulation approaches classify mortality risk more accurately than the phenotype approach. Kulminki et al (2007) conducted a study to describe the accumulation of ageing associated health disorders using the cumulative frailty index to evaluate long and short phenotypes. Results showed long life was consistently characterised by lower frailty indices, and the dynamics were strongly sex sensitive at 95% confidence intervals.

Santos-Eggiman et al (2008) longitudinal study combined the phenotype criteria with a self administered life course questionnaire to investigate the manifestations of frailty from first signs in the youngest old. They attempted to study the sequence “determinants - components- consequence” of frailty to identify medical, psychological determinants, and describe its evolution and related outcomes. The researchers are following participants and re-assessing them via questionnaire every 3 years until death. They hope to evaluate objective changes in physical, mental health performance and changes in dimensions of the frailty phenotype. This study has some potential to determine the sequence of events through life course inquiry. However, self administered information creates inherent bias due to the often inaccurate memories of older people, a limitation acknowledged by the researchers. Romero-Ortuno et al (2010) continued with a follow-on study from Santos-Eggiman et al (2008) as part of the Survey of Health Ageing and Retirement in Europe (SHARE) wave one to develop two separate gendered on-line frailty calculators. These frailty calculators mainly for use in primary care by both clinicians and non-clinicians have concurrent criterion validity for subjective (number of chronic diseases), and objective health and healthcare utilisation (number of visits to the doctor). This data would appeal to General Practitioners (GP’s), public health and policy makers for planning future service provision. However, these claims should be viewed with caution due to large amounts of missing mortality data, and diminished cognitive ability of older people when supplying self reported data.

Kamaruzzaman et al (2010) produced a new British derived model based measurement of frailty to examine the internal reliability in community dwelling old people. Data was gathered from the British Women’s Heart and Health Study (BWHHS) from 23 towns in Britain, and replicated with the Medical Research Council (MRC) General Practice Research Framework drawn from 106 general practices in Britain. They determined that 35 deficits

amalgamated into seven core factors. These seven frailty indicators explained the association between physical ability, cardiac symptoms/disease, respiratory symptoms/disease, physiological measures, psychological problems, co-morbidities and visual impairment. They argue that a British frailty index would serve as a better population metric because it enables people with varying degrees of frailty to be better distinguished over a wider range of scores. They further indicate that it is a better predictor of all cause mortality, hospitalisation and institutionalisation within British women. The development of a British frailty index has potential to improve quality of life and target efforts in early prevention and treatment. However, this index offers nothing new of any significance, it has a small age range (60-69 years) and does not consider cognition as a potential domain and has not been adopted for use within health and social care.

More recently Shi et al (2011) constructed a new frailty index to evaluate the relationship between age and deficit accumulation in Chinese populations. A deficit count of 35 was established using demographic characteristics, social economic status, function, life style, medical service use, chronic diseases, psychological and cognitive status. Shi et al (2011) observed the frailer the person the greater the depressive features and adversely altered cognition. These data were comparable with western data except, deficit accumulation was more lethal in china. They conclude the inclusion of cognition is essential component for any frailty index. Boyle et al (2010) used the phenotype criteria with a battery of cognitive tests to confirm the hypothesis that physical frailty is associated with risk of mild cognitive impairment. The study concluded that a higher rate of frailty correlated with a more rapid rate of decline in global cognitive ability. The question remains, does frailty follow increased cognitive decline or does increased cognitive decline follow frailty?

2.3.1 Summary

The frailty indices reviewed unanimously reject the notion that frailty equals muscle wasting and attempts to quantify frailty as a loss of integration intertwined with a loss in physical reserve (Filho et al, 2010; Rockwood, 2005). It seems reasonable to consider that no single body system exists in isolation and will have an effect on other systems increasing vulnerability to stressors in the form of minor insults (i.e. infection). Conversely, there is little evidence that the CHS and SOF index criteria of weight loss, poor energy and exhaustion reflect impairment in one or more physiological domains (Ensrud & Taylor, 2010). The index approach has attempted to include the physiological (i.e. mobility and balance) and psychological domains in its construction but excludes social elements that have been linked to frailty. Further, it is difficult and daunting for health care professionals to consider how long the individuals list of ailments is with a view to quantifying frailty and its relative level (Hubbard et al, 2008a). There is increased uncertainty which categories are relevant, their severity weighting and their discriminatory power throughout the frailty spectrum (Hubbard et al, 2008a). Indices are all limited by the reliance of the individuals memory to list of ailments they suffer, and indeed if they have been informed by the physician that they actually have a particular condition.

There is a lack of specificity and sensitivity, that is, do they actually measure what they are intended to measure and how accurate are they at achieving this measure. There are significant gaps in knowledge remaining; available studies have failed to include people between the ages of 18 and 45 years. There are few studies representative of the demographic population of the United Kingdom (UK); more specifically Welsh communities. It is unclear which factors are common to both frail and non-frail people, thus isolating the factors that are characteristic of frail people only. Studies to investigate which factors are common to both

frail and non-frail people: thus isolating the factors that are characteristic of frail people only have not been conducted to date. Further international research is needed to continue to evaluate the risk factors associated with increased frailty to enhance health and wellbeing.

The evaluation of the risk factors associated with increased frailty (social and economic factors) to enhance health and wellbeing have also included. No studies have explored the early detection/identification of people with specific biological and social characteristics; which may lead to a higher risk of becoming frail from documented life course history.

2.4 Psychological Aspects of Frailty

Researchers engaged within age related enquiries have sought to understand the relationship between the psychological processes of human ageing and frailty development. The term “psychological” encompasses categories of distinct enquiry which includes cognitive impairment, vascular dementia, depression and anxiety. Epidemiological evidence has indicated that low cognitive function in particular should be considered as a component of the frailty syndrome (Rockwood et al, 1994; Rothman et al, 2008; Sarkisian et al, 2008). However, it remains uncertain which element of loss manifests first:

- Physical decline, cognitive decline or frailty?
- Frailty cognitive decline then physical decline?
- Loss of social mobility, cognitive decline, frailty and independence?

The literature search identified 14 studies with psychological references including frailty in the title or abstract, these studies are summarised in table 2.1 (Appendix E).

These studies were divided into themes: mixed methods, cognitive impairment, vascular and atherosclerotic disease and depression. This will form the sub-sections for the following discussion to understand the psychological domains with regard to frailty.

2.4.1 Cognitive Impairment

The number of studies identified from the literature search into the psychological aspects of frailty have predominantly focused on cognitive impairment (n = 9). The Three-City Study reported by Ávilla-Funes et al (2009) was a multicentre cohort study of 5,644 women and 3,650 men to investigate the risk of cognitive impairment and dementia. This four year cohort study aimed to evaluate improved predictive validity of the phenotype of frailty for adverse health outcomes with the addition of cognitive impairment measures. The phenotype of frailty was used to identify frailty status with the addition of the Mini Mental State Examination (MMSE). Results showed that people classified as frail had lower cognitive function and was more at risk of developing disability over the four years of the study. The results indicate that cognitive impairment improves the predictive ability of the phenotype of frailty. The Jerusalem Longitudinal Cohort Study (Jacobs et al, 2010) investigated the association between cognitive impairment and frailty followed 840 people aged 85 years for five years. The study used the phenotype of frailty and the MMSE. The researchers found that cognitive impairment and frailty were significantly associated, and that frailty alone was predictive of mortality. Cano et al (2012) examined the relationship between cognitive impairment, frailty and ten year mortality. The study participants (n = 3050) Mexican Americans aged over 65 years in five south western US states were evaluated for frailty status using the phenotype of frailty and cognitive status using the MMSE. Results indicate that cognitive impairment and frailty are risk factors for mortality when taken individually, but when added together frailty alone was significant for risk of death. The authors conclude that in Mexican Americans careful considerations must be made to establish pathways of increasing frailty and cognitive impairment, mortality and quality of life.

The prospective cohort study reported by Mitnitski et al (2011) analysed cognitive changes of 9,266 people aged 65 years in relation to frailty status using a multistate transition model. A frailty index of 40 deficits and the MMSE were used as measures of frailty status and cognition respectively. Results indicated that frail people were at a higher risk of mortality and that the multistate model can be used to analyse cognitive changes, improvements, decline and death in relation to frailty and other covariates. The Rush Memory and Aging Project (Boyle et al, 2010) used the mixed effect model to examine the association between frailty and the rate of change of cognition with the risk of increased cognitive impairment. Participants (n = 761) underwent annual clinical evaluation and donation of brain, spinal cord and muscle/nerve tissue at death. The phenotype of frailty was used to identify frailty status, cognitive status was assessed using the MMSE and assessed annually until death. Results suggest that an increase of one unit in physical frailty was associated with a 63% increased risk of cognitive impairment. Buchman et al (2007) also used data gathered from the Rush study of a longitudinal pathologic investigation into chronic diseases to assess the association between incidental Alzheimer's disease, cognitive impairment and frailty. In accordance with the study conducted by Boyle et al (2010) the participants (n = 832) signed an anatomical gift to the Rush project on death. The annual clinical examination and other measured parameters were concordant with the later study. Results at three year follow-up showed that an annual rate of change in frailty status was associated with an increased risk of incident Alzheimer's disease. A tenth of a unit scale change in frailty was associated with a 9% increased risk of Alzheimer's disease and cognitive decline. These results suggest that frailty and Alzheimer's disease share similar aetiologies but not cognitive decline. This is because the pathology of Alzheimer's disease is widespread in populations with mild cognitive impairment and even within some without cognitive impairment (Nelson et al, 2009). The pathology of Alzheimer's disease is also associated with motor dysfunction, an indication for frailty as

well as cognitive impairment (Nelson et al, 2009). The trajectory from normality to Alzheimer's disease means that by the time older people meet the criteria for mild cognitive impairment they are already accumulating the neuropathologic hallmarks and experiencing cognitive decline a core features of Alzheimer's disease (Buchman et al, 2007). Further, mild cognitive impairment represents a transition state between normality and dementia and is more prevalent than Alzheimer's disease (Nelson et al, 2009; Buchman et al, 2007).

The Mexican Study of Nutritional and Psychological Markers of Frailty (MSNPMF) conducted by Ávilla-Funes et al (2011) investigated the association of the frailty phenotype combined with a measure for cognitive impairment and the ability to perform basic Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL). The stratified sample of community dwelling people (n = 475), aged over 70 years were drawn from 16 districts. Participants completed a battery of questionnaires to assess health and cognitive status through face to face interviews at home. The study found that IADL was independently associated with physical frailty. However, lower physical scores were associated with cognitive impairment alone. Furthermore, their findings suggest that the main contributing factors for phenotypical frailty are cognitive impairment and low physical activity. However, they conclude that more consideration of the five independent frailty sub-dimensions should be individually investigated separately.

The risk of falls, disability, hospitalisation and death in relation to frailty was investigated by Matusik et al (2012). Information was gathered from people (n = 86, 66 women 20 male) over the age of 66 years gathered from medical health documentation/histories, MMSE and a frailty index. At the 12 month follow-up frailty, dementia or cognitive impairment when considered separately were not associated with increased mortality rates. They conclude that a risk assessment of disabled geriatric people should incorporate functional (frailty index with

ADL, IADL categories) and cognitive measures jointly. Auyeung et al (2011) study of 4000 Chinese people over the age of 65 years examined the relationship between frailty and cognitive function over four years. The phenotype of frailty was used with the MMSE. Cognitive decline over four years in men were associated with weaker grip strength, sarcopenia, shorter gait and slower chair stand. Weaker grip strength alone was associated with cognitive decline for women.

The implications of these studies infer that low physical activity and cognitive measures should be specifically assessed to identify people at increased risk of frailty and its relative level (Buchman et al, 2007). Results indicate that cognitive decline is a pre-mortality disease as a person's physical scores gradually diminish over a short period of time indicating imminent mortality. The RUSH memory and ageing project (Boyle et al, 2010) could add value to the debate surrounding frailty and cognitive decline. For example, what is the link between cognition and frailty? Are these separate unconnected incidental age related concepts, which manifests first, and to what degree does this influence an individual outcome?

2.4.2 Vascular and Atherosclerotic Disease

A study by Lee et al (2011) assessed the association between metabolic, atherosclerotic disease, cognitive impairment, mortality and physical frailty independent of sarcopenia. This was a prospective cohort study of 4000 Chinese people aged 65 years and older living in Hong Kong communities. The measures used were the phenotype of frailty for frailty status, cognitive impairment was assessed with the Community Screening Instrument of Dementia (CSI-D), clinical history/records of heart disease, diabetes, stroke, hypertension, waist hip ratio and ankle-brachial index were also recorded. Results suggest that hypertension was associated with physical frailty in men only. Metabolic and atherosclerotic risk factors were

not significant for increased cognitive impairment. However, atherosclerotic disease and high waist hip ratio was significant for physical frailty independent of cognitive function and sarcopenia.

Ávilla-Funes et al (2012) conducted a seven year prospective longitudinal study of 5,480 people over 65 years of age to investigate the relationship between frailty and attributable risk factors for incident vascular dementia to evaluate the risk of cognitive decline. The phenotype of frailty was used to assess frailty status, MMSE for cognitive status and face to face interviews to collect data on lifestyle, socio-demographics and self reported chronic diseases. Increased frailty status was found to be a major risk factor of the incidence of vascular dementia independent of cognitive impairment and Alzheimer's disease.

A randomised clinical trial conducted by Ertel et al (2007) in the USA aimed to evaluate the psychological impact of an intervention to improve the IADL, physical performance and cognition. Participants were (n = 290) stroke patients over the age of 45 years, randomised to care as usual or intervention. The intervention consisted of a psychologist or social worker trained in family systems and cognitive behavioural therapy. The trial was conducted over six months in the participants own homes with a total of 16 meetings over the six month trial period. Meetings included the participant, primary and professional care givers, friends and family. Results showed no evidence of any benefits to frail participants in the intervention group with some possible unspecified harmful effects reported.

The implications of these studies are that the relationships between atherosclerotic, vascular disease, and fragility is unclear. Whilst these diseases can occur concurrently the cause and effect nature of each requires further research. For example, does diminished cognitive function manifest itself first before a decline in physical and fragility? Or does frailty precede cognitive decline? If cognitive decline precedes frailty then cognitive assessment must be

undertaken earlier in primary and community situations. This would enable risk stratification for frailty identifying people for individualised, early interventions to prolong physical, social and cognitive wellbeing.

2.4.4 Depression

Depression and anxiety has only recently been recognised as an area of frailty study. Ní Mhaoláin et al (2012) studied the fear of falling of fallers (n = 301) over 60 years of age in Ireland transitioning to increased frailty status to evaluate the psychological factors, which included measures of anxiety, depression, loneliness, personality factors and cognition. Frailty status was measured using the phenotype model. Cognitive status was evaluated using the MMSE and depression using the shortened Centre for the Epidemiologic Studies Depression Scale. Results indicated that the more profoundly frail person displayed greatly increased depressive levels. This evidence suggests that people transitioning to frailty who are fallers would benefit from increased psychological support. Another study by Ní Mhaoláin et al (2012a) explored the relationship between clinically significant anxiety and depression and its association with frailty. This cross-sectional study of people aged over 60 years of age (n = 567) were assessed for frailty using the phenotype of frailty. Anxiety was assessed using the Hospital Anxiety and Depression Scale and depression was assessed using the Centre for Epidemiologic Studies Depression scale. Within pre-frail and frail groups higher depression and anxiety rates were observed requiring pharmacology when compared to non-frail people and may be relevant to identify people at risk of psychological issues.

2.4.5 Summary

The psychological studies reviewed are mainly concerned with cognitive impairment and its association with frailty. Mixed methods design (Buchman et al, 2007; Ávila-Funes et al,

2009; Boyle et al, 2010; Auyeung et al, 2011; Ávila-Funes et al, 2011; Jacobs et al, 2011; Lee et al, 2011; Matusik et al, 2011; Ní Mhaoláin et al, 2011; Mitnitski et al, 2011; Ávila-Funes et al, 2012; Cano et al, 2012; Ní Mhaoláin et al, 2012) were favoured by the vast majority of studies identified incorporating a variety of data gathering tools. The study participants were predominantly Mexicans or Caucasian people, female gender. Few studies have investigated psychological factors within the population of people under 65 years of age or ethnic, religious groups. Most studies used the phenotype of frailty to identify frailty status, and the MMSE to assess cognitive status. Cognitive impairment in all studies was associated with increased frailty; however, frailty alone was associated with increased risk of mortality. Shorter gait length indicated higher frailty in men and weaker grip strength was indicative of frailty in women. Increased cognitive decline was associated with the need for ADL support for frail people. Cognitive impairment, waist hip ratio and atherosclerotic disease are associated with Physical frailty.

These studies demonstrate overall that the frailty syndrome is predictive of adverse changes in health, mobility, IADL and ADL, institutionalisation, cognition and mortality within the older population (Mitnitski et al, 2005; Fried et al, 2001). Woo et al (2005) demonstrated a correlation with low physical activity, poor social support and non participation in community initiatives with low socioeconomic deprivation and frailty index, demonstrating the multidimensional concept. Levers et al (2006) suggests that despite the clear associations between frailty and the cluster of factors, without a clear explanatory theory of the path from contributors to frailty to outcome, research will produce conflicting results. Heppenstall et al (2009) emphasises the need to determine the group most suitable for targeted early intervention is unclear, and that life course studies would be beneficial for this purpose.

2.5 Qualitative Studies

Qualitative studies examining frailty from the social, cognitive perspective are sparse. Barrett (2006) puts forward the case for late life frailty to be understood as a dynamic social phenomenon and the associated need that exists to examine the social construction of frail older people as a health and social care sector target population. Therefore, it is essential to illuminate interactions between social environments with patterns of incident frailty and understand its interrelationship with social networks during transition (Barrett, 2006). The Joseph Rowntree Foundation (2003) (JRF, 2003) older people's research programme was developed by older people themselves, and is about their own lived experience. The findings produced a report which, when summarised suggests that there is a need:

“To find ways of coping with the ageing process, either in fighting it, or adapting to the limitations it brings for what is a normal and natural part of life, through listening to older people about their experiences and addressing the factors they consider to contribute to comfortable, healthy ageing” (JRF, 2003).

A subsequent report by the Audit Commission (2004) further emphasised the requirement to understand the needs of older people receiving care services, stating that:

“...frail older people who are already in contact with care services need to have a voice, both in determining the care that they receive, and in shaping the services that are in place” (Audit Commission, 2004).

More recent Government publications such as; The National Service Framework Wales: for older people (2006) (NSFW, 2006 p5) re-affirmed that:

“For older people with health or social care needs, can and should be managed in a way that promotes quality of life, independence and individual choice” (NSF, 2006).

It is clear that the inclusion of the views, thoughts and perceptions of frail and older people are essential to developing, implementing and organising future health and social care services to meet their needs. The rationale for including a single interview in phase 2 was to provide insight into a frail person's lived experience and to provide a more complete holistic view of frailty as possible. The interview may help to clarify whether the voices of frail older

people could provide insights that would add factually to the development of future policies and care pathways. It is anticipated that the outcomes of this study will propose further future research into the concept of frailty and its many health and social determinants. Table 2.3 (Appendix E) summarises the qualitative studies into frailty.

A grounded theory study conducted by Puts et al (2009) used semi-structured interviews to theorise the meaning of frailty for older people of 25 Community dwelling Dutch non-frail and frail people grounded in the data. Frailty was related to poor health, walking difficulties, feeling down, being anxious, few social contacts and being unable to “do the things you want to do”. Men give more importance to the physical dimension, and women put more emphasis on psychological and social components. Results suggest that definitions should reflect the meaning of frailty for older people and their representation.

A study by Nicholson et al (2013) of 15 home dwelling frail older people 85 years or older living in the UK (inner London) sought to understand the experiences of to enhance the evidence base for person centred care. Frailty status was determined by clinical multidisciplinary intermediate care team. Psychosocial narrative approaches and psychodynamically informed observation x four interviews were used over 17 months. The psychosocial analytical methods were used to generate data. Findings challenge the way frailty is negatively viewed in predominant biomedical models. It is understood by frail older people in terms of potential capacity, a state of imbalance in which people experience accumulated losses whilst working to sustain and perhaps create new connections. The presence of others to engage and listen to their stories, recognising and valuing their daily rituals anchors their experiences and is vital to retaining capacity and quality of life.

A previous study by the same author Nicholson et al (2012) of 17 frail people living at home in the UK provided descriptions of living in the margin with little recognition of or support for the work of living and dying during the ageing process. Two separate in-depth interviews were conducted over a 17 months period. In addition, psychosocial narrative approaches- biographic narrative interpretive method and free association narrative interview method were used. Results suggested the experience of aging with frailty operates in binary modes: social and health; independence or dependence; living or dying and hinders ways to negotiate smooth transitions. Physical limitations and functional loss makes end of life concerns real. Effort to develop and sustain connections to physical environment, routines and social network help maintain continuity with present.

A study by Stephenson et al (1999) of interviews into the concept of independence and assessing differences between two sets of conversations within 2 separate cohorts with same protocols but changing gender of interviewer. The population consisted of 19 men 20 women Canadian's 67-100+ years of age living alone independently. Results indicate that independence is culturally derived construct that does not reflect the views of frail people. Social support, routines and continuity of lifestyle promotes autonomy and independence. These factors influence the lives of frail people but do not equate to being frail and can be present when a person is frail.

Grenier (2006) explored the lived experience of frail older women and their distinction with the professional construct of frailty. The study sought to understand the emotional aspects that lie within the experience of impairment, disability and decline in older age. The data provided insight to women's experience of feeling "*frail*" and identity of self that serve as protective mechanisms from becoming frail. Understanding and addressing the emotional

aspects of what healthcare professionals understand as frailty could improve the likelihood of appropriate professional responses to managing frail older people. Chater (2002) differentiated between the lived experience of frail older people and the language of ageing used by nurses and policy makers. Frail people's perceptions of frailty were compared to references by older/younger family and friends socially constructed symbols in terms of physical characteristics (wrinkles, grey hair, slow, unsteady gait, decline in function and energy). Frail people do not acknowledge getting old or feeling old, but slowing down. Frailty is not always associated with sickness or disease. Ageing was described as feeling worn out/tired and was not equated with frailty of disease. Healthcare and policy makers overemphasise the biomedical and over-medicalise aspects of health status negatively, which is at odds with the lived experience of frailty.

2.5.1 Summary

Despite the lack of research into the social, cognitive aspects of frailty, the lived experience (Grenier, 2006; Chater, 2002) of frail older people have been shown to have captured their voices and perception. These studies indicate that the social construction of the term "*frail*" and "*frailty*" have vastly different meanings to older people and health and social care professionals. Future studies should be conducted to include the voices of older or frail people. The advantages of birth cohort studies and the life course analysis for determining those at greater risk of premature frailty and preventative solutions have not been undertaken. Further investigation to develop a theory as to why older or frail people choose to, or not to seek help; or what help would be more beneficial from health and social care organisations needs to be addressed. There was a distinct absence of studies that compare and contrast the

disconnection between the socially constructed meaning of frailty, and that of being frail from the perspective of both health and social care professionals and frail people themselves.

Chapter Three - Methodology

3.0 Chapter Introduction

This chapter discusses the rationale and philosophy informing the development of the methodology used in the feasibility study. The terminology and underpinnings theory and methodology used to inform and construct the research design will be explored and evaluated.

In addition this chapter will discuss the approaches, philosophical orientation, theoretical/conceptual vocabulary, framework, researcher subjectivity/objectivity and worldviews. The considerations for successful research with regard to frail, vulnerable and older people will be discussed.

This feasibility study has been designed to explore frailty from a non-clinician perspective, to understand the concept in the most holistic way possible in a population over the age of 18 years. The existing knowledge has been enhanced by developing an understanding of the lived experience of frailty: its physical, cognitive and social consequence. These components are poorly understood and under researched.

3.1 The Aim and Objectives of the Feasibility Study

Frailty is a complex syndrome with many physical manifestations which are not fully understood. The literature review identified a number of important issues. Firstly, that no study has yet investigated which factors are common to both frail and non-frail people thus isolating the factors that are characteristic of frail people only. Secondly, despite the calls from the Welsh Government (2003) and the Joseph Rowntree Foundation (2003) for researchers to include the voice of frail older people, there is little evidence available within

the literature to illuminate what frailty means to them , or why they do or do not seek help, or what kind of help is beneficial to them.

This study sought to compare an inventory comprising past medical histories of two cohorts, one cohort of non frail people and one cohort of equal numbers of people previously diagnosed as frail. A single idiographic case study to provide evidence that sought to interpret the lived experience of frail people being '*frail*' and what would be beneficial to them from health and social care organisations. Ideography, in this context is concerned with the '*particular*', in the sense of detail, and the depth of systematic analysis to understand an event, process or relationship understood from the perspective of particular person in a particular context leading to the re-evaluation of the importance of a single case study (Smith et al, 2009 pp29-32). This is why interpretive phenomenological Analysis (IPA) was used in phase two of the study.

Aim: To test the feasibility of the methods, methodologies and procedures to gather the information needed to develop an operational frailty index in Wales: prior to applications for ethical approval for a future full study.

Objectives:

- To enable the researcher to assess the strengths and weaknesses of the recruitment and data collection process.
- Assess the ability to identify key factors to differentiate between frail and non-frail.
- To assess the average time taken for the data gathering process.
- To inform the development of questions for the semi-structured interview from the individual case notes.
- To identify the optimal operation of the recording equipment and the length of the interview process.

An understanding of the precise nature and issues involved in this phenomenon are integral to the future development of a frailty assessment tool for health and social care professionals. A pragmatic approach to the research design was adopted to provide breadth of knowledge within the area of frailty, contributing to a greater understanding to the body of existing knowledge. The methodological design was guided by the aim of the research as opposed to researcher preference or bias. Ultimately, to accomplish the above criteria and to effectively answer a complex research question, a mixed methods research approach was adopted.

3.2 Philosophic Vocabulary for Understanding Qualitative and Quantitative Inquiry

The worldview (a basic set of beliefs that guide action) is a general orientation the researcher holds about the world and nature of research, shaped by beliefs of advisors/faculty and past student experience, also known as ontology and epistemology (Creswell, 2009 p6). Broadly speaking, in general, the philosophic assumptions of ontology and epistemology conceive research methodologies (Creswell, 2013). Ontology within social science is “*the study of being*”: concerning, what is the nature of existence with the structure of reality” (Maykut & Morehouse, 2005 p3; Crotty, 1998 p10; Blaikie, 1993). In simple terms knowledge is perceived as social reality, interpreted through the lens of the individual. Epistemological assumptions are closely coupled with ontology. Epistemology comes from the Greek word “*epistêmê*” (knowledge) and concerns the origins of knowledge; it considers what constitutes reality (Krauss, 2005). The theory of knowledge is embedded in the theoretical perspective; a way of explaining and understanding “*how we know what we know*”: the relationship between the knower and the known (Flowers, 2009 p4; Hatch & Cunliffe, 2006; Maykut & Morehouse, 2005; Crotty, 1998 p3). Logic of inquiry deals with demonstration or verification principles: are causal linkages and generalisations between bits of information possible (Maykut & Morehouse, 2005). Logic can be inductive, deductive or abductive in nature.

Inductive logic moves from specific observation to broader generalisations and theories detecting patterns and regularities and has been used in Grounded Theory Methods (GTM) to examine what frailty means to non-frail and frail older people (Puts et al, 2009). Deductive logic originates from the philosophy of mathematics, it begins with a premise (theory) to be tested and conclusions drawn, predominantly it is used in quantitative research and has been used almost exclusively to investigate the determinants of frailty (Fried et al, 2001; Rockwood et al, 2004). Abductive logic produces new knowledge in a rule-governed way. It has been traditionally used in social science e.g. when a cognitive process of scientific discovery such as, hermeneutics have been investigated (Reichertz, 2010) and has been used to illuminate the lived experiences of frail older people (Chater, 2002; Grenier, 2006). Axiological assumptions refer to the values that the researcher brings to the study by positioning themselves within the study (Creswell, 2013 p20). Finally teleological questions the contribution and purpose of research to advance knowledge (Maykut & Morehouse, 2005).

3.3 Philosophical Underpinnings/Orientation

The term '*methodology*' refers to the philosophic framework and the fundamental assumption relating to the entire process of research, which influences the procedures within it: it identifies the particular practices used to attain knowledge (Van Manen, 1990 p 27). The philosophical framework used influences the procedures of research, and the entire process of the research is termed methodology (Creswell & Plano Clark, 2007). Without a philosophical background new and early career researchers will not poses the conceptual tool to enable them to consider issues and problems as they arise (Maykut & Morehouse, 2005 p3). Frameworks also known as worldviews are perceptual structures that support a theory of

research: a basis for conducting research. The theory of health or social science may also be used as a framework to be qualitatively or quantitatively tested (Creswell, 2009 p66).

The research design refers to the plan of action and links the philosophical assumptions to specific methods within it (Crotty, 1998; Creswell, 2009 p3). Experimental research, survey research and mixed methods are examples of research designs. The benefit of studying new questions complex initiatives and interactions in natural settings are particularly suited to mixed method designs (Strange & Zyzanski, 1989; Creswell & Plano Clark, 2007). Mixed method designs within general health research, and gerontological research in particular are gaining increased acceptance (Happ, 2009). Therefore, the reader is directed to table 2.1, and 2.2 chapter two. The feasibility study methodologies and methods were designed to identify the extent to which the disease process compromises a person's functional status. Also, to better understand the affect and effect of individual disease components in relation to increased frailty.

The sampling method used was purposive sampling due to the frail cohort. Purposive sampling is one technique often employed in qualitative methodology. Purposive non-random sampling techniques illustrate that the number of people interviewed is less important than the criteria used to select them. Individual characteristics are often chosen to reflect the diversity and breadth of the sample population as the basis of selection (Wilmot, 2005).

Theories are coherent groups of general propositions, commonly regarded as correct, that can be used in principles of explanation and prediction for a set of principles. Theory is classically defined within research as an abstract generalisation that systematically explains how phenomena are interrelated (Barnum, 1998; Polit & Beck, 2010 p195). Specific theories, such as cognitive theories attempt to explain behaviours in terms of the way people actively

interpret and represent their experiences , then plan action (Hogg & Vaughn, 2008) and is consistent with phenomenology. Whereas, social theory assumes people create social reality through individual and collective actions (Bryant & Charmaz, 2012).

3.4 Conceptual Framework

A conceptual theory/framework is the operationalisation of the researchers own position on the problem, showing the direction of the study and the relationships of the different constructs under investigation. The theoretical position of the researcher in general is indicative of the worldview held by the individual and guides the inquiry. The conceptual framework guiding this feasibility study was the Biological-Psychological-Social (BPS) model. This was chosen to frame the components of frailty as a process that evolves across the life course occurring between the person and his / her environment as intrinsic dynamic reactions. Simply BPS identifies the elements of a domain, their interrelationship and significance underscoring the notion that human experience is inseparable from the whole person: the whole is greater than the sum of its parts (Engel, 1981). BPS emphasises life satisfaction, social participation, psychological functioning with personal growth (Bowling & Dieppe, 2005). The BPS framework is appropriate to enable the characterisation of multidimensional, multifactoral aspects of frailty (Engel, 1977).

3.5 Philosophical Worldviews or Paradigms

It is essential that researchers consider the appropriate worldview prior to designing studies to ensure that the correct method will be employed appropriate to address the problem. Worldviews are basically beliefs that guide action: i.e. the nature of the research and the general orientation the researcher holds (Creswell & Plano Clark, 2007; Creswell, 2009). Theoretical or worldview perspectives are categorised as postpositivism, constructivism,

advocacy, participatory and pragmatism. It is helpful, at this point, to mention that worldview and paradigm are used interchangeably. In addition, different names are often used to describe apparently similar worldviews/paradigms. This is a result of similar approaches being developed in parallel across different branches of the social sciences (Flowers, 2009). This study used the constructivist worldview which is consistent with phenomenology.

3.6 Mixed Methods

A mixed methods design was used for this feasibility study. Mixed methods can be considered as a methodology and a method of collecting organising and analysing data (Creswell and Plano Clark, 2007 p5). However, there is still much debate surrounding the precise definition of mixed methods (Creswell and Plano Clark, 2007 p5). Mixed methods methodology is a research design with philosophical assumptions as well as integrated methods of inquiry that can be defined in this context, and for the purpose of this feasibility study as:

'A method that focuses on collecting, analysing, and mixing both quantitative and qualitative data in a single study or series of studies. its central premise is that the use of qualitative and quantitative approaches in combination provide better understanding of research problems than either approach alone. As a methodology it involves philosophical assumptions that guide the direction of the collection and analysis of data and the mixture of qualitative and quantitative approaches in many phases of the research process' (Creswell and Plano Clark, 2007 p5).

Therefore, mixed methods research is both a methodology and a method of collecting and organising data in a clean and concise manner (Elliot, 2005). These designs mix quantitative and qualitative paradigms and methods in convergent or exploratory findings within a single project, with one paradigm dominating (Tashakkori & Teddie 2003; Morse, 2003; Lingard et al, 2008). This feasibility study primarily used the quantitative element to inform the qualitative secondary inquiry. This was for a number of different reasons, for example, the

psycho-social and behavioural aspects of health and illness are particularly amenable to the mixed-methods approach and have gained popularity in health research in general, particularly within gerontological studies (Happ, 2009). In addition, separate analysis of both qualitative and quantitative data is appropriate in feasibility studies, where different methods can be employed at different stages of the research project (Gilbert 2009, pg 131). Further, mixed methods can be used to examine different aspects of complicated phenomena (for example, frailty and different conceptions of vulnerability or to understand the beliefs of a range of participants and stake holders). In relation to this feasibility study the perception of health and illness and social vulnerability as experienced by frail people and healthcare professionals meant that a mixed-method approach was appropriate. This feasibility study was designed to evaluate the usefulness of combining qualitative and quantitative data within a single study, the intention was to identify whether adding the voices of frail people would provide a unique perspective and add substance to a future full study design. Mixed methods designs have previously been used to study frailty, however they are too numerous to reference here (refer to tables 2.0; 2.1; 2.2 Appendix E).

More specifically this feasibility study used an explanatory mixed methods design: follow-up explanations model (quantitative and qualitative). This is a two-phase feasibility study design. The overall purpose is that the qualitative data helps explain or build upon initial quantitative results. During the first phase the collection and analysis of quantitative data is completed. The second qualitative phase is designed so that it follows from or connects to the results of the first quantitative phase. Greater emphasis is placed more on the quantitative method than the qualitative method (Creswell and Plano Clark, 2007 p72).

The data generated will be formed primarily through using quantitative collection method to identify the documented physiological, social and cognitive aspects from health and social

care electronic and paper medical histories. Qualitative methods will provide additional information for consideration of cognitive and social aspects of frailty through a person’s life course to potentially be included within a future larger study. This element will provide understanding of social and cognitive ageing, and the ways in which events are interpreted by frail people in relation to the passage of time: coping with the demands of change.

3.7 Methodology

There are many dilemmas to consider whilst conducting qualitative research these are summarised in table 3.1. These issues of ensuring quality to develop a plausible, organised, detailed and transparent account of the meaning of the data, which is coherent, and evidenced will be considered and addressed within the methods employed.

Table 3.1-Dilemmas in Qualitative Health Research

Essential Qualities	Examples of the Form Each Can Take
Sensitivity to context	Theoretical relevant literature: empirical data: socio-cultural setting: participants’ perspectives; ethical issues.
Commitment to rigour	In-depth engagement with topic: methodological competence/skill: thorough data collection; depth/breadth of analysis.
Transparency and coherence	Clarity and power of description/argument; transparent method and data presentation; fit between theory and method; reflexivity.
Impact and importance	Theoretical (enriching understanding); socio-cultural; practical (for community, policy makers, health workers).

Source-Adapted from Yardley (2000)

These qualities will be demonstrated throughout this thesis.

The research design and methodology employed in a research study should be appropriate to the research question or aim set (Cohen et al, 2001 p35). The central question was a broad question that proposed an exploration of the phenomenon/concept of the study. The phenomenon in question related to the exploration of the social and cognitive effect, and affect of frailty experienced by people in their everyday lives. The strategies were then developed to best answer the question posed. The following discussion will evaluate and consider qualitative research traditions, identifying the guiding principles for the final choice.

There are many approaches to qualitative research with long traditions. These approaches enable researchers to examine social practices and processes, to identify barriers and facilitators to change. Furthermore, a considered choice of approach to best answer the question posed helps ensure products are well received and useful (Starks & Brown-Trinidad, 2007). Three possible strategies emerged, i.e. grounded theory, ethnography and phenomenology. Descriptions of each strategy were created, evaluated with regard to their application.

3.8 Quantitative

Quantitative designs can be crudely divided into experimental and observational. Quantitative data in this study will be gathered using an observational design (Devane, 2011). Observational designs involve the researcher collecting information regarding the prevalence, distribution and inter-relationship of variables in a population. These designs describe the clinical course of the individual by collecting information to describe the natural history, or progression of a particular condition to identify risk factors (Divane, 2011; Thadhani & Tonelli, 2006). Observational designs are the only method able to provide accurate information concerning the impact of frailty on later outcomes of a person's life course

(Santos-Eggiman et al, 2008). The simplest form of observational study is the case control method, cases can be prospective or retrospective and identified from a number of sources (Van Stralen et al, 2010). Prospective studies collect data at baseline before a disease process begins and then follows the cohort longitudinally over a period of many years until exposure is identified. In contrast retrospective studies find cases that have already been identified as being exposed to the disease of interest (in this case frailty) and their health records examined to determine cause and effect (Van Stralen et al, 2010). Appropriately designed case control studies are able to provide the same information as cohort studies in a more rapid and efficient manner (Van Stralen et al, 2010). For example, according to Mann (2003) although both cohort and case control studies can provide useful information, cohort studies are generally conducted over a longer period of time, and are therefore time consuming. Conversely, a properly conducted case control study can access existing 'cases' with a particular health problem (in this case frailty) and yield valid data more quickly (Mann, 2003). Case control analysis in general attempts to identify changes in independent variables, in this case historical prior health/morbidity problems during earlier life and their significance in their frailty status. It is an efficient research method for investigating risk factors associated with a disease. It involves collecting data about an outcome in the present and looking back in time for possible causes or antecedents; comparing the odds of exposure in the frail group to the odds of exposure in the control group (Polit & Beck, 2008 p 255). Previously studies examining frailty have used observational designs (refer to table 2.1) similar to the case control method to determine factors that contribute to increased vulnerability to becoming frail (Rothman et al, 2008; Kiely et al, 2009; Fallah et al, 2011; Gill et al, 2010). Case control is an ideal method for identifying contributory factors from patient medical and Social Services notes. By using the case control method, conclusions

such as the development of functional dependence can be drawn. These can identify circumstances in early life associated with the population characteristics of frailty along the life course (Hopkins, 2000).

3.9 Qualitative

Among qualitative research the semi-structured interview is the most commonly used and most widely employed method of data gathering. Knowledge is gathered and constructed in the interactions of the interviewer and interviewee. Taylor (2005 p39) suggests it is to explore the 'insider perspective'. To capture, in the participants own words, their thoughts, perceptions, feelings and experiences and are used extensively within qualitative inquiry.

Grounded theory developed by Glaser and Strauss (1967) originates from sociology, more specifically symbolic interactionism. Symbolic interactionism believes that individuals engage in the world that requires reflexive interaction as averse to environmental responses (Goulding, 2004; Starks & Brown-Trinidad, 2007). Many middle range theories of phenomena relevant to nursing have been developed through grounded theory, and it has become a widely used method within health care studies (Polit & Beck, 2010 p269). Grounded theory seeks to develop explanatory theory surrounding social processes within the environments that they take place in the words and actions of those individuals under study. It examines causes, contexts, contingencies, consequences, covariance and conditions to understand the patterns and relationships among these elements (Strauss & Corbin, 1998). Grounded theory is suitable for studying behaviours that have an associated interactional element (Goulding, 2004). It does not attempt to illuminate the experiences of the phenomenon under investigation of people during their everyday lives regarding the effect

and affect of frailty; it builds theory to explain social processes. Therefore, grounded theory is not a suitable methodology to achieve the research aim.

Ethnography stems from the cultural domain and the discipline of anthropology, its focus is on small scale societies to form a holistic view (Gilbert 2009, p 266; Goulding, 2004). Ethnography provides health care researchers with access to health beliefs and practice of a sub culture (Higginbottom et al, 2013). It has been previously used in the study of older people by Kaufman (1986) and has been prominent within life course research. Ethnographers seek to learn from rather than study members of cultural groups to understand their world views (Higginbottom et al, 2013). Ethnography can be used as a means to identify common threads such as social relationships from partial or full descriptions of group cultures (Goulding, 2004). However, the process is labour intensive and always involves direct, prolonged contact with group members. Thus, to illicit holistic explanations, months or years of fieldwork are often required (Goulding, 2004; Polit & Beck, 2010). Therefore, ethnography would not have been suitable due to the limited scope of this feasibility study.

Phenomenology is both a philosophy and a methodology (Goulding, 2004) which has previously been used in frailty studies (Grenier, 2006; Chater, 2002). Phenomenology is rooted in early 20th century European philosophy, it is used to provide thick descriptions and close analysis of the lived experience and how people embodied perception to understand meaning (Starks & Brown-Trinidad, 2007). Essentially there are two schools of phenomenological approaches: descriptive (Husserl, 1970) and interpretive (Heidegger, 1962) (Lopez & Willis, 2004). Interpretive Hermeneutic Phenomenology (IHP) is the science of interpretation of text, hereby language. In its written or spoken form, is scrutinised to reveal meaning in phenomena (Rapport, 2005 p125; MacManus-Holroyd, 2007).

Fundamental to IHP are the interpretation of narratives provided by participants in relation to the context under study. Hermeneutics is a process, and method for bringing out and making manifest what is normally hidden in human experience and relations (Lopez & Willis, 2004). This approach developed through hermeneutical phenomenology focuses on how language reveals being. Phenomenology builds on the idea that with special attention to context, and original purpose theoretical, interpretive understanding or meaning is possible (Leonard, 1994 p56).

More specifically Interpretive Phenomenological Analysis (IPA), developed by Smith et al (2009) was used for this study. IPA is a branch of Hermeneutic phenomenology that enables service providers, health and social care professionals to reach, hear and understand the experiences of participants to influence and contribute to theory (Pringle et al, 2009). The origins of IPA are in health psychology (Pringle et al, 2009), and are theoretically rooted in critical realism and social cognitive paradigm. It provides the opportunity to explore, interpret and understand the notion of temporality, taken to mean the horizon of all possibilities of being or existence to illuminate people's perceptions of frailty (Earle, 2010). The IPA approach chosen for this feasibility study was the idiopathic case study. This is a method suitable for small samples of up to ten participants, and enables the researcher to write up a single case or an exploration of themes shared between cases (Fade, 2004). As this study was a 'feasibility' study a single case was subject to IPA analysis, as this was all that was required. Indeed, it was not clear whether this IPA approach would yield any relevant data and so a single interview was undertaken to explore its feasibility. However, a detailed IPA approach could be used in any future study, yielding more comprehensive data.

3.10 Researcher Subjectivity and Objectivity

An alternative way of visualising theory is through a theoretical lens or perspective to guide the study (Fonow & Cook, 1991 p2). This approach has previously been employed to research disability and other bases of diversity (Mertens, 2003). Frailty itself and its determinants, the social, cognitive context is a complex syndrome. The social, cognitive context is completely different to its physical context, its measure in laboratory tests and clinical appearance. Reality dictates that there are interactions between individual people in response to interactions with others. During inquiry, human knowledge is constructed and entwined within perceptual frames, histories and values of the inquirer. From interpretivist perspective objectivity (distanced, detachment and neutrality) in the social science is not possible and should be rejected. In essence, the experiences of the researcher are integral to his / her interpretations. Furthermore, Eisner (1992, cited in Green, 1998) evaluation theory entreat substantive expertise of the individual or expert (Green 1998 p390). Phenomenologists believe that the researcher cannot be detached from those being researched and should acknowledge this (Hamersley, 2000, cited in Floyd, 2009; Groenewald, 2004). Subsequently, the researcher's beliefs, motives and social position must be scrutinised through self reflective designs, scrutinising their own role to minimise subjective contamination (Marsh & Keating, 2006) p127. Creswell (2013 p47) recommends that the researcher positions themselves within the research study: i.e. in the methods section, introduction or other place in the study, their background, how it informs their interpretation of the information in the study (refer to the research diary (Appendix F) for a pen picture of the author, including his clinical experiences, status and personal beliefs).

In reality, whilst doing research, clear distinctions between subjectivity and objectivity do not exist. There is a clear understanding that there is no window into the life of the individual,

any gaze is filtered through the lens of language, gender and social class. There are no objective observations, only observations socially situated in the world of the observer and the observed. Individuals are seldom able to provide complete explanations of their actions, they are merely able to offer stories of what and why (Denzin & Lincoln, 2005 p21). Therefore, it is possible to create understanding of the phenomenon through asking questions, observing and interpreting “*only what I hear and see*”. However, awareness of my own beliefs, values and experiences could affect my knowing.

Separation of my own values and beliefs as a researcher cannot be totally detached whilst conducting research. I provide information that I have found, not what I think I have would find. My inherent experiences should have little influence on the interpretation and translation of the findings. Heidegger (1962) states;

“Whenever something is interpreted as something, the interpretation will be found essentially upon fore having, foresight and fore-conception. An interpretation is never a presupposition less apprehending of something presented to us.” (Heidegger, 1962 p191).

Furthermore, Heidegger (1962) opposed the view that understanding is never without presuppositions (expert knowledge) on the part of the researcher which makes the enquiry a meaningful undertaking, and rejects the concept of bracketing (i.e. the act of suspending judgment about the natural world on the part of the researcher) (Lopez & Willis, 2004). However, being aware of my own perspective through self reflexivity during and throughout the research processes and writing this thesis was given careful consideration.

Chapter four - Methods

4.0 Chapter Introduction

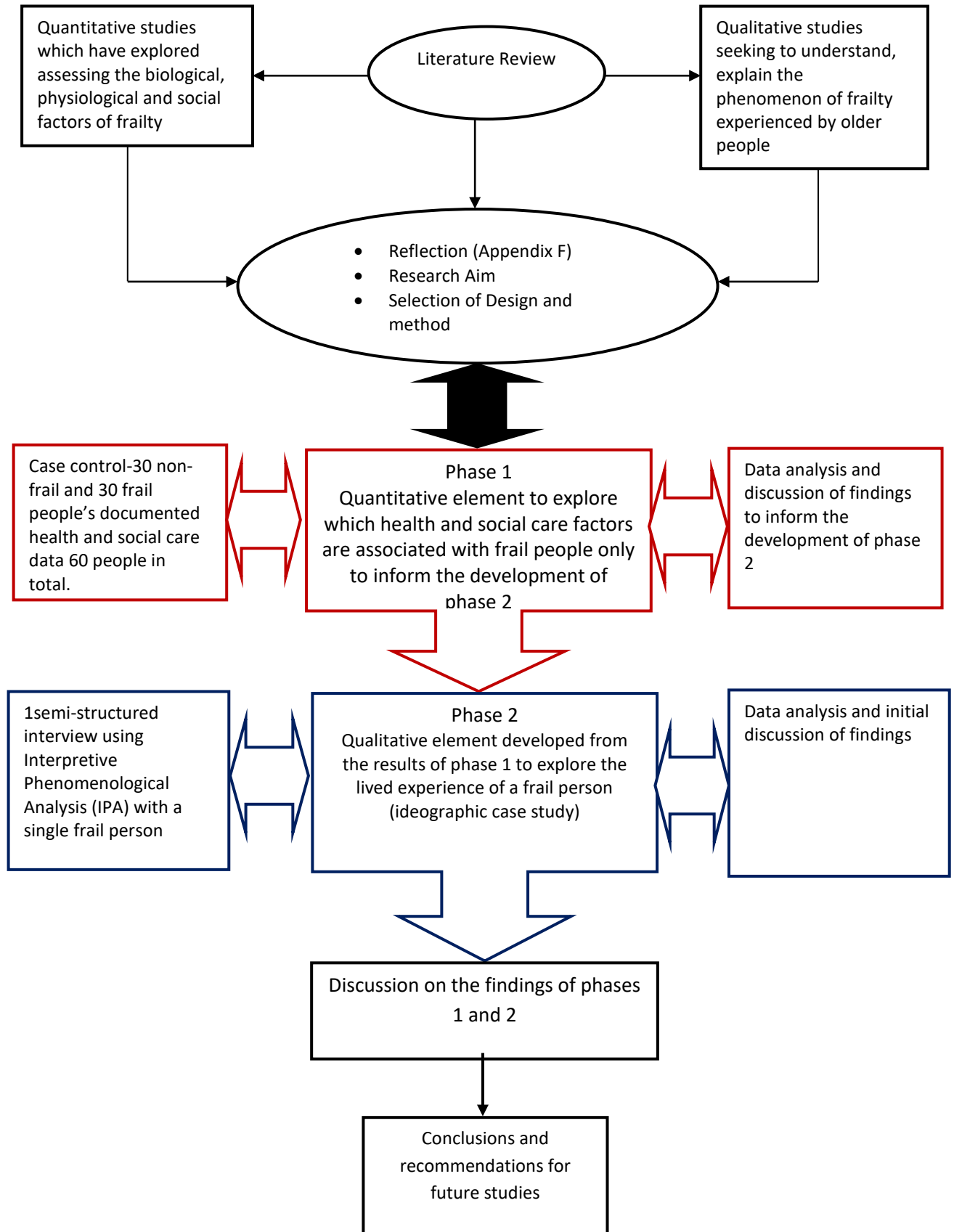
This chapter will present the chosen design of the feasibility study. The population demographics, ethical / governance issues, and permissions needed to conduct the research will be shown.

The study was designed in two phases using explanatory mixed methods design: follow-up explanations model (quantitative and qualitative). This involves generating data from phase one through quantitative case control method to examine 30 non-frail and 30 frail people's documented health and social care data to inform the design of phase two. This involved a single qualitative, idiographic case study semi-structured interview using Interpretive Phenomenological Analysis (IPA).

The overall purpose was that the qualitative data helped explain or build upon initial quantitative results to provide additional information for consideration of cognitive and social aspects of frailty through a person's life course to be included within a future index. During the first phase the collection and analysis of quantitative data was completed. The second qualitative phase was designed so that it followed and connected to the results of the first quantitative phase. Greater emphasis was placed more on the quantitative method than the qualitative method (Creswell and Plano Clark, 2007 p72).

Figure 4.1 overleaf depicts the design of the feasibility study research.

Figure 4.1 - Feasibility Study Research Design



4.1 The Population, Research Demographics

This study represented a sample of frail and non-frail people (18, 60% female and 12, 40% male) over the age of 18 years (age range 41 to 95 years). This study took place within the former county of Gwent where its unique demographics, socioeconomic and historical industrial past (coal mining and steel production) require specific health and social care needs. The number of frail people is estimated to be 20,000 from a total population of 560,000 (Gwent Frailty, 2010). This has particular relevance due to the identification of frail people through the Gwent Frailty Service (GFS) which is built around four core Community Resource Teams (CRT), and two integrated service teams (IST) covering local authorities' boundaries and coterminous with the Aneurin Bevan Health Board localities (Monmouthshire have two teams). These are supported by a Single Point of Access (SPA) (Gwent Frailty Service, 2010). These teams function to develop prevention initiatives, crisis intervention, reablement and transition to long term community/primary care. The Gwent Frailty Programme has provided care for over 10,000 frail people to date (Aneurin Bevan health Board, 2012).

4.2 Data Collection Tools

4.2.1 Phase 1

Phase one involved the examination of a total of 60 individual service user life course medical/social histories (30 non-frail and 30 frail). This allowed for data generation to identify the possible stages and domains that may exist within the frailty spectrum. The criteria (modified Rockwood et al (2004) index) previously identified by the Gwent Frailty Service to determine a person's frailty status was scrutinised after examining the patient notes to minimise bias and confirm the criteria / information identified following the literature

search was concordant. This information formed the basis for establishing of the contributing factors documented within the patient notes/Social Services documentation. Confirmation of frailty status enabled accurate comparison with non-frail patient information, noting other factors in the notes which may impact on health and wellbeing.

4.2.2 Phase 2

Qualitative data were gathered through using a phenomenology informed, semi-structured interview technique. The interview schedule was formulated following the results of phase one. This enabled the researcher to ask appropriate questions. The schedule (Appendix B) was provided to the interviewee one week prior to the day of the interview. Observations documents (GP patients information, staff, patient notes, carers; community resource team patients, patient notes, and staff documentation) were also collected and analysed to be used when relevant or appropriate (Creswell, 2013 p86). Data gathered illuminated an understanding of the lived experience of a frail person.

Case studies can be translated to give different perspectives, explore contradictions and develop meaning and understanding of life events (Liamputtong, 2010 p203). The additional value of a case study is that it provides a means of troubling our assumptions, preconceptions and theories (Smith et al, 2012 p30). Considering the research question, aim and objectives Interpretive Phenomenological Analysis (IPA) was chosen. This approach was better suited to answering the qualitative question posed: to identify the social and cognitive aspects of pre-frail and frail people (the essence of being frail). This element will provide understanding of biological, social and cognitive ageing, and the ways in which events are interpreted by frail people in relation to the passage of time: coping with the demands of change.

4.3 Participants, Sampling and Recruitment

Participants were identified via the Community Resource Team (CRT) and GP databases following the usual assessment of needs i.e. modified Rockwood et al (2004) frailty index. Referred individuals were approached by a member of their CRT/GP in the first instance in person and asked if they would like to participate in a research study. Respondents who declared an interest were provided with an information leaflet and consent form. The study was also explained fully to the potential participant by the chief investigator. The quantitative examination of a sample of 30 patient notes, documentation from the CRT and Social Services (SS) representing the population of frail people was undertaken. These data were compared with information from a sample of 30 non-frail patient notes (total no = 60).

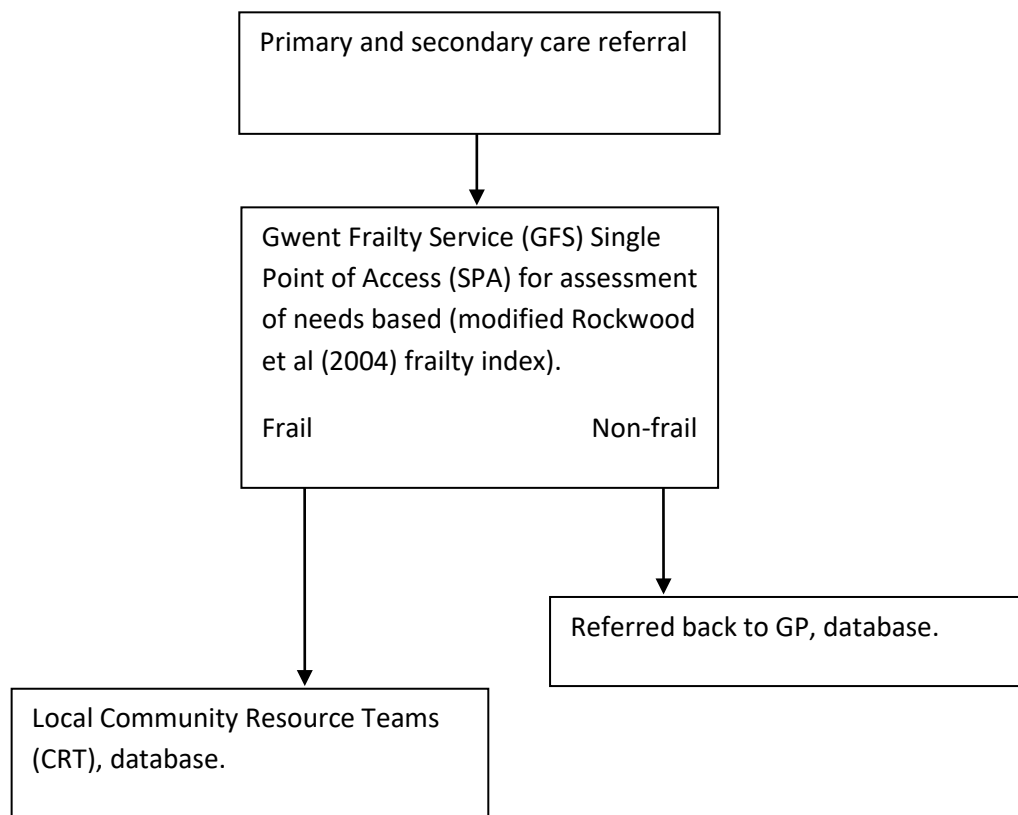
The plan of procedure facilitated the recruitment for the semi-structured Interpretive Phenomenological Analysis (IPA) interview via purposive sampling of the frail participant that fulfilled the interview criteria. Purposeful sampling is adopted in qualitative research for the identification and selection of information-rich cases for the most effective use of limited resources (Patton, 2002 p45). This involves identifying and selecting individuals or groups of individuals that are especially knowledgeable about or experienced with a phenomenon of interest (Cresswell and Plano Clark, 2007 p111).

Recruitment of the purposive sample started on the 22nd of February 2013 and was completed on the 27th May 2013 following Good Clinical Practice (GCP) guidelines and the Declaration of Helsinki. The average recruitment rate was ten frail and ten non-frail participants per month. Non-frail recruitment was not problematic. The General Practitioner (GP) identified suitable potential participants (n = 30) and provided the receptionist with details of who to approach either by telephone or on the day in person when attending their scheduled appointment (fig 4.0). The GP representative asked the patient if they would be interested to

take part in the study. Following a positive response, the chief investigator was provided with details to contact the patient and discuss the project in a private place. Frail participants (n = 24, 80%) were identified by the Community Resource Team (CRT) on referral. CRT managers were fully co-operative and arranged access to their database and training to enable data retrieval. Potential participants deemed suitable by the CRT were asked by telephone or during scheduled visits if they would like to take part. Again, following a positive response, the Chief Investigator (CI) was provided with contact details to arrange an appointment to discuss the project. Travelling to the home address of each frail participant was time consuming. This was overcome by booking appointments on the same day in the same area where travel time between appointments was minimised. The response and co-operation from some members of the CRT was excellent. However, this was not consistent throughout the organisation and the CI was reliant on these key individuals to identify potential participants. Social Service managers were fully co-operative arranged access to their database and provided six frail participants (20%).

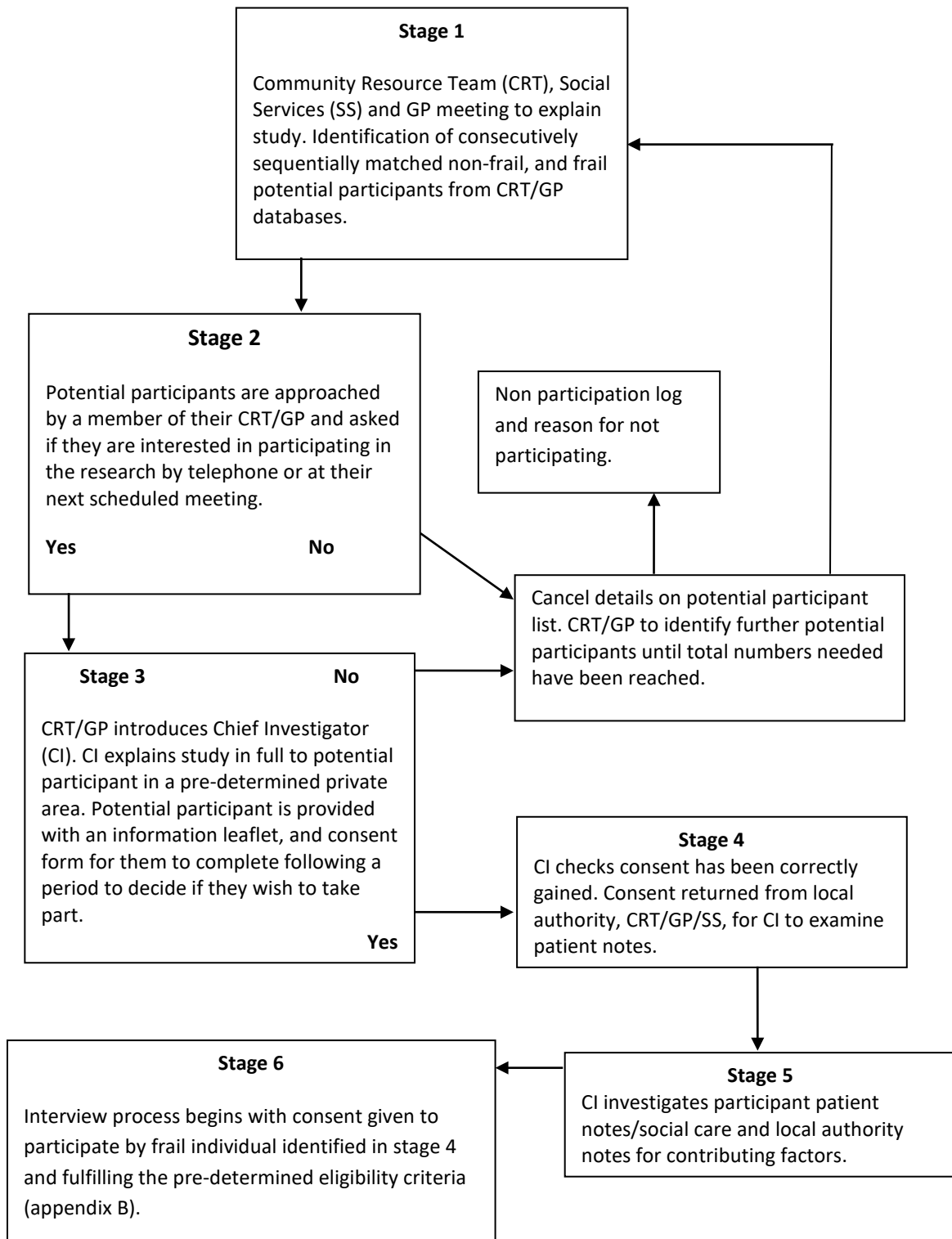
People regularly attend their GP surgeries to access services, as a person grows frailer. Attendance to both secondary and primary care increases due to greater health needs. The Gwent Frailty Service was established to provide a link between primary and secondary care to assess people's needs. Referrals (fig 4.2) are made via the Single Point of Access (SPA) to the Gwent Frailty Service (GFS) for assessment of needs via a modified Rockwood et al (2004) frailty index. Following confirmation of frailty status the individuals are either; referred back to their GP (non-frail) or the Community Resource Team (CRT) (frail) as appropriate, and placed on the routine service electronic databases.

Fig 4.2: Participant referral process.



Within case control studies it is important to match comparable groups to reduce confounding variables (fig 4.3) (Polit & Beck, 2008). Matching involves using information about subjects to form comparable groups to control confounding variables such as: age, gender, ethnicity and social status (Polit and Beck, 2008 p 244).

Fig 4.3: Flow diagram of study procedure.



Non-frail group participants were matched one by one with the identified frail group on the importance of confounding variables (age, gender, ethnicity and social status). Consecutive sequential sampling of the routine electronic database of potential non-frail participants will minimise researcher bias within practices.

4.4 Data Collection

Data were gathered from secondary care sources obtained with the co-operation of the records department Ysbyty Ystrad Fawr (YYF), Caerphilly Social Services (SS), Caerphilly Community Resource Team (CRT), and Avicenna medical centre Gwent. A data collection framework (Appendix A) was developed based on the disease / social categories from the health and social care data gathered, and revised throughout the data collection process which was used to document data from all sources. The framework was revised by adding a column for the age of the participant for each health condition to be entered and the conditions list was sequentially ordered in disease categories.

4.5 Analysis

Quantitative data were analysed using SPSS (version 21) with reports obtained for all results relating to the deficits identified from the documented health and social care data. The non-parametric technique Chi-square was used for independence, a statistical technique which is optimal for data measured on nominal and ordinal scales (Pallant, 2003). Missing data was managed through assigning a specific number in the database and shown clearly in the statistics.

Qualitative data were analysed using Interpretive Phenomenological Analysis (IPA) method development by Smith et al (2009). This method was used due to the applicability and suitability of IPA to a single ideographic case study. The phenomenological method of

explication and analysis was based on Smith et al (2009) Interpretive Phenomenological Analysis (IPA) consisting of a series of eight steps. The aim of using IPA was to illustrate, inform and master themes by firmly anchoring findings in direct quotes from the participant's account (Smith et al, 2012). This approach provided a theory of interpretation through which the hermeneutic researcher achieved congruence between philosophy, methodology and method. IPA acknowledges the interrelationship between interpretation and interpreter, moving forward in understanding where the interpreter understands the parts of the text in relation to the whole and the whole in relation to its parts (the hermeneutic cycle). Furthermore, IPA researchers try to make sense of the participant making sense of their experience (the double hermeneutic cycle), this captures the dual role of the researcher (Smith et al, 2012 p3). The series of eight steps are:

1. Familiarising yourself with the data.
2. Phenomenological coding.
3. Interpretive coding.
4. Identification of themes.
5. Clustering themes.
6. Peer/supervisor review.
7. Integrative analysis.
8. Construct a narrative.

Qualitative and quantitative data obtained from the study were analysed and compared developing a typology, coded thematically and reconstructed during the final stage to develop situations and interactions, enlarging the focus on the phenomenon under study; thus, ensuring triangulation (Flick, 2009 p 65).

4.6 Reflexivity

Reflexivity is a central concept, an invaluable tool to promote understanding within qualitative research of the phenomenon under study, and the researcher's role where it is viewed as adding credibility (Smith, 2006). In essence reflexivity is the researcher's articulation of his / her personal views and insights about a particular phenomenon (Dowling, 2006). Urquhart (2013 p70) defined reflexivity as:

'the process of critical self-reflection on the biases, and theoretical predispositions of the researcher on his or her values, preconceptions, behaviour or presence and those of the participants, which can affect the interpretation of responses' Urquhart (2013 p70).

In effect, it is the researcher's scrutiny of his or her research experience, decisions, and interpretation in ways that bring the researcher into the process and allow readers to assess how, and to what extent his or her interests, position, and assumptions influenced the research (Bryant & Charmaz, 2012 p609). Therefore, it is essential that the relationship between, and influence of, the researcher and participants be made explicit, typically this is in the form of a diary (Jootun et al, 2009). Smith et al (2009 p189), suggest that there are four layers of reflexivity, pre-reflective reflexivity (unconscious, consciousness), reflective glancing (intuitive undirected reflection), alternative reflection (experience of importance), and deliberate controlled reflection (later phenomenological reflection). This emphasises the undisputed importance of the role and relationship of reflection on reflexivity (Dowling, 2006).

My reflexive stance (Appendix F) has informed how the research was conducted, relates to the participant, and their representation in the findings and discussion. Therefore, this research required critical reflection on the nature of the findings and the process of reviewing an experience in order to describe, analyse, evaluate and so inform learning about practice

(Reid, 1993). Despite IPA rejecting bracketing, I was aware my own position as chief investigator that it was critical to examine my perceptions and beliefs about frailty to better understand them. Models / frameworks of reflection range from simple formats such as Gibbs (1988) to more complex approaches such as Fish, Twinn and Purr (1991). It was evident that I required a framework that would allow pre-reflection, glancing, alternative, and controlled reflexivity, therefore, these were not suitable for this study. Therefore, I have based my reflection loosely on the tool proposed by Johns & Freshwater (1998) which has been adapted for my purposes. I did not follow this framework rigidly since the tool is more suited to practical situations and experiences interacting with the participants. This was because I wanted my reflection to expose my values and beliefs and any factor that has influenced my interaction with the participant.

The tool involves:

- Aesthetics of the situation (how acted and responded to the situation).
- How I felt at the time.
- Ethics (the difference and similarities between beliefs and personal actions).
- Reflexivity (how a similar situation could be addressed in future).

4.7 Triangulation

Evidence gained from patient notes, and the combined interview data were drawn together enabling methodological sequential across methods triangulation and meta-matrix (major regular formation of elements into columns and rows) techniques during the final stage (Narayanan & Armstrong, 2005 p 86). Sequential across methods is a typology, defined as; *'a way to classify theoretical concepts which is created by 'cross-classifying or combining two or more simple concepts to form a set of interrelated subtypes'* (Cameron, 2009). Triangulation integrates different methods which are used to assess the same phenomenon

toward convergence and increased validity. Explanatory sequential means that the quantitative phase is followed by the qualitative phase to connect the data between the two phases with a greater emphasis placed on the quantitative element (QUANTITATIVE _ qualitative). Methodological sequential across case triangulation of evidence for all categories will enhance confidence for the inclusion of social and cognitive categories within a future larger study to form a frailty index (Casey & Murphy, 2009). However, the data generated during this feasibility study was of limited use due to the small sample sizes used. This activity has positively informed the future studies by edifying the Chief Investigator (CI) of the applicability of the method and methodology with regard to the analytic process. Methodological sequential across case triangulation of evidence for all categories will provide enhanced confidence for the inclusion of social and cognitive categories within a future frailty index (Casey & Murphy, 2009).

4.8 Ethical Issues and Governance

The research methodology and methods are minimally intrusive, without imposing a disproportionate burden on the participant complying with the Mental Health Act (2005) (MCA, 2005) sections 30-34. The interview did not include participants with diminished cognitive factors due to the difficulty in memory and communication. Capacity to consent (difficulty in cognition) had previously been assessed during the participant identification procedure by the GP/CRT in accordance with the feasibility study inclusion/exclusion criteria.

Due to old age, poor eyesight, and frailty, information was provided in large print and the information leaflet had a photograph of the researcher to aid recognition. People with difficulty hearing were asked to recount what they were asked to do within the research to

assess understanding. Potential participants were provided with plenty of time and opportunity to ask questions before deciding whether to take part in the research.

The participants were provided with sources of independent and impartial advice before deciding to take part in the research through the older people's advice service online and the Citizens Advice Bureau (CAB). Research participants were made aware of the statutory obligation placed on the researcher regarding disclosure of criminal acts made upon them.

Participant that decided to withdraw from the study and did not want their information/data included in the study were assured it would be destroyed when requested. All participants were assigned a personal identification number and a named person for enquiries. Participants were reminded that all information from their patient notes were confidential. Their identity was known by the researcher. To minimise potential difficulties the researcher included a reflective diary (Appendix F) with the aim of exploring his thoughts, feelings and emotions throughout the research process.

4.9 Permissions

The feasibility study has gained permission (Appendix D) from the Research Ethics Committee (REC) (ref - 12/WA/0360). Aneurin Bevan Health Board (ABHB) Frailty Service and Research and Development (R&D) (ref- RD/1116/12) have provided written support for the study, which includes permission: to access GP patients information, staff, patient notes, carers in each of the five localities; community resource team patients, patient notes, staff, documentation and carers in each locality. Permission has been granted by the Association of Directors for Social Services Cymru (ADSSC) (ref: SE/LU/GJ 1) to access data held by them. Following completion of the study Gwent R&D completed a study audit with a favorable outcome.

Chapter Five – Analysis and Results

5.0 Introduction

The results are presented separately: quantitative followed by the qualitative. Quantitative data were analysed first so that the qualitative data could explain or expand on the significant (or non-significant), outliers or unexpected results.

5.1 Quantitative Data

The feasibility study required and recruited 30 frail people and 30 non-frail people's (matched by age, gender, ethnicity and social status) (total n = 60 participants) documented electronic or paper health and social care records (refer to table 5.1 p 92). There were no withdrawals from the study. There were 20% of those approached to participate who declined in both cohorts. Reasons for not wanting to take part were because of multiple agency involvement avoiding increased visits, the desire for their personal details being kept private, on one occasion, the opinion of the personal consultee that the potential participant would not want to participate. Further development of a personal and nominated consultee information sheet was identified for future studies. This enabled the chief investigator to assess the process and procedure involved to identify the cohort and gain consent.

The quantitative element produced the following results:

The health care notes of 60 patients: 30 frail and 30 non-frail participants (table 5.1). Thirty six (60 %) were female and 24 (40 %) males evenly distributed between the two groups. The research should have recruited a 50/50 split to minimise bias, however, this was not possible due to the consecutive sequential referral process to minimise researcher bias.

The average age of the participants was similar 75 (non-frail) and 76 (frail). A higher proportion of the frail patients were 'teetotallers' (21, 70 %), non-smokers (25), living alone (14), with a relative (2), widowed (8), and were taking on average more medications (average 9.84). Four of the frail participants were housed in specialist accommodation due to their specific care and mobility needs. All non-frail participants owned their own home compared to 18 of the frail participants. Home ownership suggests higher educational / employment attainment and corresponding earning capacity. The mean BMI (kg/m^2) for non-frail was 26.88 (overweight) compared to frail 30.37 (obese).

Table 5.1: Descriptive Statistics

Variable	Non-frail n = 30	Frail n = 30
Mean Year of Birth	1938 (75 years)	1937 (76 years)
Age Range for Male / Female	41 to 95 years	41 to 95 years
Number of Male & (%)	12 (40%)	12 (40%)
Number of Female & (%)	18 (60%)	18 (60%)
Non-Smokers Number of People	22	25
Smokers Number of People	7	4
Married Number of People	19	15
Unmarried Number of People	2	3
Divorced Number of People	5	3
Widowed Number of People	2	8
Mean BMI (kg/m²)	26.88	30.37
Mean Number of Current Repeat Medications	6.7	9.84
Living Arrangements Number of People	Alone = 10 Spouse = 20 Relative = 0	Alone = 14 Spouse = 13 Relative = 2
Alcohol Consumption Number of People	None = 15 Mild = 13 Mod = 0 Heavy = 0	None = 21 Mild = 5 Mod = 2 Heavy = 1
Type of Accommodation Number of People	Owner = 30 Association/council = 0 Specialist = 0	Owner = 18 Association/council = 8 Specialist = 4

Table 5.2 displays the class of medications prescribed to non-frail and frail participants. The table shows that there was almost a fourfold number of frail to non-frail people prescribed laxatives and Angiotensin-Converting-Enzyme (ACE) inhibitors (11, 36%; 3, 10%: difference 26%). Double the number of frail people compared to non-frail were taking medications for mucosal protection, calcium channel blockers and non steroid anti-inflammatory drugs (6, 20%; 3, 10%: difference 10%), and diuretics (10, 33%; 5, 16%: difference 17%) were identified. Almost twice as many frail to non-frail people were prescribed opioid analgesics (8, 26%; 5, 16%: difference 10%), anti-depressants and nitrates (7, 23%; 4, 13%: difference 10%). Two more frail participants than non-frail (12, 40%; 10, 33%: difference 13%) were recorded taking lipid regulating drugs, glucocorticoids (3, 10%; 1, 3.3%: difference 6.7%), antibiotics, benzodiazepines and alpha blockers (2, 6.6%; 0, 0%), anti platelets (4, 13%; 2, 6.6%: difference 6.6%). Two more non-frail than frail people were prescribed cardiac glycosides (3, 10%; 1, 3.3%: difference 6.7%). One more frail than non-frail participant respectively in each class was shown to be regularly taking bisphosphonates (2, 6.6%; 1, 3.3%: difference 3.3%), thyroid (6, 20%; 5, 16%: difference 4%), type 2 diabetic (8, 26%; 7, 23%: difference 3%), iron deficiency (3, 10%; 2, 6.6%: 3.4%), rennin/aldosterone, and hormone antagonists (1, 3.3%; 0, 0%: difference 3.3%), vitamin supplements (9, 30%; 8, 26%: difference 4%), and anti coagulants (4, 13%; 3, 10%: difference 3%). Conversely, one more non-frail than frail participant respectively in each class was shown to be regularly taking hormone replacement and anti cancer, and anti-malarial (1, 3.3%; 0, 0%: difference 3.3%), B12 supplements (4, 13%; 3, 10%: difference 3%). There was no difference in the number of non-frail and frail participants were being prescribed beta blockers and H₂ antagonists (7, 23%), aspirin (8, 26%), bronchodilators (5, 16%), Paracetamol (6, 20%), hyperuricaemics, anti emetics (1, 3.3%), and skin preparations (4, 13%).

Table 5.2: Frail and Non-Frail Current Repeat Medications

Class Of Medication (Number of People and %)	Non-frail n = 30 (%)	Frail n = 30 (%)
Angiotensin-Converting-Enzyme (ACE) inhibitors	3 (10)	11 (36)
Laxatives	3 (10)	11 (36)
Mucosal protection	3 (10)	6 (20)
Calcium channel blockers	3 (10)	6 (20)
Non-steroid-drugs	3 (10)	6 (20)
Diuretics	5 (16)	10 (30)
Opioid analgesics	5 (16)	8 (26)
Anti depressants	4 (13)	7 (23)
Nitrates	4 (13)	7 (23)
Lipid lowering	10 (30)	12 (40)
Glucocorticoids	1 (3.3)	3 (10)
Antibiotics	0 (0)	2 (6.6)
Alpha blockers	0 (0)	2 (6.6)
Benzodiazepines	0 (0)	2 (6.6)
Anti platelets	2 (6.6)	4 (13)
Cardiac glycosides	3 (10)	1 (3.3)
Bisphosphonates	1 (3.3)	2 (6.6)
Thyroid medication	5 (16)	6 (20)
Diabetic meds	7 (23)	8 (26)
Iron def meds	2 (6.6)	3 (10)
Renin - aldosterone meds	0 (0)	1 (3.3)
Hormone antagonists	0 (0)	1 (3.3)
Vitamin supp	8 (26)	9 (30)
Anti coagulants	3 (10)	4 (13)
Hormone replacement	1 (3.3)	0 (0)
Anti cancer drugs	1 (3.3)	0 (0)
Anti-malarials	1 (3.3)	0 (0)
B12 vitamin	4 (13)	3 (10)
Beta blockers	7 (23)	7 (23)
H2 antagonists	7 (23)	7 (23)
Aspirin	8 (26)	8 (26)
Bronchodilators	5 (16)	5 (16)
Paracetamol	6 (20)	6 (20)
Hyperuricaemics	1 (3.3)	1 (3.3)
Anti emetics	1 (3.3)	1 (3.3)
Skin preps	4 (13)	4 (13)

Key: Different Number; Similar Number; Same Number;

More Non-Frail than Frail

It can be seen in table 5.3 that the majority of frail participants had hypertension (22, 73 %). There was also a threefold prevalence of Atrial Fibrillation in the frail cohort, with a greater prevalence of myocardial infarction (MI), aortic stenosis and oedema. Both the frail and non-frail cohorts have a high prevalence of hyperlipidaemia. However, there were no statistically significant differences between the two groups.

Table 5.3: Cardiovascular Disease

Deficit	Frail Numbers and (%)	Non-frail Numbers and (%)	Continuity Correction value	Degrees of freedom	Asymp sig <0.05
MI	6 (20)	3 (10)	0.608	1	0.436
Aortic Stenosis	6 (20)	2 (7)	1.422	1	0.233
Oedema	8 (26)	6 (20)	0.143	1	0.705
Atrial Fibrillation	9 (30)	3 (10)	2.833	1	0.092
Heart Failure	2 (7)	1 (3)	0.004	1	0.951
Coronary Heart Disease	2 (7)	0	0.553	1	0.457
Ischaemic heart disease/Angina	7 (23)	7 (23)	0.000	1	1.000
Vascular Disease	6 (20)	9 (30)	0.273	1	0.602
Hypertension	22 (73)	18 (59)	1.050	1	0.305
Hyperlipidaemia	12 (40)	14 (46)	0.022	1	0.883

Legend: for the assumption significance-to be significant the value must be 0.05 or smaller.

Table 5.4 identifies that double the number of frail people (8, 26 %) have shortness of breath between the groups compared to non-frail people (4, 13 %), whereas COPD, and asthma demonstrate little difference. Interestingly, non-frail participants (17, 56 %) had a greater history of chest infections compared to frail people (9, 30 %). The overhaul picture here is conflicting with the number of non-frail and frail people with ischaemic heart disease including angina being equal (7, 23 %) and vascular disease is higher for non-frail people (9, 30 %). The accumulated total of frail and non-frail people had shortness of breath (7, 12 %)

associated with chest infection, ischemic heart disease/angina (4, 7 %), and heart failure (1, 2 %).

Table 5.4: Respiratory Disease

Deficit	Frail Numbers and (%)	Non-frail Numbers and (%)	Continuity Correction value	Degrees of freedom	Asymp sig <0.05
Shortness of Breath	8 (26)	4 (13)	1.074	1	0.300
COPD	5 (17)	4 (13)	0.000	1	1.000
Asthma	6 (20)	6 (20)	0.000	1	1.000
Bronchitis	3 (10)	1 (3)	0.269	1	0.604
Chest Infection	9 (30)	17 (56)	2.959	1	0.085
Pneumonia	4 (13)	2 (7)	0.225	1	0.635

Table 5.5 shows that (7, 12 %) of frail and non-frail people had shortness of breath associated with chest infection, ischemic heart disease/angina (4, 7 %), and heart failure (1, 2 %).

Table 5.5: Cross tabulation by Shortness of Breath against Angina, Heart Failure and Chest Infection

Deficit	Frail and Non-frail with Shortness of Breath n (%)	Continuity Correction value	Degrees of freedom	Asymp sig <0.05
Chest Infection	7 (12 %)	0.623	1	0.430
IHD/Angina	4 (7%)	0.246	1	0.620
Heart Failure	1 (2 %)	0.000	1	1.000

It was found that constipation and diverticular disease were higher for the non-frail participants (table 5.6). Of interest, gall bladder removal was also higher in the frail (4, 13 %) compared to non-frail (1, 3 %). However, there was a greater incidence of appendectomies

and colostomies having been performed on the frail population (8, 27 %) compared to non-frail people as none within that group had undergone appendectomy or colostomy.

Colostomies were linked to treatment for Crohn’s disease and bowel cancer. The incidence of all cancers (current or in remission) excluding basal cell were restricted to frail people only.

Table 5.6: Gastrointestinal Tract (GI)

Deficit	Frail Numbers and (%)	Non-frail Numbers and (%)	Continuity Correction value	Degrees of freedom	Asymp sig <0.05
Crohn’s Disease	1 (3)	0	0.000	1	0.986
Haemorrhoids	3 (10)	2 (7)	0.002	1	0.968
Colostomy	3 (10)	0	1.478	1	0.224
Appendectomy	5 (17)	0	3.647	1	0.056
Constipation	6 (20)	10 (33)	0.639	1	0.424
Diverticular Disease	4 (13)	9 (30)	1.410	1	0.235
Hiatus Hernia	8 (26)	8 (26)	0.000	1	1.000
Gall Bladder	4 (13)	1 (3)	0.950	1	0.330

On review of the notes, none of the participants had type 1 diabetes recorded (table 5.7).

There were small differences in the numbers between frail (10, 33%) and non-frail (8, 26 %) people with type 2 diabetes. Thyroid disorders were almost equal for both groups. A single frail participant was recorded i.e. Addison’s disease (hypocortisolism).

Table 5.7: Endocrine Disorders

Deficit	Frail Numbers and (%)	Non-frail Numbers and (%)	Continuity Correction value	Degrees of freedom	Asymp sig <0.05
Diabetes type 1	0	0	0.000	1	0.986
Diabetes type 2	10 (33)	8 (26)	0.136	1	0.712
Thyroid Disorder	4 (13)	5 (17)	0.000	1	1.000
Addison’s Disease	1 (3)	0	0.000	1	0.986

Table 5.8 figures demonstrate that having a stroke does not pre-dispose an individual to becoming frail since there were equal numbers of frail and non-frail (5, 17 %) participants. Other diseases that affect cognitive ability were conflicting, two frail participants (7 %) had mild cognitive impairment / Parkinson's compared to non-frail (1, 3 %). Conversely, the non-frail participants had a greater prevalence of Alzheimer's' disease and dementia (1, 3%) as there were none recorded in the frail population.

Table 5.8: Cognitive Disabilities

Deficit	Frail Numbers and (%)	Non-frail Numbers and (%)	Continuity Correction value	Degrees of freedom	Asymp sig <0.05
CVA	5 (17)	5 (17)	0.000	1	1.000
Parkinson's Disease	2 (7)	1 (3)	0.001	1	0.976
Alzheimer's' Disease	0	1 (3)	0.000	1	1.000
Dementia	0	1 (3)	0.000	1	1.000
Mild Cognitive Impairment	2 (7)	1 (3)	0.001	1	0.976

Table 5.9 shows that the number of non-frail participants who had experienced a head injury (2, 7 %) which was greater than the frail cohort where none were recorded. The prevalence of muscular and minor limb fractures were higher for non-frail (20, 66 %) compared to the frail (12, 40 %) cohort. There was a small difference between the frail (16, 53%) and non-frail (13, 43%) group for osteoarthritis, although knee replacement are higher for the frail group (4, 13 %) than the non-frail group (1, 3 %).

Table 5.9: Muscular Skeletal

Deficit	Frail Numbers and (%)	Non-frail Numbers and (%)	Continuity Correction value	Degrees of freedom	Asymp sig <0.05
Limb Disorder	1 (3)	0	0.000	1	0.986
Head Injury	0	2 (7)	4.213	2	0.122
Sciatica	2 (7)	2 (7)	0.000	1	1.000
Osteoarthritis	16 (53)	13 (43)	0.421	1	0.516
Knee Replacement	4 (13)	1 (3)	1.034	1	0.309
Hip Replacement	5 (17)	4 (13)	0.003	1	0.956
Rheumatoid Arthritis	1 (3)	0	0.000	1	0.986
Spinal Disc	4 (13)	4 (13)	0.000	1	1.000
Muscular / Minor Limb Fractures	12 (40)	20 (66)	2.848	1	0.091
Hernia Inguinal/Umbilical	3 (10)	1 (3)	0.306	1	0.580

The prevalence of all cancers shown (table 5.10) were greater for the frail category as none were recorded in the non-frail category, except for basal cell carcinoma.

Table 5.10: Cancer

	Bladder	Lung	Prostate	Breast	Basal Cell	Bowel
Frail	1	1	1	1	4	1
Non-frail	0	0	0	0	5	0

There were comparable numbers for kidney disease within frail (7, 23 %) and non-frail (6, 20 %) population (table 5.11). Genetic degenerative disorders such as muscular dystrophy, multiple sclerosis and chronic fatigue syndrome were almost statistically significant in the frail population (17 %) as there were none recorded in the non-frail cohort. Surprisingly, the numbers of falls and giddiness observed were higher in the non-frail (17, 56 %, and 10, 33 % respectively) compared to the frail population (13, 43 %, and 6, 20 % respectively). The numbers of hearing disorders recorded were almost double for the non-frail (14, 46 %) than the frail (8, 26 %) participants. Eye disorders were equal for cataract, although the numbers of dry eye are higher in the non-frail group.

Table 5.11: Miscellaneous Health Deficits (Kidney, Balance, Eyesight, Hearing, and Genetic)

Deficit	Frail Numbers and (%)	Non-frail Numbers and (%)	Continuity Correction value	Degrees of freedom	Asymp sig <0.05
Kidney Disease (stage 3)	7 (23)	6 (20)	0.000	1	1.000
Urinary Tract Infection	11 (36)	7 (23)	0.874	1	0.350
Falls	13 (43)	17 (56)	0.421	1	0.516
Giddiness	6 (20)	10 (33)	0.639	1	0.424
Eye Disorders PCSq	Cataract = 6 Dry eye =2	Cataract = 6 Dry eye =8	Pearson 4.260	2	0.119
Hearing Disorders	8 (26)	14 (46)	1.552	1	0.213
Genetic Degenerative Disorders	5 (17)	0	3.491	1	0.062

Social Care

Table 5.12 shows that all mobility measures were found to be **statistically significant** within the frail group compared with the non-frail participant who had none, except for wheelchair use. The use of handrails (18, 60%), disabled blue badge (14, 46.6%), help with household tasks (22, 73.3%), showering aided (13, 43%) or adapted (12, 40%), help dressing (20, 66.6%), meal prep (23, 76.6%), social isolation (9, 30%) and help alarm (5, 16.6%). A total of 29 of the 30 frail participants mobility was categorised as restricted (21, 70%) or housebound (8, 26.6%).

Table 5.12: Mobility from Social Services Database

Mobility	Frail Numbers	Non-frail Numbers	Continuity Correction value	Degrees of freedom	Significance
Handrails	18	0	22.937	1	p < 0.000
Disabled Blue Badge	14	0	15.745	1	p < 0.000
Walking Stick	6	0	4.630	2	p = 0.031
Mobility (PCS)	Restricted 21 Housebound 8	Restricted 0 Housebound 0	Pearson 56.129	2	p < 0.000
Household Tasks (PCS)	22	0	Pearson 40.000	3	p < 0.000
Showering (PCS)	Aided 13 Adapted 12	Aided 0 Adapted 0	Pearson 0.055		p < 0.000
Help Dressing	20	0	27.075	1	p < 0.000
Meal Prep	23	0	34.125	1	p < 0.000
Social Isolation	9	0	8.366	1	p = 0.004
Wheelchair	3	0	1.404	1	p = 0.236
Help Alarm (PCS)	5	0	Pearson 6.667	2	p = 0.011

5.2 Qualitative Data

A single one hour semi-structured interview was conducted with a frail participant to complete phase 2 of the feasibility study.

A single semi-structured interview of a frail person (referred to as “A”) was required to assess the optimal use of recording equipment and the length of the interview process. The interview was completed and transcribed in full (Appendix C). The data were analysed in a series of initial steps (familiarisation, phenomenological coding and interpretive coding). From this analysis, the five themes were developed i.e. life purpose and support, trust and faith, coping with vacillation, acquiescence of fate and consequential incident. The themes’ will be discussed with direct quotes from the interview transcript.

Definitions are available on page xii

Life purpose and support:

The participant “A” refers to his sense of purpose in his own life and satisfaction of being trusted and respected by his community. Supporting others with their life issues empowers and enables him, providing a sense of self efficacy. There is acceptance of his need for the support of others due to his loss of mobility and appreciation of that support.

“Yeah my daughter, she understands and our friends, uh yeah they bend over backwards to help me, well to help both of us in every way”

“You get/you do get um ah...a joy, let’s put it that way, of knowing that you’ve helped them, the thing is that nobody knows about it, it’s one of those things that nobody knows about because it’s not something that you talk about”.

Trust and faith:

This passage demonstrates that “A’s” trust in the belief that faith in God is reliable. This strong feeling (“*to help the need*”) empowers him to help others privately with their difficulties in life, drawing on the understanding that remembering the religious teaching will provide guidance.

“God gave me a ministry of encouragement so that my work if you like in the church is encouraging people, encouraging them in their faith, encouraging them in their difficulties, and that helps a relationship somehow, but some people come to church with problems, burdens, they don’t tell anyone but, I’m told so I meet the need”.

Coping with vacillation:

Whilst accepting the decreasing mobility and increasing functional decline “A” copes with the confidence and knowledge that he has a home and family who will take care of him and his wife. Despite this, he struggles with moving away and burdening his daughter with his and his wife’s care. However, the thought of moving to residential home care horrifies him, causing a dilemma.

“You see I know that when I’m unable to help myself or my wife, my daughter will provide a home for us in Plymouth which again is something to be thankful for because I’ve visited so many homes, residential homes, some frighten me, some were very pleasant, but I’m not sure that’s the right thing, It’s good to be fed, looked after and but when you see pictures of um them just sitting around as it were, waiting to die, it doesn’t do anything for you does it, it doesn’t give you any hope really”.

Acquiescence of fate:

The interviewee deliberates with the acceptance of his eventual mortality with disregard for age, instead he looks at death as a process; a pre-determined event beyond his control which is similar regardless of age. Trusting in his religious beliefs helps him to accept this

eventuality and gives him comfort. The analogy highlighted within the text shows the participant trying to make sense of his transitioning between life stages. He relates his life experience to re-learning as he did as a child to cope with his daily challenges and to preserve his self identity in the face of declining health.

*“Thinking about age, I had a feeling that **between the age of 90 and 100, is exactly the same as being born and reaching the age of 10**, you start when that is and end when that is, um it’s a process, but question, why? Thing is, you can’t understand; you just have to hope and trust”.*

Consequential incident:

As a direct result of “A’s” restricted mobility, due to the physical deficit following the pulled muscle, he now is unable to walk without a walking stick. This has had a direct effect on his ability to contribute to helping his wife with activities of daily living. He shows appreciation for his wife’s care for him, even though he feels frustrated not being able to do more.

“I suppose it was in the late 80’s/1990 when my back went because I used to help to get breakfast, make the teas, wash up, loads of stuff like that, but when my back went I no longer could do things without having the stick in my hand and uh it wasn’t easy so my wife has had to tend me and she’s done well”.

The participant referred to his frailty as “*restricted*” with an emphasis on movement “*everything I do now is slow, my wife insists that it’s not slow, it’s dead slow um because I don’t do anything unless I plan it carefully*”, reflecting the feeling of worsening mobility rather than in terms of declining health, increased morbidity and disease. This emphasises the disconnect between health and social care professionals label of frailty and the way “A” defines himself consistent with the finding by Chater (2002).

5.2 Reflection on the Interpretive Process (refer to Appendix F for research diary)

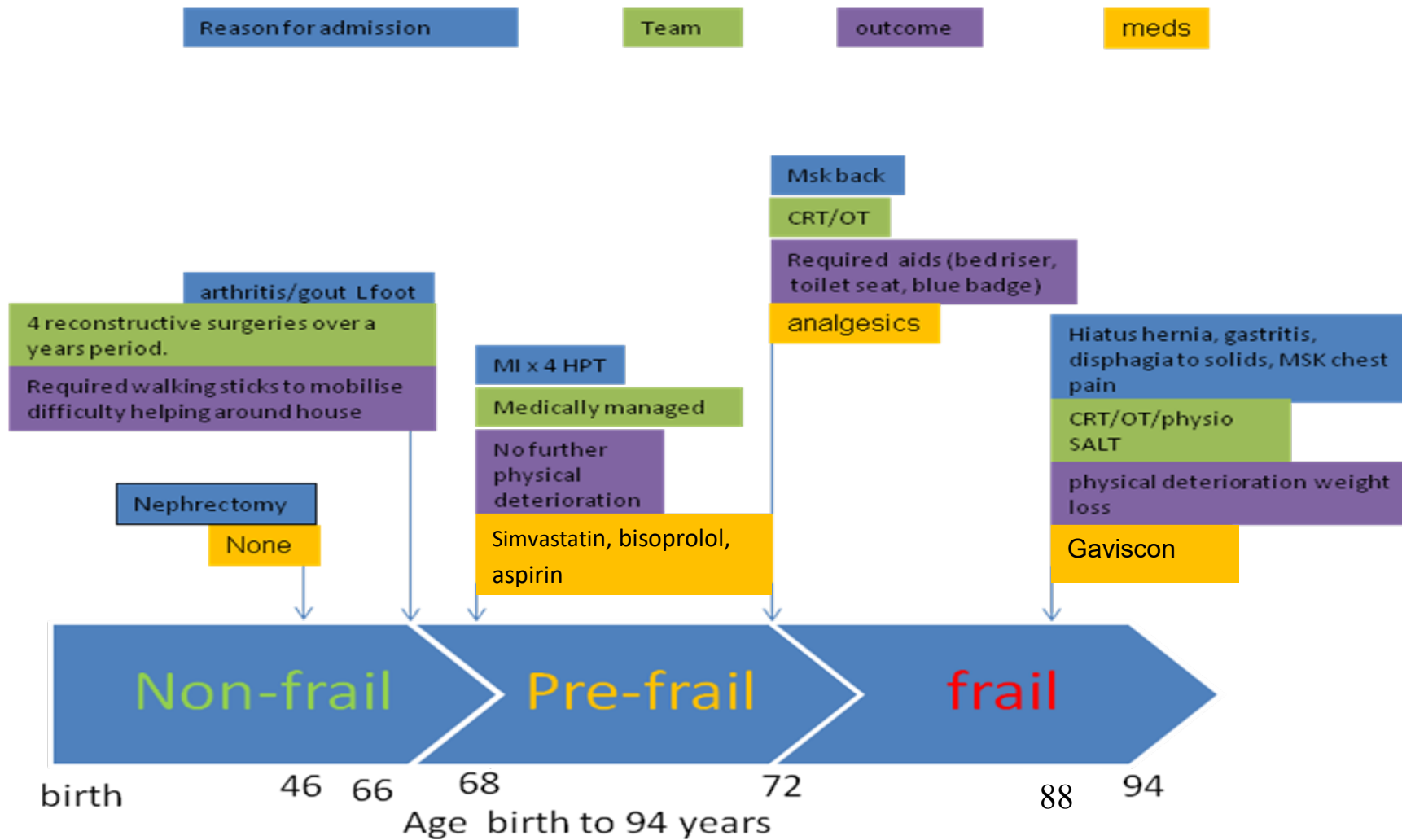
Through reflecting on my presuppositions I realised that this activity helps me to evaluate whether I have interpreted what was said, not what I thought I would hear: therefore, reflecting upon what I previously believed has broadened my approach and grounded the interpretation in the data. At the beginning of the analysis I realised that I was expecting to find that social isolation would be a theme. I believed that living with chronic and debilitating illness would produce the reaction of dependence and perceived burden on others (carers). This was due to my only experience of what I understood as frailty and assumed as being frail. This however, was a misinterpretation and lack of understanding about frailty and coping. I began to realise that this may be true for some individuals but as a unique person A's lived experience was one of belief and understanding that community and kinship are formidable allies. I have indeed been surprised that I have found the power that spiritual faith can provide and the real support it provides. I have no religious faith, although I have an unorthodox spirituality, I don't believe in God, Jesus or any other such entity. I have reflected on the relationships that I have and it has made me appreciate the underlying support that I take for granted. I now understand the faith my wife has, what she gains from it and why she attends church as often as possible.

5.3 Life Course

The life course (fig 5.1) depicts the events from birth to age 94 of the interview participant "A". The information depicted was assembled from both the health and social care paper and electronic information. The non-frail, pre-frail and frail notation was based on the screening tool developed by Fried and colleagues (2001), and will be used in this instance for illustration purposes only.

From birth there were no serious childhood illnesses found. Indeed, the first documented visit to hospital culminated in a nephrectomy at the age of 46 years without complication or adverse health outcome. Arthritis and gout can be seen to cause “A” difficulties requiring four surgical reconstructive surgeries during the following year (slow gait speed). This caused “A” to require using a walking stick and limited his ability to perform IADL (household management tasks). Within the following two years of these events “A” suffered Myocardial Infarction (MI) which was subsequently medically managed with medication (reduced physical activity (pre-frail)). There followed a period of recovery until the age of 72 when “A” pulled a muscle in his back (muscle weakness (frail)). This required the intervention of the Gwent frailty service Community Resource Team (CRT) and social services to install bed/toilet seat raisers. An application for the Welsh Government Blue Badge was successfully granted. “A” frailty status continued to deteriorate until the final Criteria for full blown frailty was met, weight loss, dysphagia to solids requiring the services of the CRT, Speech and Language Therapy (SaLT) and physiotherapy aged 88 years.

Figure 5.1 – Life Course Illustration of Clustering Effect



The intention of including a life course illustration was to investigate the usefulness of the data when presented in a graphical format. It is possible that constructing a life course timeline for all non-frail and frail people in a larger study could potentially show patterns of an increased risk of adverse events at points in time. This could enable service planners to target specific diseases and age groups for preventative intervention within a community setting.

5.4 Triangulation of Quantitative and Qualitative Results

Triangulation was achieved by tabulating evidence gained from documented social care information, medical histories and the knowledge gained from the single ideographic case studies interview. The meta matrix method described by Yin (2003) was used for case analysis. Consequential incident is analogous with Blue Badge, household tasks, help dressing and meal preparation.

Table 13: Triangulation of Results

QUALITATIVE						
Q U A N T I T A T I V E	Items Highlighted from the Results Tables	Life Purpose and Support	Trust and Faith	Coping with Vacillation	Acquiescence of Fate	Consequential Incident
	Handrails					
	Disabled Blue Badge					✓
	Household Tasks					✓
	Help Dressing					✓
	Meal Prep					✓
	Social Isolation					
	Wheelchair					
	Walking Stick					
	Mobility					✓
	Showering					✓
	Key Safe/Help Alarm					

The feasibility study was conducted to determine if the themes identified would be relevant for a larger study and yield plausible / generalisable results. Themes are not populated primarily due to the small sample size used. However, it is anticipated that all themes would become populated following the analysis of the larger full study.

Chapter Six - Discussion

6.0 Introduction

The majority of this chapter will be dedicated to discussing the physical, social and cognitive factors of frailty. The discussion presented in this chapter is divided into three sections.

Section One - the quantitative data (case control) of non-frail and frail people's health and social care paper and electronic patient files over the age of 18 years.

Section Two - the qualitative data Interpretive Phenomenological Analysis (IPA) of a single ideographic case study interview.

- Section Three - draws together the previous two sections to integrate the data forming a more holistic view of the physical, social and cognitive factors of frailty.

Previous studies have predominantly used prospective cohort studies database searches of older people to investigate the health determinants of frailty. These studies are too numerous to reference here, however, there are comprehensive tables (2.0, 2.1 and 2.2) available that includes these details within chapter two. A study by Sanders et al (2011) found that frailty was associated with diagnosed depression, stroke, cognitive impairment, arthritis, and pulmonary disease but not coronary heart disease, diabetes or kidney disease.

Throughout the discussion references have been provided linking to the body of existing literature with the inclusion of direct quotes from the participant (*in italics*), and examples of empirical data integrated into the text where appropriate.

6.1 Section One – Quantitative

6.1.1 Obesity

BMI can be used to identify relative levels of obesity, and for the purpose of this study they are used interchangeably (Must & Anderson, 2006). Obesity has previously been associated with the frailty syndrome in women (Blaum et al, 2005). However, frailty assessment tools do not generally include BMI as a factor. A number of health problems have been mooted as a direct cause / consequences of its pathophysiology, such as; cardiovascular disease, pulmonary disease, hypertension, type 2 diabetes, some cancers, and osteoarthritis, and it is concordant with shortening of life expectancy due to its patho-genetic consequences (Bray, 2004). In this study, a difference in the Body Mass Index (BMI kg/m²) was found between the frail 30.37 compared with non-frail 26.88. This demonstrates accordance with the work of Hubbard et al (2010), who found that non-frail people had a BMI between 25 and 29.9 and frail people's BMI was > 30. This evidence confirms that this is a factor to be included within any future frailty assessment tool development. The difference between non-frail and frail BMI of 3.49 (average) would suggest a greater corresponding number of participants with, for example, type 2 diabetes (frail 10, 33% and non-frail 8, 26%). Although there is an increasing trend in the frail cohort it is not significant: this may be due to the small sample size.

Obesity is a known risk factor for cardiovascular and respiratory diseases. In this study it was found that frail people had a greater prevalence of cardiovascular disease than the non-frail group. Heart failure is seen often in conjunction with AF, aortic stenosis (Lilly, 2011pp. 248-249), and (due to the pathophysiological mechanisms) is associated with signs and symptoms of increased shortness of breath and peripheral oedema which indicates worsening / increasing disease severity (American Heart Association and New York Heart Association

(2012) (AHA-NHYA, 2012). However, cardiovascular disease was prevalent in both cohorts. This suggests that there is a need to delineate and differentiate between classes of disease severity to increase sensitivity and specificity enabling stratification of an individual's frailty levels in a larger cohort study.

6.1.2 Medication

The use in the number of current, repeat different family / types of medication prescribed for the non-frail cohort was 6.7 average opposed to 9.87 average in the frail cohort. This increased use of medication in the frail cohort suggests that it is reasonable to assume a dose response effect (Rockwood et al, 2004) with increasing health deficits. Many existing frailty indices include repeat medication use of six or more as a deficit for frailty (Song et al, 2010; Rockwood et al, 2004). There is a good rationale for including information on the use of medications. However, this is not a true deficit. These indices fail to differentiate between the class/type of medication which would serve as a better matrix for determining frailty status. For example; Co-codomol an opioid analgesic was the most widely used and prescribed to frail (8, 26%) and non-frail (5, 16%) to alleviate pain associated with osteoarthritis where non-frail (20, 66 %) were more affected compared to frail (12, 40%) people. However, the common known side effect of opioid analgesics are constipation and possibly leading to diverticular disease (frail 4, 13%: non-frail 9, 30%), which then require further medications to be given to counteract these, in this case 11 frail people 36% opposed to 3 non-frail 10% were prescribed laxatives. Thus, increasing the number of repeat medications registered and promoting subsequent pseudo-frailty status. The conditions that creates the need for specific medications, such as; cancer and muscular dystrophy, seem to better delineate frailty status.

Previously constructed frailty indices have included diseases such as hypertension and hyperlipidaemia as deficits to be counted towards frailty accumulation scores

(Kamaruzzaman et al, 2010; Song et al, 2010; Rockwood et al, 2004). The statistics (table 5.3) imply that it is common in both groups and therefore, should be viewed with caution as it is unclear whether this is a differentiating factor for frailty. Furthermore, Angiotensin-Converting-Enzyme (ACE) inhibitors often used in conjunction with calcium channel blockers a frontline medication for treating hypertension was prescribed to frail (11, 36%; 6, 20%) and non-frail (3, 10%; 3, 10%). It is debatable whether these conditions should be included within frailty indices / assessment tools if these conditions are appropriately medically managed to within acceptable limits. Therefore, appropriate medical management negates their deleterious effect on the physiological systems maintaining equilibrium and avoiding frailty. Therefore, better and more appropriate use of prescribed medications would counteract the deleterious effect of physiological, psycho-social issues and enable better quality of life for older people into the waning years of their lives.

The reported number of chest infections and shortness of breath are conflicting, because it would be expected that both of these conditions would be more prevalent in the frail group. However, the incidence of chest infection was higher in the non-frail group. The use of antibiotics that are commonly used to treat such infections were not readily available and included within the repeat current medications listed on the GP electronic database. However, two of the frail cohort was recorded as taking antibiotics (penicillin) at the time of data collection. The omission of the number of occasions that antibiotics were prescribed specifically for chest infections in a certain period of time precludes the ability to differentiate between exacerbation, isolated, recurrent or prolonged incidence which would indicate worsening of the underlying condition.

6.1.3 Stress

There is increasing evidence that cancers are linked to stress, and the increasing levels of chronic stress molecular markers, such as; proinflammatory Cytokine Interleukin-6 (IL-6), Insulin-Like Growth Factor (IGF-1) and Chemokine Ligand 10 (CXCL10): although the relationship unclear at present (Hayes, 2000 p406; Kumar Pal et al, 2010).

These proinflammatory cytokines, particularly IL6 released from fat cells also characterise obesity (Bray, 2004). Cancer by its insidious nature will reduce functional reserve in any person and it is reasonable to consider people diagnosed as frail. The issue here is to determine if a person's fitness or frailty status to undergo treatment successfully and survive. It is well accepted that cancer treatments by their toxic nature deplete the functional reserve (Kumar Pal et al, 2010; Retornaz et al, 2008), and this may explain the development of frailty earlier in those that have received chemotherapy and survived.

This study showed that people suffering from genetic conditions such as Addison's disease which is an autoimmune disease where the adrenal cortex is destroyed, and it is often diagnosed following a life stressor (Abdel-Motleb, 2012). It is logical that people suffering Multiple Sclerosis (MS) and Muscular Dystrophy (MD) would become frail early within the life course due to the increased level of physiological stress associated with degenerative diseases. This study found that all of the participants with degenerative genetic diseases were classed as frail.

The mechanism for care here are within the realms of social care services due to the multifactoral needs of the person to live independently. All participants with genetic degenerative diseases were referred by the local social services department. These patients were managed almost exclusively within large specialist tertiary centres in conjunction with their General Practitioner (GP).

6.1.4 Mobility

Non-frail people appear more prone to head injuries (2, 6.6%) than frail people (0,0%). This may, in part, be due to increased independence / mobility and the statistical likelihood of encountering hazards which cause trips and falls within and outside the home environment. The study by Ní Mhaoláin et al (2012) of the fear of falling of fallers could offer another explanation as to why frail people avoid venturing beyond their controlled zone reducing the chance of falling. This evidence helps explain why 60% (n=20) of the non-frail had experienced muscular / minor limb fractures compared with 40% (n=12) in the frail group. A higher incidence of knee replacements in the frail (4, 13%) cohort may be as a result of greater severity, pain and limiting mobility factors than in the non-frail (1, 3.3%) due to osteoarthritis (16, 53%; 13, 43% respectively) and rheumatoid arthritis (1, 3.3%; 0, 0% respectively). There is consequently a need for further investigation.

The implications of the figures with regard to proprioception (vision, balance), i.e. eye (cataract equal for both cohorts n = 6, 19.6%), and hearing (frail 6, 20%; non-frail 14, 46%) disorders with the associated, expected increase in the number of falls and giddy episodes (frail 6, 20%; non-frail 10, 33%). This does not correspond to frail people only and are surprisingly higher within the non-frail population. Again these deficits are included within frailty indices (Kamaruzzaman et al, 2010; Song et al, 2010; Rockwood et al, 2004) although the variety of frailty scales available have rarely been tested for reliability and validity using suggested guidelines (Boullion et al, 2013; Rockwood et al, 2005). The question here is: under the definition by Rockwood & Mitnitski (2011), are these true deficits? Do they have an adverse outcome that covers several organ systems, and do these factors need to be included for deficit accumulation scores to predict or assess frailty? Clegg et al (2013) claim that falls are a result of stressor events in more severe frailty in conjunction with decline in

other vital postural systems (vision, balance and strength). However, this does not explain the stated higher numbers and Percentage Difference (PD) of non-frail compared with frail participants suffering hearing (PD = 13%), eye (PD = 0%), giddiness (PD = 13%), and falls (PD = 13%) compared to the frail people. These figures show that the PD of non-frail (13%) for falling was the same for giddiness and hearing but not eye disorders. A possible explanation is that the psychological fear of falling of fallers prevents them from attempting their normal activities expediting them to further immobility due to muscle weakness into frailty.

The social care notes provided evidence that all mobility measures were significantly higher within the frail group compared with the non-frail group, except for wheelchair use. These statistics correspond to the findings of Theou and colleagues' (2012) that the first ADL's to become impaired with increasing frailty were bathing, managing medication and cooking.

It was found that all of the frail participants had applied for a blue badge parking permit on average seven years prior to social service assessment for frailty. Unfortunately, there is no assessment by any agency to gain the blue disability badge. The average time before requiring social service assessment for frail participants was seven years post blue badge. Establishing that frail participants only have applied and gained a blue disability badge status has interesting possibilities. Disability blue badge status requires annual application for renewal this would be an ideal opportunity to have a formal assessment of needs at this stage. However, no formal assessment is conducted by any organisation or agency at any point at present. The possibility of assessing people as part of the blue badge application / renewal would be of great interest for early risk identification and subsequent annual indication of decreased functional status and increased dependency.

Previous literature has demonstrated that disability, co morbidity and mobility are different concepts within the context to frailty and do not correlate (Walston et al, 2006; Conroy, 2009; Gill et al, 2011). However, the social care results suggest that despite disease processes preceding frailty, impaired physical functional status was the strongest predictor. Furthermore, Takata et al (2013) stated that assessing IADL (food preparation, vacuuming, and other associated household tasks) disability was the most powerful measure to establish increased frailty status. The extent to which the disease process compromises a person's functional status appears to better categorise frailty from these results: consistent with the conclusion by Gealey (1997). However, further investigation into the social care aspects should be undertaken to strengthen this evidence.

6.1.5 Disease Severity and Frailty

The dynamic model currently adopted to explain frailty implies that a person has assets on one side and deficits on the other. The assets help a person maintain independence in the community (health, functional capacity and positive attitude) and the deficits threaten independence (chronic disease, disability and dependence on others) (Brocklehurst et al, 1985; Rockwood et al, 1994). The problem is that the dynamic model does not consider disease severity or successful treatment care plans, just an arbitrary count on each side. The concept of introducing severity scores into frailty screening / assessment tools has some possible advantages to overcome this simplistic view. However, accurate determination of a person's underlying chronic disease relies on accurate, detailed prior assessment by an expert physician due to the complexity of the grading criteria, specialised training and skills required. For example, heart failure has been classified by the American Heart Association and New York Heart Association (2012) (AHA-NYHA, 2011; Lilly, 2011p 233) is shown in table 6 and 6.1:

Table 6 – NYHA functional classification of chronic heart failure

Classification	Functional capacity
I	Patient with cardiac disease with no limitation on ordinary physical activity, no undue fatigue, palpitation, dyspnea or angina pain
II	Patient with cardiac disease resulting in slight limitation of physical activity. Comfortable at rest, ordinary physical activity causes fatigue, palpitation, dyspnea or angina pain
III	Patient with cardiac disease with marked limitation of physical activity. Comfortable at rest. Less than ordinary activity causes fatigue, palpitation, dyspnea or angina pain
IV	Patient with cardiac disease resulting in inability to carry on any physical activity, without discomfort. Heart failure or angina pain present even at rest, any physical activity increases discomfort

Table 6.1- NYHA objective assessment of chronic heart failure

Classification	Objective assessment
A	No objective evidence of CVD, no symptoms/limitations on ordinary activity
B	Objective evidence of minimal CVD, mild symptoms and slight limitation during ordinary activity, comfortable at rest
C	Objective evidence of moderately severe CVD. Marked limitation in activity due to symptoms, even during less than ordinary activity. Comfortable at rest
D	Objective evidence of severe CVD, severe limitation. Symptoms at rest

Examples of the classification in use are below for clarification: source – (AHA-NYHA, 2012; Lilly, 2011p 233).

A patient present with no symptoms, since hypertensive disease caused by aortic valve abnormalities can be asymptomatic, however, has a large pressure gradient across the aortic valve or severe obstruction of the left main coronary artery is classified functional capacity I, objective assessment D. Conversely, a patient with severe angina syndrome with angiographically normal coronary arteries is classified functional capacity IV, objective assessment A (AHA-NYHA, 2012). This illustrates the complexity of any single assessment

and the accuracy required to establish functional severity / limitation essential for prognosis and suitability for rehabilitation. Considering disease severity for even a single deficit such as heart failure shows that a person can be classed as frail which negates the effect of any other minor deficit. There is however, a cascade of apparent physiological signs associated with disease progression such as shortness of breath, pitting oedema, and in the latter stages of heart failure abdominal oedema (Lilly, 2011). The evidence suggests that shortness of breath is of little use since it may be evident in any individual particularly if they are unfit. The dose response effect observed by Rockwood and colleagues (2004) has been drawn from a data base search which has not differentiated between frail and non-frail. The prospective study simply used data from a homogenous cohort of people over 65 years of age. It appears predictive of increasing morbidity and decreased mobility but lacks sensitivity and specificity to predict any particular deficit related to increased frailty risk making the relative level indicated of little prognostic use. This has been demonstrated by the search by the Gwent Frailty Service, researchers in the field of frailty, and Geriatricians to construct an accurate reproducible screening / risk tool.

6.1.6 Multidisciplinary Working and Inter-Sectoral Collaboration

There has been a recognised need and renewed call to establish an integrated multimodal, coordinated multi-disciplinary and multiagency approach, delivered in an integrated health and social care system (EIPAHA, 2012). The Gwent Frailty Service (GFS) has established an integrated health and social care service including rehabilitation / physiotherapy, falls prevention, and community healthcare teams. Health professionals are thought to be a credible source of health advice for patients and have a pivotal role to play (Graham et al, 2005). During the past many attempts to introduce multidisciplinary teamwork in primary

care have failed, partly due to the fact that GPs did not participate in the implementation of the method (Hansson et al, 2008).

Masterson (2007) suggests that one of the barriers to successful multidisciplinary teamwork historically has been the lack of joint record keeping, stating that most of the professionals involved maintained their own records. The GFS has access to both health and social care electronic database records although they are only accessible separately via “Vision” and “SWIFT” software applications that are incompatible for integrated service use. However, it has been recognised that many of the systems and data currently in use require significant development to meet future needs and to support the development of the outcome measures (Joint Strategic Needs Assessment Long Term Conditions) (JSNALTC, 2013).

Sheehan et al (2007) observed that inter-professional teams were characterised by a collaborative working approach using inclusive language and continually sharing information, however multidisciplinary teams worked in parallel, drawing information from one another without common understanding of issues that could influence intervention. Atwal & Caldwell (2005) found key differences between the interactions of different professionals, suggesting that Consultants tended to have the greater rates of asking for orientation and giving opinions, whereas Nurses, physiotherapists, occupational therapists and social workers rarely gave opinions or orientation. Although this aspect was not included as an objective it was incidentally evidenced by the lack of detailed or missing information stored on the databases by doctors, nurses and allied health professionals. The health care notes showed that doctors had a tendency to document only basic information with regard to life course history concentrating on the health issue before them. History taking and documentation was more completely and accurate performed by social services, specialist trained advanced nurse practitioners and those with specialism. When older people have been

discharged from hospital back to the community social work services have historically been most effective in reducing the level of unmet needs in the areas of nursing, medication, and physical therapy. Therefore, social service provision may be more effective dealing with complexity (Oktay et al, 1992).

6.2 Section Two – Qualitative

Previous qualitative studies are sparse and limited in their scope to informing health and social care organisations of the meaning, and lived experience of frailty. Nicholson et al (2012) explored support for living and dying in the community. Grenier (2006) investigated the lived experience of frail older women and their distinction with the professional construct of frailty. Chater (2002) described lived experience of frail older people and the language of ageing used by nurses and policy makers. Stephenson et al (1999) studied the concept of independence. Nicholson et al (2013) sought to understand the experiences of to enhance the evidence base for person centred care. Puts et al (2009) theorised the meaning of frailty for older people.

6.2.1 Identity, Stress and Coping

The psychological, cognitive aspects of frailty reflecting this has been termed by Fillit & Butler, 2009 as the “*Frailty identity crisis*”. Although the term is usually applied to individuals within other age categories it seems reasonable to consider how increasing frailty might relate to identity since it relates to psychological wellbeing, and can be applicable to older people. The concept can be adaptive or maladaptive and manifests during transitioning through the frailty continuum. People who have successfully managed identity achievement experience less stress in challenging situations and have durable self esteem (Marcia, 1966). Andrew et al (2012) studied this link between frailty and cognitive effective processes to

empirically test the concept of and establish connections to the wellbeing of frail older people. The authors concluded that frailty was associated with low levels of wellbeing impaired by the identity crisis which could play an important role in defining subjective health in frail older people (Andrew et al, 2012).

The theme of Acquiescence of fate was identified during the analysis, the passage demonstrates that “A” is identifying himself in some way to when he was in his first decade: making sense of his evolving identity; *“between the age of 90 and 100, is exactly the same as being born and reaching the age of 10”*.

People who perceive that they are faced with predictable inescapable exposure to stressful shock (inability over expected control) can develop learned helplessness (Gross, 2009 p153). This manifests as an inability to thrive, through learning they have no agency, giving up and resigning themselves to their fate (Toates, 2001 p354). Similarities can be drawn from geriatric failure to thrive which shows diminished capacity for life and outlines a process of functional decline (giving up) that is often difficult to explain (Townsend-Ricchiccioli & Tanner-Sandford, 2009; Palmer, 1990). The identity crisis, learned helplessness and the locus of control are closely linked (Hayes, 2000).

The locus of control evolved following the seminal work of Selye (1955). They are coping strategies that offers a better chance of recovery from disabling health condition to minimise the harmful effects of long term stress in everyday life (Gross, 2009; Hayes, 2000; Partridge & Johnson, 1989). The locus of control can be either intrinsic (belief in control), or extrinsic (victims of circumstance) (Hayes, 2000 p407). People with an intrinsic locus of control are more likely to take charge and influence their lives, opposed to people with extrinsic locus of control who take a passive view of their lives (Gross, 2009). The locus of control has been explained by personality theories, which are dependent on the distribution along a continuum

between extrovert and introvert or, those who see control within themselves and those who see outside themselves (Rogers & Horrocks, 2010 p 101).

6.2.2 Self Efficacy

Bandura (1989) developed the theory of self efficacy which in essence determines how and whether people feel in control of their lives or the maintenance of self esteem and perceived control: expectations of capacity to succeed (Azizli et al, 2015; Bosmans et al, 2015; Chen, 2015; Hogg & Vaughan, 2008 p164; Hayes, 2000 p218). The importance of self efficacy enables people to believe they are capable of doing tasks, i.e. if they perceive that they are unable to do the task they would not try. The concept of self efficacy was clearly demonstrated when “A” was asked how he coped with his health problems:

“...we managed through somehow[laughs], um you take it as it comes, accept them and then work out how you can get over it and it’s amazing how um your mind can guide you to ur the way to do things um when its hurts to do things” ln 86-9.

This is an excellent example of his maintenance of perceived control and self esteem.

These findings support the conclusions of Stephenson et al (1999) of social support, routines and continuity of lifestyle promotes autonomy and independence influencing the lives of frail people but not equating to being frail, and can be present when a person is frail. Nicholson et al (2012) in her work on work of living and dying during the ageing process also concluded that efforts to develop and sustain connections to the physical environment, routines and social network helped maintain continuity with present.

6.3 Section Three – Quantitative and Qualitative

6.3.1 Stress Theory Applied to Frailty

Cesari, Vellas & Gambassi (2013) proposed the concept of stress in the dynamism of the ageing process and its mechanisms. The authors state that stress as senescence is not only a

theoretical concept, but also a scenario with specific physiopathological background. Perceived stress has been linked to a person's locus of control, or their ability to withstand adverse emotional / physical challenges. Therefore, personality type plays an important role in identifying people with an increased likelihood of premature frailty. Frailty as stated previously represents '*limited functional reserve*' or '*failure to integrate responses in the face of stress*' where a catastrophic loss of function is the outcome following a minor insult (Bergman et al, 2007; Rockwood & Hubbard, 2004). Indeed, the addition of stress in this representation has been offered as the single factor that differentiates frailty from Geriatric Failure to Thrive (GFTT) (Woolley, 2004; Fried & Waltson, 1998; Verdery, 1997). However, there are no studies available from either the perspective of frailty or GFTT to show that stress is the delineating factor between the two concepts. Available studies have thus far concentrated efforts on molecular proinflammatory markers to measure chronic physiological reaction to stress which showed a correlation with increased frailty and rising circulating levels of C-Reactive Protein (CRP) and Cytokine Interleukin-6 (IL-6) with an elevated BMI into the obese and morbidly obese range (Hubbard et al, 2008). Singh & Newman (2011) found that IL-6 particularly may be a common cause of multiple age related conditions or a common pathway by which disease leads to disability and adverse outcomes in older people.

This confusion is compounded by the lack of a definition of the term '*stress*' used by the authors, as it means many things to many people. In fact the general public would describe stress in terms of pressure, tension, unpleasant external forces or an emotional response (Ogden, 2012 p289). There are also many different definitions put forward by psychologists, one being:

*"....a state of psychological and physical tension produced, according to the **transactional model**, when there is a mismatch between the perceived demands of a situation (stressor) and the individual's perceived ability to cope. The consequent*

state of tension can be adaptive (eustress) or maladaptive (distress).” (Statt, 2003; p150).

There is, however, some congruence between expert and lay perspectives within the definitions chosen. The concept of stress itself involves biochemical, physiological, behavioural and psychological changes (Ogden, 2012 p289). There are two components:

1. The physical which involves direct material or bodily challenge (Sarafino, 2006).
2. Psychological which involves how individuals perceive circumstances in their lives (Sarafino, 2006).

These two components have been successfully captured by using the mixed method design (case control, and IPA).

During a person’s life it is impossible to avoid situations or experiences that would not cause stress, and so everyone has or will experience stress at some stage, examples concordant with F-frailty are: chronic/worsening health conditions requiring hospital appointments/admission. It is known that a learned capacity for control in the face of stressors when young gives rise to adult resilience, lacking learned capacity as a child is however, detrimental in later life (Toates, 2001; 2007). These factors and the loss of brain receptors (amongst others) during older age can pre-dispose people to detrimental stress (Toates, 2007 p337). It has been demonstrated earlier that “A” has learned to cope with his situation; the early life learned capacity was shown:

“I suppose one would call it the slums of London, um very poor family, seven altogether living in two up and two down, how we did it I do not know, but we never went without. I didn’t know my father very much ‘cause he was hospitalised when I was very young, and he died when I was very young” In 4-7.

Stress has been extensively studied for many decades and so psychologists have historically offered three differing models to gain insight into the effects that stress has on the body, they are:

1. Cannon's (1932) fight or flight (which described the role of adrenaline).
2. Selye's (1974) General Adaptation Syndrome (GAS) also known as the pituitary adrenal stress syndrome (which describes the role of adrenocortical responses).
3. Holmes and Rahe (1967) life events theory (stress and stress related changes as a response to life experiences).

Cannon's (1932) theory described an immediate response to a stressful or anxiety provoking event which produces a high level of physiological arousal described as fight or flight (Hayes, 2000). In modern society these threats are rarely responded to by physical action and are often continuous and non-specific, the fight or flight response is costly in terms of energy and the body cannot sustain this reaction for long.

Selye (1955; 1974) accidentally discovered a triad of responses commonly followed the unpleasant injecting procedures used while conducting animal research into the sex hormones. These responses were enlarged adrenal glands, the thymus gland shrank and ulcers developed in the digestive tract (Morrison & Bennett. 2006). From the quantitative results it can be seen that people suffering frailty are more prone to appendectomy and gallbladder removal compared to non-frail people (table 5.5). Conversely, the incidence of Diverticular disease and constipation in the non-frail cohort were greater compared to the frail cohort. With unmanaged, repeated or prolonged exposure to a stressor perpetuates the organism under study to suffer increased tissue damage, susceptibility to disease, and in extreme cases death (Gross & Mcilveen, 1997).

For over forty years Selye (1974) followed up his findings using aversive stimuli such as heat, cold, exercise and concluded that there were universal and non-specific responses to stress. In other words, the same physiological responses followed a range of stimuli, these

being pleasant or unpleasant. Selye's observations based on the response to stress was seen to be an innate drive of living organisms to maintain homeostasis and he proposed that it did so in a three stage process (Morrison & Bennett, 2006). Selye (1974) concluded that the fight or flight response was the first stage in response to stress and produced a model known as the General Adaptation Syndrome (GAS).

The first stage is the alarm stage which involves the fight or flight reaction described by Cannon, is an immediate response which prepares the body for action by mobilising the body's resources by activating the sympathetic division of the Autonomic Nervous System (ANS). Selye's (1974) found that this stage (shock phase) which also corresponds to the first component of stress (actual or perceived direct material or bodily challenge) producing an initial momentary drop in blood pressure then a rapid rise above normal (counter shock phase). This results in the activation of the hypothalamus to signal the pituitary to release adrenocorticotrophic hormone (ACTH) which triggers the adrenal gland to release epinephrine, norepinephrine and cortisol (the stress hormones) into the bloodstream (Sarafino, 2006). The effects are accelerated heart rate and blood pressure for strenuous activity, glucose is released from the liver for energy, accelerated respiration to supply more oxygen to the muscles, tensing of the muscles for adaptive response, an increase in blood coaguability so that clotting is quicker if injury occurs, perspiration to cool the body and curtailing of digestion to provide greater blood availability to muscles and the brain (Gross & Mcilveen, 1997). This mechanism is evident particularly within the older population suffering, for example acute Myocardial Infarction (MI), where the patient presents with fatigue, dyspnoea, faintness or syncope and ANS activation (pallor, sweating and hypotension) (Van de Werf et al, 2003), followed by increased heart rate and blood pressure secondary to sympathoadrenal discharge (Sorita et al, 2014). The Welsh Health Survey

(WHS, 2012) showed that 62 % of the population over the age of 65 years reported being treated for hypertension and a heart condition, 55 % suffering two or more illnesses, and 65 % limited by a health problem; this encapsulates the notion of acute versus chronic frailty. Frailty has previously been shown to be a risk factor for incident cardiovascular disease with increased mortality rates, and vice versa in prevalent cardiovascular disease (Afilalo, 2012). The number of people in the frail (20 %) cohort having suffered an MI was twice as many as the non-frail (10 %). The interviewee “A” referred to his MI in the following passage:

“...after that when I was um, 68 I had a heart attack which turned out to be a, a vein that ur erupted um and died um but was of no consequence so/ but again after 4 years/5 years of hospital treatment back and forwards, um they eventually discovered that what my heart needed was uh stronger muscles and so they put me on a tablet and uh its a marvellous/its worked and it's now uh and when they take my blood pressure it's excellent and at my age they just can't believe it”.

An acutely ill patient can be defined as: *'a patient suffering from a condition of rapid onset which is often accompanied by severe symptoms'* (Gale, 2008). It can then be argued that these incidences of life threatening events of this type can be termed *“acute frailty”* under certain circumstances. McDermid and colleagues (2011) proposed that this develops in some critically ill patient due to the acute disease rapidly overwhelming the functional reserve and that it is independent of age and illness severity. This view is in contrast to the status quo of what has been termed *“chronic frailty”* where the disease processes deplete the functional reserve over a longitudinal period of time. Weiss (2011) defines chronic frailty as *'the accumulation of pathologic processes that are evident and for which there is substantial agreement about definition: chronic diseases'* (Weiss, 2011). Indeed, according to Weiss (2011) an understanding of the presence or absence of frailty and chronic disease constitutes a basic representation of physiologic reserve. This is evident (chronic frailty) within the “A's” account of visiting the hospital for 4/5 years before appropriate medical management plan was implemented reducing or removing the physiological stressor.

If the stressor continues the physiological reaction enters the second stage of resistance, which involves coping and attempts to reverse the effects of the alarm stage (Gross, 2009 p205; Ogden, 2012). During this stage, where the body attempts to adapt to the stressor physiological arousal remains higher than normal and the body replenishes the hormones released by the adrenal gland (Sarafino, 2006). Even though there is this continuous physiological arousal the organism shows few outward signs of stress, but the ability to resist new stressors may become impaired due to the action of corticosteroids which aggravates the natural inflammatory reaction and the immune system's reaction to infection and cell repair which have a high turnover is inhibited (Gross & Mcilveen, 1997). Although there appears to be no outward signs of immune deficiency the body's resources are depleted because they are used faster than they are replaced. Previous studies have predictably produced results in the development of distinct diseases such as atherosclerosis and hypertension in primates and mice, confirming the deleterious effect of long term stress on a body (Henry, 1977). Furthermore, Ischaemic stroke and Coronary Heart Disease (CHD) (table 5.1) share risk factors and pathogenic process: atherosclerosis and thrombosis (Tanne et al, 2002). This mechanism may help to explain the concept of Ph-frailty portrayed as a state of intact physical and cognitive function with physiological vulnerability and may correspond to the perceived state of pre-frailty (Whitson et al, 2007).

Prolongation of the physiological arousal produced by repeated or additional long term stress initiates the third stage of exhaustion which occurs when the body's immune system and energy reserves are depleted until resistance is very limited (Gross, 2009 p205; Sarafino, 2006). As a result the adrenal gland enlarges and exhausts their stores of hormone, tissues begin to show signs of damage, muscle fatigue and the endocrine gland, kidneys and other internal organs are damaged. Selye (1974) terms this as the disease of adaptation which

include ulcers and coronary heart disease (Gross & Mcilveen, 1997). This reaction to long term stressors and their physiological toll on homeostasis could be termed chronic frailty. Further investigation may explain why gall bladder removal was higher in the frail population and the high incidence of appendectomies and colostomies compared to non-frail people, as none had undergone appendectomy or colostomy. The phenotype of frailty proposed by Fried and colleagues (2001) assesses these observable and measurable clinical signs / manifestations to determine frailty status, consistent with full-blown Functional frailty (F-frailty) proposed by Whitson et al (2007) which ignores disease severity. The central question here is: what is pre-frail? Can a person be almost frail? This is likened to being almost pregnant! A person is either pregnant or they are not; does it then follow that a person is either frail or they are not frail?

Selye's (1955; 1974) useful approach has been widely acknowledged in the understanding of the physiological responses to a stressor and has led to the development of two areas of research. The first was psychoimmunology which studies the relationship between the psychological factors and the immune system of the body and the second is the locus of control and types of coping strategies to minimise the harmful effects of long term stress (Hayes, 2000). Selye's (1974) GAS theory proposes that an organism automatically responds to an external stressor within a straight forward stimulus response has been challenged. Some stressors produce patterns of physiological activity which are different to those produced by other stressors, Van Diest et al (2001) suggests that a defence conceptualization of hyperventilation is not always appropriate. Another consideration is that Selye's (1974) GAS was based on responses to stressors produced in non-human animals, this fails to consider the role of psychological factors in the production of stress response and that both effects may be present in stressors (Gross & Mcilveen, 1997).

Previously, within section one, a single frail participant was recorded for Addison's disease (hypocortisolism) which is often diagnosed following a life stressor. Life events have been linked to psychiatric symptoms, such as, depression and anxiety (Gross, 2009 p203). Evaluation of the effects of life stressors is possible. Holmes and Rahe (1967) produced an inventory (questionnaire) comprising 43 life events (stress and stress related changes as a response to life experiences). Life events were given a life change unit score, the highest being the death of a spouse (100 units). Participants are asked to add each life event they have experienced within the previous two years. A total score between 150 and 199 units predicted a 33 % chance of a stress related illness such as headache, diabetes, fatigue, hypertension, chest and back pain, ulcers, infections. A score of 200 to 300 predicts a 50 % chance of these same illnesses within two years, over 300 predicts a major life crisis and is highly predictive (80 %) of serious physical illness within two years. This inventory is readily available online and automatically calculated; it is easily completed within minutes. It can be seen from figure 5.1 (page 104) that "A" had many life experiences which would have been counted and scored via the questionnaire: thus estimating the risk of future illness prompting psychological and/or cardio pulmonary rehabilitation.

The physiological and psychological stressors follow, as shown in the definition at the beginning of this section includes (in bold type) the transactional model. The transactional model (Lazarus and Folkman, 1984) describes a cognitive appraisal of event (meaning making). It has three components to it, type of stressor, stress response and coping strategy. There is a potential to develop multimorbid disease management templates which are geared to the individual. These management templates can take into account common psychosocial factors such as depression and the needs of carers, similar to the Continuing Health Care (CHC) models (JSNALTCMC, 2013). This model promotes self efficacy previously

discussed in section two, and the concept of frailty could become synonymous with stress theory and offer therapeutic interventions in its treatment. Furthermore, an opportunity may exist for one of the blue badge self assessment questionnaires to be a life event inventory to aid annual risk prediction. This will require substantial future research in this area to further the knowledge surrounding frailty and stress.

Chapter 7 Conclusions and Recommendations

7.0 Introduction

The reflections on the discussion will be synthesised in broader terms within this final chapter. The research question, aim and objectives will be revisited to demonstrate that they have been achieved. What has been studied and how they have been evaluated, followed by concluding remarks, and finally ideas for future research.

7.1 The Research Conclusion

The study has focused attention on the physiological, social and cognitive aspects of frailty within a population over 18 years of age by investigating which of these component parts correlate with frailty alone. This was achieved by comparing two sets (non-frail and frail cohorts) of documented health and social care electronic and paper records from social services, primary and secondary care. The evidence gathered from the feasibility study has provided a greater understanding of the social care needs of people who are frail with respect to those who are not frail to be included within the future frailty index. Additionally this has added substance to the debate surrounding what constitutes health and what is social care. The social cognitive aspect has provided insights into the effects of and experience of progression from non-frail status into the frailty spectrum, with the potential to preventing or reversing these affects. The knowledge delineated from the feasibility study has added factually to an understanding of the most appropriate items that should be included within a future frailty index.

Results from the feasibility study have informed the development of both the processes and procedures that will aid the execution of any future study. Such future studies will require an increased rate of recruitment and to include as many people with cognitive impairment as possible within an ethically approved framework identifying personal or nominated

consultee. This would be addressed by contacting previously identified frail people via telephone or mail shot from the GP/CRT frailty database for potential inclusion in the project. Recruiting frail participants could feasibly be identified via the Community Resource Team (CRT) and the GP simultaneously; managers would need to ensure that the potential participants are not deceased prior to contact. The non-frail participants (matched by age, gender, ethnicity and social status) may be identified via the GP. A need for a dual information leaflet explaining the study to both non-frail and frail participants was identified.

The case control method has provided some results with regard to the similarities and differences in diseases between frail and non-frail people. It is difficult at this stage to draw any firm conclusions: due to the small sample size employed in the feasibility study. However, the case control method has proven to be applicable to investigating the factors of frailty to inform the development of a frailty index with its ability to compare two sets of data: highlighting aspects that are associated with frail people only. Preliminary results suggest that non-frail and frail people share many common health deficits that could be disregarded from the assessment tool; such as hypertension and hyperlipidaemia. The strongest indicator of functional decline leading to frailty was the mobility measures (Table 5.11), particularly the Welsh Government Blue Badge Scheme (2012). This information was available and obtained from the Social Services electronic database (SWIFT). The use of wheelchairs appears at this point to be of no significance, this may indicate that disability is different to mobility and requires further detailed research. The deficit accumulation model is based on a summation of all biological and physical markers of impairment that is inseparable from chronic diseases. Although the cumulative deficit approach is elegant and useful for other purposes, it is not intended to guide a discussion of the mechanisms that cause frailty (Weiss, 2011).

The semi-structured interview confirmed the validity of the questions asked to gain the detailed information from the interviewee in this single case study interview. The time allocated to conduct the interview was also appropriate, and the consent process was acceptable to the interviewee. The interviewee made particular reference to the quality of the information leaflet provided.

Social care features are significant within the frail group and the interview provided an explanation for further understanding of this potential category. One particular theme requiring further investigation and explanation was identified (consequential incident). A future study using interviews is needed to lead to the development of a theory to explain/aid understanding of the factors that influence Health Seeking Behaviour (HSB) to further extend the study. This potentially significant surprising result would not have been realised without combining health, social care and interview data together. It is possible that when this theme is fully investigated and explained could lead to an opportunity for early community or primary care assessment for functional decline leading to frailty. The Blue Badge Scheme has shown evidence where from first contact to requiring social care assessment has been significant years apart. This evidence may provide an opportunity for early assessment, ameliorating existing preventative interventions in the community. Further research into the significance of social care data should be undertaken to confirm these findings.

The interview revealed instances of many events that had an effect during A's life course. These events provided insight into the mechanisms of coping with challenges, particularly major health and social issues and how they were overcome. Overcoming social isolation and completing tasks of daily living are explained clearly. The importance of friendship and fellowship becomes evident. Thus, demonstrating the symbiotic relationship between himself

and his wife who, despite suffering early dementia, was able to perform these essential activities of shopping, cleaning and food preparation. Exceptions to this relationship were the inability of his wife to continue with his personal care due to his restricted mobility. This situation eventually led to the involvement of public agencies. Particular health related instances involve overcoming cardiac arrest during his sixth decade of life which had, by his own admission, no significance following medical therapy.

A major significant event, due to the consequential incident (pulled muscle) he had suffered, was recorded which occurred early during his seventh decade Table 5.11 illustrates the significant impact on “A’s” mobility within and outside the home. A pulled a muscle in his back severely restricted his movement and mobility which included a hospital admission with referral to the Community Resource Team (CRT), recorded within his medical records. Further restrictions on his ability to prepare meals and participate in household tasks were also evident in the data. This incident occurred during “A’s” late 80’s. This incident corresponds to the age (88 years) that “A” had applied for mobility Blue Badge through Social Services (SS). As a result of restricted mobility, an application was made to Social Services (SS) for the Welsh Government Blue Badge Scheme (BBS). The BBS application was the first contact with SS documented during 2006. Further contact was made with SS to assess for physical household aids during 2009 (handrails). This follow-up assessment was requested by “A” due to further functional decline, mobility issues and his wife’s advancing age affecting her ability to care for him. The data shows only people classed as frail had applied for Blue Badge status and of those 14 (46 %) of the 30 had blue badge status. The average time between application for Blue Badge and requiring help with daily tasks was seven years.

7.2 Delimitations and Limitations of the Study

Delimitations and limitations are found in proposals for qualitative, quantitative and mixed methods studies. These parameters will be discussed with regard to statistical procedures and research strategies (Creswell, 2013 p161). Table 7.1 lists the delimitation and limitations of the study.

Table 7.1: Delimitations and Limitations of the feasibility Study

Delimitations (not included)	Limitations
The exploration of client and third sector involvement in relation to social care provision	A single NHS organisation with one locality Community Resource Team (CRT) and one GP collaborator
Socioeconomic evaluation	The small sample size used for this feasibility study
Cognitively impaired people (interview only)	A single qualitative interview only

Although there are few statistically significant differences between the frail / non-frail group through tables 5.2 to 5.10: this may be due to the relatively small sample size ($n = 60$). There are, however, descriptive differences between the two groups, especially when one considers patho-physiological degeneration. Disease severity, which was not factored into the study, has a major influence on the functional limitations of a person and should be included into any assessment tool to increase sensitivity and specificity. This could be a differentiating factor and account for the small percentage differences seen. This would be difficult to accomplish and would require a large multicentre, multidisciplinary study. However, the delimitating and limiting aspects are of interest, it would not be practical to pursue these due to the time constraints and scale of the feasibility study. However, it is recognised that the

items contained within table 1 are legitimate areas for future study. Due to the small sample size it is not possible to generalise the findings to the population under study or any NHS organisation. However, the analysis and results of this study are intended to inform future research opportunities within the area of frailty.

7.3 Contribution to Knowledge

The feasibility study has added to the existing body of knowledge by focusing attention on the physiological determinants, social factors and cognitive aspects of frailty within a population over 18 years of age, by investigating which of these component parts correlate with frailty alone. The existing knowledge has been enhanced by developing an understanding of the lived experience of frailty: its physical, cognitive, and social consequence as experienced by a single older frail person.

Phase one was a case control study which comprised the examination of documented health and social care paper and electronic patient records (30 non-frail and 30 frail). Although not significant results provided evidence that many of the physiological components of frailty are shared between non-frail and frail people. The feasibility study quantitative results suggest that frailty indices currently available do not adjust for the severity of any single chronic disease, successful management regimes, degeneration, and severity therefore, lack specificity and sensitivity for establishing frailty status. This could be the reason why a universally acceptable definition for frailty has not been established. However, this could require highly focussed assessment which would need significant validation for general use so that these factors would not preclude its use. The social care data showed the most promise for inclusion in future frailty indices, particularly the disability blue badge scheme.

Phase two was a single one hour semi-structured interview who was a regular church attendee which was conducted with a frail participant. From this analysis, the five themes were developed of life purpose and support, trust and faith, coping with vacillation, acquiescence of fate and consequential incident. The major finding of this study was that frailty was experienced as day to day coping with physiological and psychological stressors. In order to achieve self efficacy, the frail person needs intrinsic locus of control to combat life challenges.

The theory of stress was used proposed to explain and integrate the physical manifestations of frailty which involves direct material or bodily challenge and the psychological which involves how individuals perceive circumstances in their lives. Further research is required to establish the role of stress in relation to increased frailty.

7.4 Implications for Practice

Usually it is difficult and unwise to make recommendations for practice following an exploratory feasibility study: particularly with a small sample size such as this. I have therefore, included recommendations for further research in the field of frailty for future consideration. However, following the findings it is possible to propose the implications for practice that could be implemented following appropriate and detailed planning.

Firstly, the blue badge scheme from first application and future re-applications should include validated questionnaires to be completed by the person making the application or appropriate consultee. This can be completed either online or in paper format which could then be used to assess a person's present and / or future frailty risk / score and its relative level. Annual assessments returned with the Blue badge application can be used to indicate a reduction or increase in the relative level of frailty and provide a point that would trigger

further needs assessment via the health and social care providers. It is an ideal vehicle to capture the population of people of all ages that require support to remain in their own homes and communities, maintaining social contact and independence for as long as possible.

Secondly, a BMI measure should be considered (below 18.50 or above 30.00) which could be used to capture / indicate people of all ages who would benefit from further detailed assessment via referral to a relevant specialism (e.g. geriatrics). This could provide an early warning improving sensitivity and specificity for frailty and its relative level. Identification of people with over or under nutrition would trigger a further possibility for early risk assessment and preventative community based measures to reduce obesity or improve malnourishment.

Thirdly, the number, dosage and type of medication prescribed to people should be closely scrutinised to provide a red flag for further assessment by a Doctor or pharmacist to determine adverse interactions and increase efficacy. This would reduce the effects of drug interactions and /or toxicity.

These measures would be relatively inexpensive to implement. However, considerable organisation and negotiations would need to take place to identify how and who would be best placed and experienced to conduct these initiatives. It must also be realised that the information gained would need to be integrated onto a single easily accessible information system for health and social care services within primary, secondary, tertiary and community organisations to be successful.

7.5 Concluding Remarks

The deficit accumulation approach (symptoms, disease and disability) championed by Rockwood and colleagues (2004) is simply a 'snap-shot' in time and will provide information

on the historical presence of a disease rather than its progression. The plethora of frailty scales currently available have rarely been examined for reliability and validity bringing their usefulness into question (Boullion et al, 2013). Furthermore, successful management regimes, degeneration and severity are ignored, lacking specificity and sensitivity for use in daily practice beyond research (Pijpers et al, 2012). It appears, therefore, to make little difference as to the number of diseases compared to the severity and impact of each upon a person's functional reserve. It could be that the dose response effect indicating that each single category point on the frailty index scale increases the medium term risk of death (Rockwood et al, 2005) be observed when conducting a database search for common health related conditions suffered by all older people without first differentiation of frailty status. This approach seems inherently flawed in that it fails to be specific to frail people only.

Although this new information does not move the debate surrounding frailty due to the small sample was used in this feasibility study, it is possible from the statistics presented, to offer a plausible explanation to understand why frailty researchers have failed to improve reliability and sensitivity in their screening / assessment tools. The concept of stress when applied to frailty may develop a greater understanding of the phenomenon and promote cost effective community interventions. This can only be realised with the concerted effort and determination of frailty researchers to add further to the body of existing knowledge.

For the foreseeable future, the concept of frailty within health and social care will remain problematic and controversial (Karunanathan et al, 2009) due to the continued subjective use of the term, this may explain why a universally accepted frailty screening assessment tool has not yet been developed. To enable a greater, more objective use of the term "frailty", substantial qualitative research is required to include the voices of older frail people themselves. Frailty research is in need of new approaches to understanding the role of

functional decline, geriatric failure to thrive and frailty. The question remains are they synonymous with each other? The obvious question is whether frailty is at best an umbrella term for early functional decline and geriatric failure to thrive, in the same way that dementia is used for psychological conditions, such as; mild cognitive decline and Alzheimer's?

Finally it is helpful to remember what it is that researchers are attempting to measure, why, for what purpose, and what it is meant to achieve: it matters not what name it is given as long as its purpose measures what was envisaged. Any assessment tool for frailty must be person centred to identify ways of supporting and providing what is needed to make a difference for the frail individual's quality of life and subsequent wellbeing: not just a labelling tool to predict mortality or withhold treatment.

Table 7.0 shows a possible format and structure of a frailty assessment tool for use within primary / secondary and community practice by non experts from the results of this feasibility study. This table is not meant to represent a completed tool. However, it does show a possible alternative structure, format, visual indicator and content to the existing frailty assessment tools currently available. This type of assessment and subsequent implementation of a care plan is not without its challenges. A significant change in professional attitude would be required to enable true multi-coordinated, integrated working to benefit the person being assessed to provide positive change that benefits the individual.

Table 7.0 example of a frailty assessment tool for use in primary / secondary and community incorporating severity scores.

Factors of Frailty	mild	moderate	severe
Stress proinflammatory markers IL 6 (pg/ml)	0.8 – 1.7	1.8 – 3.5	> 3.6
Obesity BMI (kg/m ²)	18.50 - 24.99	≥25.00 – 29.99	<18.50 or >30.00
Medications/condition (specific)	LOW DOSE	MED DOSE	HIGH DOSE
	H2 antagonists	Bisphosphonates	Angiotensin-Converting-Enzyme (ACE) inhibitors
	Aspirin	Thyroid medication	Laxatives
	Bronchodilators	Diabetic meds	Mucosal protection
	Paracetamol	Iron def meds	Calcium channel blockers
	Hyperuricaemics	Renin - aldosterone meds	Non-steroid-drugs
	Anti emetics	Hormone antagonists	Diuretics
	Skin preps	Vitamin supp	Opioid analgesics
		Anti coagulants	Anti depressants
		Hormone replacement	Nitrates
		Anti cancer drugs	Lipid lowering
		Anti-malarials	Glucocorticoids
		B12 vitamin	Antibiotics
			Alpha blockers
		Benzodiazepines	
		Anti platelets	
		Cardiac glycosides	
Genetic disease	stage 1	stage 2	stage 3
Personality traits	Resilient	Under controllers	Over controllers
Mobility	unable to conduct house cleaning tasks e.g. vacuum cleaning	unable to conduct cleaning tasks and personal care e.g. bathing	unable to conduct cleaning tasks + personal care + meal preparation
Life events inventory score (units)	150- 199	200– 299	>300

7.5 Recommendations for Future Research

These recommendations are from the results of the research itself and the observations from the literature review.

Assessment

- Development of a frailty assessment/risk tool for primary and community care.
- The development of an annual risk assessment with the disability blue badge scheme application.
- The integration of social care information into future frailty assessment tools is required.
- The applicability of integrating a functional/frailty questionnaire into annual applications for blue badge status for frailty risk assessment.

Delineation and Differentiation

- To investigate frailty further research is required in order to explore the differences between having a disease and any associated degeneration. Just having a condition does not (in itself) highlight how this impacts on a person's functional reserve. Indeed, it has been widely acknowledged that frailty is distinct from functional decline, disability, age, cumulative chronic disease and co-morbidity (Walston et al, 2006; Conroy, 2009; Gill et al, 2011).
- To differentiate between frailty, early functional decline or geriatric failure to thrive.
- Geriatric failure to thrive and F-frailty needs differentiation and further clarification.

Stress

- Consideration of the effect of life stressors, obesity and its association with frailty should be considered further for future investigation.
- The concept of stress, physiological and psychological frailty.

Psychological

- An understanding of the relationship of developmental psychological disorders should be studied within the context of frailty and its relevance.
- An understanding of general medical disorders (epilepsy and personality disorders due to brain injury).

Qualitative

- The social construction of health and social care professional and frail people to provide a universal language when referring to frailty.
- The help seeking behaviour of older and frail people requires exploration to aid understanding of their needs.

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Appendix A - Data documentation framework

Study identifier: 2013C year of birth male/female frail/non-frail

Marital status: smoker: non-smoker:

Type of housing: own local authority specialist accom

Alcohol: non mild mod heavy

Latest BMI: Bp = exercise: none light mod heavy

Medical history from sources (*YYF, *GP, *CRT) * delete if not available

Age at diagnosis	Year diagnosed	Diagnosed documented health related diseases (tick as appropriate, add date)	Hospital admission	Notes
		Cardiac MI, As, oedema, AF, HF, CHD, IHD/ Angina, Vascular	Y/N	
		Diabetes DMII, DMI, none	Y/N	
		Kidney disease	Y/N	
		Lung SOB, COPD, Asthma, Bronchitis, C infection, pneumonia)	Y/N	
		Falls (yes/no/explained/giddiness)	Y/N	
		Replacement (hip/knee)		
		Osteoarthritis	Y/N	
		Rheumatoid arthritis		
		Lipids		
		Hernia	Y/N	
		UTI	Y/N	
		Bowel Crohns dis, piles, colostomy, appendix, constipation, diverticular		
		Cancer (bladder, lung, breast, prostate, other)		
		Limb disorder		
		Neurological head injury, CVA,		

		Parkinson's dis, Alzheimer's, Dementia, Mild Cognitive Impairment		
		Sciatica/disc	Y/N	
		MSK	Y/N	
		Eyesight (cat, sore, blind)		
		Hearing loss		
		Gallstones removed		
		Thyroid		
		HTN/HPT		
		No of current meds		

Social care data (SWIFT)

Date of first contact and reason:

Handrails	Yes/no:	Date
Disabled blue badge	Yes/no	Date
Mobility	None restricted housebound	Date
Help with daily tasks	Yes/no	Date
Help dressing	Yes/no	Date
Walking stick	Yes/no	Date
Living with	Spouse relative alone	Date
showering	Aided unaided adapted	Date
Help with dressing	Aided unaided	Date
Help with meal prep	Yes/no	Date
Care attendance hours		Date
Social isolation	Yes/no	Date
Key safe/alarm	Yes/no	Date
wheelchair	Yes/no	Date
Other specify		Date

Appendix B - Interview Schedule

1. Can you tell me about your background?
Possible prompts: What happened during this period? How did you cope with things?
2. Can you tell me about the time when you started to find it harder to do the things around the house?
Possible prompts: What happened? How did you feel? How did you cope? Does anything make it better or worse?
3. Can you describe how frailty effects your relationship with other people?
Possible prompts: Partner, family, friends? Do you get many visitors?
4. Have you changed the way you do things?
Possible prompts: Can you describe how you feel about this change at that time? What do you think about this?
5. How would you describe yourself as a person?
Possible prompts: How do you feel about yourself?
6. Have the problems since becoming frail changed the way you feel or think about yourself?
Possible prompts: Do you see yourself differently now than before you had difficulties? In what way?
7. How do you think other people see you?
Possible prompt: Partner, family, friends?
8. Is there anything that could help you manage better in the future?
Possible prompts: Support, friends, family.

Appendix C: Interview Transcript

1 I: Okay so first question is; can you tell me about your background? So a little bit about
2 where you grew up, and the circumstances around that, and a little bit about your medical
3 history as well as we go along through the years.

4 R: OK, Um, born in [REDACTED], which was um, I suppose one would call it the slums of
5 London, um very poor family, seven altogether living in two up and two down, how we
6 did it I do not know, but we never went without. I didn't know my father very much
7 'cause he was hospitalised when I was very young, and he died when I was very young.
8 Um so, yeah, and I miss/I/when I think what my sons had (LAUGHS) I do miss that part of it.
9 Um we lived in a main street in [REDACTED], and opposite was a church, St [REDACTED] church and
10 that church became our home if you like. Um, because not only did it provide for the
11 spiritual side, but it provided for everything, everything, physical, sports, scouts and uh, and
12 I became uh, what do you call it, sport, I went mad on sports, um, so uh, and scouts, scouts
13 taught me a lot, but ah would you know, scouts enabled me for the first time in my life to
14 see the sea and the countryside, um, uh now,... where are we, at um teenage, at school I
15 didn't do very/I, I did pass to go to a grammar school, but um I didn't do very well, in fact
16 um, the bottom half of the exam was my place, um I left there was I was 16, and got a job in
17 the city, it sounds very posh, I was an office boy in an um, office in London um just a bus
18 drive away and um I went from one job to another, um clerical work and then um was
19 conscripted because of the/the threat of war, in the armed forces, which I spent most of my
time in

20 India, uh thoroughly enjoyed it, uh I was seconded to the [REDACTED], and part of
21 my job was training and administration and looking after people, and um it uh/I enjoyed
22 every moment of it. Right, war over, demobbed, marriage, I met my wife in the church
23 opposite.

24 I: So church can become very very important to you throughout your early life?

25 R: Yeah, and um, after the demob my wife had moved to [REDACTED] because she was bombed
26 out of London, and so we moved to [REDACTED] and uh shared the house with her parents, um
27 my wife had a good job with [REDACTED], um I tackled several jobs, but in the end um I
28 ended up as a office manager and that's training people um in a bakery, um after a while I
29 got interested in baking, how it happened etc etc and I decided that I would uh study, go to
30 college/technical college, and uh learn all about bread and cake making etc etc and because
31 all the marks were centred more on the theory side, I came away with a/ah 1st class City and
32 Guilds which enabled me to then start climbing stairs in the bakery industry, um which went
33 surprisingly easy, um and everything in my life after that was easy and looking back now it
34 were because people trusted me, if I said yes that's right, they knew it was right because in
35 my industry I was in, and in the sale side there were 50 men and all of them were um... well
36 what can I say, um, they would tell any story to get a result whether it was true or false, my
37 directors soon discovered this and so I got promoted because they believed me, um, and
38 uh, ...I were taken over at least three times by different bakeries um, and um each time
39 somehow or other I managed to get a promotion on each rise, and um, uh in my moving I
40 moved from [REDACTED] to [REDACTED], [REDACTED] to [REDACTED], [REDACTED] to [REDACTED], [REDACTED] to [REDACTED],
41 [REDACTED] to [REDACTED], all beautiful places. One thing I had mind was I would never ever go
42 any farther than Birmingham 'cause I went for an interview in Hails Owen just outside
43 Birmingham and it shook me, so much how it was very/in those days Birmingham was a dull
44 place and so life's treated me very well, um we'd be... hit/we'd be hit um in the faith, and

45 Christianity has played a great part in the life of my wife and I, um and still does.
46 *I: So do you think that's uh helped in any way, how did you cope with all the early times and*
47 *the difficulties?*

48 R: Yeah um, the um/it means um we have a faith that believes in a God who understands,
49 and who helps and we had a son and a daughter um, both born healthy/um both grown up,
50 both uh married, both got children/grandchildren, and it means that we've got nine now,
51 nine great grandchildren and, um so and what a blessing/son and a daughter is at this time
52 of our life 'cause it means that we're supported, um my son comes and takes my wife
53 shopping and does odd jobs, my daughter she comes and spends 4-5 days every month um
54 help, more or less taking over, so um a son and a daughter, children are a real blessing, so
55 uh as far as the/that's concerned. Um, medically now, uh medically, when I was uh....just
56 trying to think how old/um, when I was uh 50 living in [REDACTED], um I had tremendous
57 pains in my stomach um, we took me to hospital and eventually ended up with me losing a
58 kidney, the right hand/the right kidney, but I was assured that I could manage easily on one,
59 and at 95 nearly, um that kidney's done a good job although I must say here my doctor had
60 been very um much um alert on not to give me anything that would cause kidney problems,
61 uh he done a good work on me, um and then in the/when I was 66 um we used to go
62 walking a lot with the dogs, um I found that I could no longer go walking because my right
63 big toe ached/hurt too much, uh one day I woke up and my foot was twice the size and red
64 and blue, went to hospital, they said we're going to wait until it goes down but during the
65 night the thing broke, um and a whole lot of mush came out. Anyway, uh x-rays later
66 discovered that my big toe had been split um at some time and poison had got in and the
67 foot was poisoned, and looking back, when I was a scout/teenager, somebody had dropped
68 a table on my foot and there was a young age and just sack it off, but they reckon I had split
69 the toe then and it took all that time for the poison. After oh...., 1 2 3 4 5 operations,
70 opened the toe, take the poison out, took bones away after about four operations um I was
71 put on antibiotics for a year and uh although it healed I never got any use back of my foot,
72 and then gout, arthritis set in and both feet after about two years um they didn't work at all
73 and so um I have no feeling in my feet. Um and

74 *I: is that the main thing that's...*

75 after that when I was um, 68 I had a heart attack which turned out to be a, a vein that ur
76 erupted um and died um but was of no consequence so/but again after 4 years/5 years of
77 hospital treatment back and forwards, um they eventually discovered that what my heart
78 needed was uh stronger muscles and so they put me on a tablet and uh it's a marvellous/it's
79 worked and it's now uh and when they take my blood pressure it's excellent and at my age
80 they just can't believe it, and then there's all sorts of aches and pains. Recently, last/when I
81 were 90 I pulled a muscle in my back and since then that's not been back a lot because it
82 prevented me from doing things um.

83 *I: So each time how did you cope with the various health problem issue?*

84 R: Looking back, um yeah, yeah I suppose it was because you have uh help from your family
85 and we also had in our fellowship we got so many friends, that they all support you um in
86 little ways and big ways. And uh, how can you again wonder, but oh yes ah, ah..we managed
87 through somehow[laughs], um you take it as it comes, accept them and then work out how
88 you can get over it and it's amazing how um your mind can guide you to ur the way to do
89 things um when its hurts to do things, but no I can't think of anything that really hurts us
90 although it must have hurt my wife because um she had to stand on the side. But ur I think
91 that about covers it does it?

92 *I: It does yes. I think you've also answered part of question 2 which is can you tell me about*
93 *the time when you started to find it harder to do things around the house?*

94 R: um..I suppose it was in the late 80's/1990 um when my back went because before I used
95 to help to get breakfast, make the teas, wash up, loads of stuff like that, but when my back
96 went I no longer could do things without having the stick in my hand and uh it wasn't easy
97 so my wife has had to tend me and she's done well.

98 *I: So how do you feel about your wife having to take over a little bit?*

99 R: Oh I find it very hard because I'm physically a wreck, but mentally I'm very alert, um my
100 wife's the opposite. Um she can't remember things and that sort of thing, but physically
101 she's fit, I mean she's walking and that, but um I find it hard to sit down and be waited on,
102 it's not easy, especially when you know that she's also nearly as old as you are and suffers.

103 *I: So how do you cope with that feeling? Is there anything that you do or anyone you talk to*
104 *to cope with that feeling?*

105 R:[...]

106 *I: Or does faith play a part in that?*

107 R: A big part yes, it must do um looking back as sort of a whole um... yes because we have
108 beliefs and still believe in a living God it gives us a confidence to go forward and and when
109 we make mistakes which is easy enough we can forgive each other and the good thing
110 about my wife's memory is that she doesn't remember the things [laughs] which is a bonus
111 to me Really.

112 *I: Okay, question 3 now, can you describe how frailty affects your relationship with other*
113 *people?*

114 R: Um, I think one gets nearer/I think one's feelings get nearer to/ I know my son and
115 daughter yes, my daughter understands me more than my son because my daughter had to
116 care for her Mother in law who was 90. But my son, he still thinks I should be able to do
117 things as he can and he's what 66 now. Um yeah my daughter, she understands and our
118 friends, um yeah they bend over backwards to help me, well to help both of us in every
119 way.

120 *I: Do you get many visitors throughout the day or through the week?*

121 R: Oh yeah, because now I can/ we can only/we cannot/ we don't have a car now uh we
122 can't get to church I can only get to church on a Sunday morning so our friends come and
123 they visit us and so, there again it's all based on this faith thing really.

124 *I: So its been a strong part of your whole upbringing and your family beliefs*

125 R: And your family are close, um today there's so many a broken homes, um but because
126 we're close as a family, my son lives in [REDACTED] and my daughter in [REDACTED], um but we
127 see a lot of them so I think that helps a lot.

128 *I: Okay, have you changed the way you do things?*

129 R: Very much so, um everything I do now is slow, my wife insists that it's not slow, it's dead
130 slow um because I don't do anything unless I plan it carefully; what I'm going to do, where
131 I'm going to go, how I'm going to carry etc etc, and then slowly do it. Um I spend/my from
132 70's and 80, I spend a lot of time in the garden and a job that used to take me 5 minutes
133 now took me half an hour, because getting up and down/we've got a garden that that's
134 terraced and stairs and although we've got railings um to go up and down, up and down,
135 taking time th, th. But um I still do a bit of gardening [mumbles] but ah otherwise um.

136 *I: So how do you feel about not being able to do as much gardening would you like?*

137 R: I'm quite frustrated really because um I used to spend hours in the garden, I used to do
138 an hours planning and then doing and going to the um garden centres, I no longer can do

139 that, so I had to rely on either using um the internet and that sort of thing, or getting my
140 son to buy things. You lose a bit of what I call independence, and I think independence is
141 very Important. Um I suppose you also lose a bit of dignity ah, but it doesn't affect me all
142 that much.

143 *I: You just mentioned, you say use the internet, do you still use the internet? Can you explain*
144 *a little bit more about the internet, how you used it and if you still use it?*

145 R: Well, not so much the internet, so much as um... garden brochures, they send/I've been
146 dealing with a garden centre a long time and every 3 or 2 or 4 months I get a brochure and if
147 I want anything I send it that way and by and large they've been quite good. The good thing
148 about it is that the goods are sent straight to the door, so it does help. But um on the
149 internet my son/yeah and my daughter, um when we want things they get them there, and
150 oh yes but don't ask me what the internet is, I do not know. We haven't/we're not
151 computerised, um I did think at one time but um, I don't think I could manage it, uh... I
152 don't know. But anyway we don't do it now, but um it's easy when you've got people who
153 understand you know.

154 *I: I do. How would you describe yourself as a person now compared to what you were? Are*
155 *there any changes or?*

156 R: Um, I feel good about myself. Um I just don't understand why I'm now 95 next birthday,
157 um and the last time was I was at hospital, I had a problem with my chest, um I just went
158 um they did/they took a long time, every part, ECG etc, and in the end he said that there
159 was, I'd pulled muscles in my chest, um nothing wrong with my heart, nothing wrong with
160 anything else, in fact for my age he said I was in excellent condition which um helps but I
161 would like to be able to do more..... but I know I know I'm restricted.

162 *I: So how do you feel about not being able to do a little more than you do at the moment?*

163 R: I suppose I've um come to accept it and um know my limitations, which is very very
164 important. I know what I can do, I know what I can't do, although I still try. See take for
165 instance this morning my wife wanted a tin of spam opened, she couldn't do it, now I've no
166 use in my hands, and so after oh it must've been three quarters of an hour I got it open, um
167 now that's hard when you can't do things like that, like opening tins and opening jars,
168 opening ointments etc that's that/thats when it really hits you that you've got to rely on
169 somebody else and I say that I'm an independent soul [laughs] therefore it's not easy.

170 *I: That's very interesting. So we'll move on a little further now. Have the problems since*
171 *becoming a little frail changed the way you feel and think about yourself? Do you see*
172 *yourself differently now than before?*

173 R: Oh ye ye yes I. It's, it's part of what we already said because you come to acknowledge
174 that you can't do things and your limited, and I think in limiting yourself you have a sort of
175 peace that you have because uh you no longer want to do those things [laughs]

176 *I: I understand. So, how do you think other people see you? Do they see the same or do you*
177 *think that?*

178 R: My friends at church um that's strange, they see me as I used to be but they also [laughs]
179 see me as I am. In other words, they accept me for what I can give to them um but also
180 Realise that I'm restricted. Um....you see um my church life has always been with children,
181 but when I got to eighty I had to give that up but, perhaps you wont understand this, God
182 gave me a ministry of encouragement so that my work if you like in the church is
183 encouraging people, encouraging them in their faith, encouraging them in their difficulties,
184 and that helps a relationship somehow, (I don't know whether I made it clear) but people,
185 some people come to church with problems, burdens, they don't tell anyone but, I'm told so

186 I meet the need. Normally all it is is a hug, and it works.
187 *I: So how does that make you feel about yourself?*
188 R: Well quite happy, again I know my limitations and I can live with it, I know what I can do
189 and I know what I can't do, so I do what I can, and I that satisfies me.
190 *I: Can you explain a little bit more about how it satisfies you and how you feel satisfied in*
191 *yourself from doing that?*
192 Its difficult...I suppose because you know what you can do and you know what you can't do
193 and you live within those parameters.
194 *I: What about the sense that you get from other people coming to see you, and you being*
195 *able to help? How do you feel about that?*
196 R: You get/you do get um ah....a joy, let's put it that way, of knowing that you've helped
197 them, the thing is that nobody knows about it, it's one of those things that nobody knows
198 about because it's not something that you talk about. Encouragement is a private thing
199 between you and the other person, so I don't know, uh you just know, you just have a feeling,
200 and really that's what we're talking about feelings. You see I have a physical body and a
201 mind that feels but I also have a spirit, a soul that is completely different um and I believe
202 that living in the spiritual world as well as the physical world makes things so much easier.
203 Um.... I am today what I am because of what God made me. Thinking about age, I had a
204 feeling that between the age of 90 and 100, is exactly the same as being born and reaching
205 the age of 10, you start when that is and end when that is, um it's a process, but question,
206 why? I mean, yesterday on the news, Richard Briars died, which I was very fond of, 79 I
207 think he was, and I'm 95, um you know this is something that I don't understand and I don't
208 know where it's going except I know where I'm going [laughs] you know so that's it....so
209 that's my faith, I'm going by faith, both my wife and I, we can boast that we're living by faith,
210 and end up in the supernatural. Thing is you can't understand, you just have to hope and
211 trust.
212 *I: It's very interesting*
213 R: I rambled on a bit but uh...
214 *I: No not at all, it was very interesting. Is there anything that could help you manage better*
215 *in the future? Any kind of support from anywhere? Any kind of device that would help you?*
216 R: We're fortunate, we are supported very very well but I would say that thinking of the
217 many people that are our age and live on their own, things could be made easier as I talked
218 about, opening things and being able to cope with accidents in the home and things wanted
219 doing, cos always going wrong, um I think that's where people have a need um one time I
220 used to get a list out of people who we could trust, work people and [mumbles] so that if
221 we wanted something done, we knew we could trust them because today [laughs] there are
222 so many con men around. Fortunately we have a man at the bottom of the road who's a
223 handy man who's not only helpful but who is willing to help in difficult times, and also um
224 another builder up the road here. They bend over backwards, alright we have to pay them
225 of course, but they bend over backwards to give us a good service. I think that's what
226 people need, they need to know that they've got somewhere, some place they can go and
227 get help that they can trust.
228 *I: So trust is something that's really important to you?*
229 R: Oh yeah, especially today, and some many have no one to turn to at all, so life must be
230 extremely hard for them. I know there's a whole lot of flats in Caerphilly that are all sort of
231 one person flats and they're all generally, when we visited, mostly old, um how they cope
232 with not feeling well at night etc I don't know but um again there's work/they do spread out

233 to help people, I think that's what we need, more help, more care workers. Not, not I'm
234 talking about real care workers, people who really, really care, but otherwise um.

235 *I: So, if you had someone out that would help you undo jars and open tins for you at the
236 press of a button what sort of things would be helpful?*

237 R: Yes, oh yeah I think naturally those who have no support, yes, to be able to live I suppose
238 in what they call in a controlled area. You see I'm...I know that when I'm unable to help
239 myself or my wife, my daughter will provide a home for us in [REDACTED] which again is
240 something to be thankful for because I've visited so many homes, residential homes, some
241 frighten me, some were very pleasant, but I'm not sure that's the right thing, It's good to be
242 fed, looked after and that but when you see pictures of um them just sitting around as it
243 were, waiting to die, it doesn't do anything for you does it, it doesn't give you any hope
244 really. Um I trust your children will look after you when you are my age [laughs].

245 *I: I think that's/time will tell I think*

246 R: Yeah

247 *I: Well that's very interesting, thank you very very much for talking to me and that's it, we're
248 all finished.*

Appendix D – Ethics and Governance



GIG
CYMRU
NHS
WALES

Bwrdd Iechyd
Aneurin Bevan
Health Board

Ref: AG/PK/GJ

Direct Line: 01495 765031

28 August 2012

To whom it may concern
c/o Carolyn Wallace
C.Wallace@glam.ac.uk

Title: **An Investigation to define the physiological, cognitive and social factors associated with pre frail and frail people.**

Student: Gareth Jones

Supervisory Team: Prof. Joyce Kenkre, Dr Carolyn Wallace, Prof. Pradeep Khanna (ABHB), Mr Mark Prosser (Invacare)

This is a letter of written confirmation of the agreement to support the PhD study entitled 'Developing a Frailty Index: An investigation to define the physiological, cognitive and social factors associated with pre-frail and frail people'. The Frailty Service will provide Gareth Jones (PhD student) with access to GP patients, staff, patient notes, carers in each of the 5 localities; community resource team patients, patient notes, staff, documentation and carers in each locality.

Yours sincerely

Dr Andrew Goodall
Prif Weithredwr/Chief Executive

Bwrdd Iechyd Aneurin Bevan
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Bwrdd Iechyd Aneurin Bevan yw enw gweithredol Bwrdd Iechyd Lleol Aneurin Bevan
Aneurin Bevan Health Board is the operational name of Aneurin Bevan Local Health Board



Leading Social Services
in Wales
Yn arwain
Gwasanaethau Cymdeithasol
yng Nghymru

ADSS Cymru Business Unit,
C/o Fairfield House
Social Services & Housing Department, TCBC
Civic Centre, Pontypool
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To:
Gareth Jones MPhil/PhD student
University of South Wales
Room GT110
Elaine Morgan Building
Glyntaff campus
Pontypridd
CF371DL

Enquiries Latha Unny

Date 2 May 2013

Direct Line 01633 648286

Our Ref SE/LU/GJ 1

Dear Gareth,

Study – An investigating into the physical, social and cognitive factors associated with pre-frail and frail people

I am writing on behalf Association of Directors of Adult Social Services Cymru and am pleased to tell you that we have decided to recommend your project to social services departments. A circular advising directors of social services of this decision will shortly be in their hands.

It would be helpful if, when approaching adult social services departments, you make it clear that you have ADSS Cymru's support.

The reviewers recommended your study as contributing significantly to the understanding of frailty as a concept that does not necessarily relate just to older people, and that there is a greater

understanding of lived experience of frailty. The reviewers also commented that 'this study is well designed, uses appropriate methods, and pays proper regard to ethical issues'.

We would be pleased to receive the results of your study in summary form in the interests of ensuring that social services departments receive the maximum benefit from co-operating in research projects such as your own. ADSS Cymru places great importance on disseminating findings and conclusions to encourage practice solutions and transformation of services through research based evidence. We would appreciate knowing your expected publishing date.

Yours sincerely,

A handwritten signature in black ink that reads "Sue Evans." The signature is written in a cursive, flowing style.

Sue Evans

Honorary Secretary, ADSS Cymru,

And

Director for Social Services and Housing, Torfaen Council



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Research and Development Department

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Mr Gareth Jones
Room GT110, Elaine Morgan Building
Faculty of Health Sport and Science
Lower Glyntaff
CF37 1DL

9th October 2013

Dear Mr Jones,

Site Audit Reference: RDA-10

**Study Title: A Pilot Study of an investigation into the factors of family frailty –
Single NHS Organisation Study**
ABUHB R&D Reference Number: RD/1116/12

Following on from the R&D Department audit of your site file on the 9th October 2013 please find attached the Corrective and Preventative Action (CAPA) Plan detailing our findings.

If you have any questions about the CAPA Plan please do not hesitate to contact Michael Morgan on 01633 656353.

We would like to take this opportunity to thank you for all your co-operation with the audit.

Yours sincerely

Rosamund Howell
ABUHB R&D Manager

Michael Morgan
ABUHB Research Governance Officer

Appendix E - Table 2.0, 2.1 and 2.2 Research Studies Surrounding Frailty

Table 2.0. Research Studies Surrounding Frailty (in chronological order)

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Speechley and Tinetti (1991)	Established Populations for Epidemiologic Study of the Elderly Yale Health and Ageing Project	336 people 80+ years Community	60% female	Canada	Quant	Longitudinal Prospective cohort study	The frequency and circumstances of falls in 3 groups (frail, vigorous, transition). Observed patterns of clustering among demographic, physical and psychological variables.	18 deficit index produced. Not validated for frailty but useful for those at risk of falls. Frail group had more falls, vigorous group had less falls but resulted in more serious injury and were dependant on displacing activities and environmental hazards. Injury prevention should be aimed at all groups and tailored to expected differences in fall groups. Transition is an important group to target.
Fried et al (2001)	Cardiovascular Health Study (CHS)	5317 people 65-101 years community	58% female	USA	Quant	Longitudinal Prospective cohort study Up to 7 years follow-up	Annual examinations and surveillance. Co-morbidity is an etiologic risk factor for increased frailty and is not synonymous with either disability or co-morbidity, disability is a result of increased frailty status..	Prevalence of frailty in the community 6.9%, greater in women than men. Phenotype was predictive of falls, worsening mobility or activities of daily living, hospitalisation and death. Classification criteria to determine status = non frail, pre frail, frail. Operational definition of 5 determinants were slow gait speed, weight loss, muscle weakness, poor endurance reduced physical activity. No. Of deficits >3 =frail, 1-2=pre-frail, 0=non-frail.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Jones et al, (2004)	Mobile Geriatric Assessment Team	81 mean age. Rural community 92 in the intervention group, 77 control group	56% female	Canada	Quant	Randomised control trial. (RCT) Control group = Standard care, intervention = multidisciplinary specialised geriatric assessment and management for 3 months.	To construct and validate a frailty index clinically sensible and practical based on the comprehensive geriatric assessment. Status -mild, moderate, severe. Measures included- cognitive status, mood, communication, mobility, balance, bowel and bladder function, nutrition, IADL's and ADL's, social resources, and co-morbidity.	Standardised frailty index + comprehensive geriatric assessment (FI-GCA) was developed. Permit risk stratification of future adverse outcomes. Community validation, easy to use, with no special instrumentation. Requires clinical judgement. Highest criterion of validity is predictive validity.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Studenski et al (2004)	Clinical Global Impression of Change in Physical Frailty (CGIC-PF)	10 moderate to mild frail people for feasibility test.	80% female	USA	Quant /Qual	Mixed methods. Instrument development and feasibility test.	Expert panel members –46 clinicians, 24 patients and 12 caregivers. CGIC-PF Designed to represent a Geriatricians global opinion about frailty. Intrinsic areas to frailty are highlighted on a 7 point scale. Medical complexity, healthcare utilisation, appearance, self-perceived health, activities of daily living, emotional status, and social status.	Shows measure is able to discriminate magnitude and direction of change in frailty risk, and capture patterns of physical impairment/psychological change. Strong face validity, reliability and feasibility for use in clinical research.
Mitnitski et al (2004)	None	36,4024 community and institutionalised people 65 + years.	58.5% female	Canada, Sweden, Australia	Quant	Cross-sectional and cohort.	Investigate the relationship between the accumulated health related deficits and mortality in the elderly across 3 countries.	Older people in the community accumulated deficits at about 3%/year, institutionalised did not accumulate deficits. Women at any age were more frail and had lower mortality. Relative fitness and frailty can be defined in relation to deficit accumulation. There are maximum deficit accumulation beyond which survival is unlikely.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Rockwood et al (2005b)	Canadian Study of Health and Aging (CSHA)	10263 people 65+ years community	62% female	Canada	Quant	Prospective cohort study longitudinal 5 years	Developed a 7 point clinical frailty scale based on clinical judgment combining co-morbidity, cognitive impairment and disability. Very fit-well (well with co-morbid disease), apparently vulnerable (mildly frail), moderately frail, severely frail. Frailty by consensus or compromise or a variety of viewpoints classified as research proceeds to fit within the spectrum of definitions.	Operational definition of frailty should identify clinically recognisable degrees of frailty. Clinical frailty scale has better predictive validity than the operational definition. Better at measuring death and institutionalisation. Relatively easy to use, requires clinical judgement.
Woo et al (2005)	Social determinants of frailty	2032 people 70+ years	51% female	Chinese	Quant	Cross-sectional survey questionnaire	Frailty Index FI (Rockwood) + socioeconomic, social support network factors and lifestyle. Constructed FI with 62 variables covering social, psychological and physical health and tested for association with socioeconomic, lifestyle and social support factors.	Mean FI for women was higher than men. Men increasing frailty in manual occupations, inadequate expenses, lack of exercise abstinence from alcohol, few relatives or neighbours and lack of participation helping others. Women lack of contact with relatives, community/religious activities. Susceptible to treatment and reversible. Frailty has to be studied as a complex interplay of physical, psychological, social and environmental factors as a multidimensional concept.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Gill et al (2006)	None	754 people 70+ years community	64% female	USA	Quant	Prospective cohort study	Fried (CHS) criteria. Transitions between states of frailty were dependant on the preceding frailty state.	Frailty is a dynamic process with frequent transitions between states over time. Ample opportunistic time for prevention and remediation of frailty exist.
Ensrud et al, (2008)	Study of Osteoporotic Fractures (SOF)	6701 women 69+ years	100% female	USA	Quant	longitudinal Prospective Cohort Study	To compare predictive validity of a simple SOF against Fried CHS criteria with components of weight loss, chair rise and reduced energy levels (SOF) with CHS.	SOF index predicts falls, disability, fracture and death as well as the CHS index (no difference). May identify women at risk of adverse health outcome in clinical practice.
Fairhall et al (2008)	Frailty Intervention Trial (FIT) study protocol	230 people 70+ years GP and community based	% not given	New Zealand	Quant	Randomised Controlled Trial (RCT) Multidiscipli nary v usual care.	Fried CHS against SOF criteria. Home visits to provide therapy. Develop a multiple intervention to target the operational definition and establish the effect of the intervention on mobility, hospitalisation and institutionalisation.	SOF predicts risk of falls disability, fracture and death as well as the CHS. Strategies are readily transferable to routine clinical practice, and applicable to aged care health services.
Kulminski et al (2008)	Canadian Study of Health and Aging (CSHA)	40721 people 65 + years	Not given	USA	Quant	Cohort study based on Cardiovascul ar Health Study cohort	Fried Cardiovascular Health Study (CHS) v Phenotypic Frailty Index (PFI). Compare how well measures of frailty based on the phenotype of frailty and index of accumulation of deficits predict mortality.	CHS underestimated the risk of death in 720 persons PFI underestimated mortality risk for 134 people. Integration of both approaches are promising for increasing precision of discrimination of risk of death and most vulnerable.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Santos-Eggiman et al (2008)	Lc65+	Community	65-70 years	Switzerl and	Quant	Longitudinal Prospective cohort study	Modified Fried + life course history via questionnaires Designed to investigate the manifestations of frailty from first signs in the youngest old, identify medical and psychological determinants, and describe its evolution and related outcomes. To study the sequence “determinants – components-consequence” of frailty. Self administered questionnaire on life history, socioeconomic status, medical diagnosis from childhood, followed by an in person interview at the study centre to administer anthropometric and performance tests (modified Fried criteria). Follow-up interview (questionnaire) every 3 years until death to study health related quality of life, objective changes in physical and mental health performance and changes in dimensions of the frailty phenotype.	Cohort design is the only method providing accurate information concerning the impact of frailty on later outcomes such as the development of functional dependence. Make a contribution clarifying causal pathways leading from health to frailty and disability.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Sarkisian et al (2008)	Macarthur study	70 -79 years 1180 high functioning participants in urban centres	Not given	USA,	Quant	Longitudinal Prospective cohort study	CHS Fried + 10 other variables. Sub-dimensions were assessed using regression models for disability and mortality. Exclusion of cognitive, psychosocial factors associated with functional decline and disability have been under scrutiny despite its predictive strength. Provides support for the hypothesis that cognitive impairment is intrinsic to frailty and integrally related to the physical frailty criteria.	They conclude that pathways to frailty differ and that sub-dimension adapted care may enhance care of frail older people. Older adults experience different trajectories and pathways to frailty. Two further cardiovascular health study phenotypes and four subdivisions of the expanded frailty phenotype were identified. Sub-dimensions of frailty more lethal with worse prognosis. Sub-dimension adapted care might enhance care of frail people.
Ávilla-Funes et al (2009)	3 city study	Age 65-95 Community	61% female	France	Quant	Longitudinal Prospective cohort study	CHS modified fried criteria with 2 measures of cognitive function.	Addition of cognitive function with CHS criteria increased the ability to stratify frailty risk. Improves predictive value for adverse health conditions.
Buchman and Wilson (2009)	Rush memory and ageing project.	832 people over 8 years. Mean age 80.4 years.	74.4% women	USA	Quant	Longitudinal	Modified fried + MMSE Developed and validated a continuous composite measure of frailty and its rate of change over 8 years.	Frailty is progressive in some older people and the rate is associated with mortality. Each 1 unit increase in frailty was associated with x5 mortality risk.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Hilmer et al (2009)	Reported Edmonton Frailty Scale (REFS)	111 people 70+ years Hospital admissions	70% female	Australia	Quant	Cohort study	Edmonton frailty scale validated against the Geriatrician's Clinical Impression of Frailty. Develop a frailty measure of frailty for acute inpatients by non-geriatricians.	Valuable tool to assess prognosis and response to therapy. Scale for use of non geriatrician of cognitive co-morbidity, function and inter-rater reliability.
Lang et al (2009)	English Longitudinal Study of Ageing(ELSA)	4818 people 65+ years National population study	55% female	England	Quant	Longitudinal cross sectional	Frailty index of multiple deprivation based on 58 potential deficits. To assess how individual Social Economic Status (SES) and neighbourhood deprivation affect frailty.	Neighbourhood deprivation and individual SES were independently associated with frailty in community dwelling older people. Older adults living in poor areas are the most vulnerable. Individual circumstances should be assessed when developing policies or interventions for frailty.
Ottenbacher et al, (2009)	Established Populations for Epidemiologic Studies of the Elderly (EPESE)	65+ years 2049 community living Mexican Americans	59% female	USA/Mexican	Quant	Cross-sectional, longitudinal 10 years	Modified fried (CHS). Identify sociodemographic variables and health status non frail, pre-frail frail.	Psychosocial and cognitive components should be included in future frailty studies, and continue to examine the trajectory of frailty as a dynamic process.
Andela et al (2010)	No name	75+ years hospital admission	45% female	Netherlands	Quant	Cohort study	Groningen frailty indicator 15 item scale that screens for loss on 4 domains; physical, cognitive, social and psychological. Assessment on 5 wards on admission for frailty.	Almost all on the geriatric ward were diagnosed frail, 80% on all other wards diagnosed frail with most prevalent on the psychosocial scale indicator.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Bilota et al (2010)	Older People's Quality of Life (OPQOL)	239 people 65+ years community	Not given	Italy	Quant	Observational Cross sectional	Comprehensive Geriatric Assessment/Study of Osteoporotic Fractures + Older People's Quality Of Life questionnaire. Investigate and correlate the dimensions of QOL associated with frailty.	Frailty was associated with depressive symptoms at a young age. Robust was associated with low body mass index. QOL was negatively affected by frailty status and future not only health related QOL but other domains as well.
Boyle et al (2010)	Rush Memory and Aging Project (RMAP)	761 older people without cognitive impairment at baseline.	76.7 female	USA	Quant	Prospective cohort study Longitudinal 12 year follow-up.	Fried + Mini Mental State Examination and other cognitive tests. To test the association of frailty with the rate of change in cognition.	A higher rate of frailty correlated with a more rapid rate of decline in global cognitive ability. 1 unit increase in physical frailty was associated with a 63% increase in the risk of mild cognitive impairment. The higher the level of frailty the increased global decline in cognition.
Espinosa et al (2010)	San Antonia Longitudinal Study of Aging (SALSA)	310 Mexican Americans and 305 European Americans 65+ years	Not given	USA	quant	Longitudinal Observational cohort study 10 year follow-up.	Fried + covariates (chronic diseases), incontinence and cognitive impairment.	Conventional criteria showed greater prevalence of frailty in MA than EA. When considering the population researchers should carefully decide whether to use conventional criteria or ethnic specific criteria.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Freiheit et al, (2010)	None	374 people 60+ years who received cardiac catheterisation	73% male	Canada	Quant	Prospective cohort study	Balance gait speed cognition self reported health BMI depressive symptoms and living alone + 1 year dependency on Activities of Daily Living and Health Related Quality of Life.	Physical, cognitive and psychosocial criteria was predictive of increased disability and decreased HRQL at 1 year. May have application but requires further validation.
Kamaruzzaman et al (2010)	British Women's Heart and Health Study	4286 women 60-79 23 towns in Britain. community dwelling old people	Women only From	British	Quant	Prospective cohort study	Derive a model based measurement of frailty and examined internal reliability in 7 factors explained the association between frailty indicators physical ability, cardiac symptoms/disease, respiratory symptoms/disease, physiological measures, psychological problems, co-morbidities, and visual impairment.	New British index 35 deficit 7 core factors. Better predictor of all cause mortality, hospitalisation and institutionalisation. A cluster of indicators are important in older people. Potential to improve quality of life and target efforts in early prevention and treatment. British FI would serve as a better population metric because it enables people with varying degrees of frailty to be better distinguished over a wider range of scores.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Ortuno et al (2010)	Survey of Health Ageing and Retirement in Europe, wave1	31,115 people 50+ years	17304 female	Europe	Quant	Prospective cohort study	Fried modified with cognitive measure included. Follow-on from Santos-Eggimann et al (2008). Gendered approach used. Two separate on-line calculators for men and women developed. Has concurrent criterion validity for subjective and objective (number of chronic diseases) health and healthcare utilisation (number of visits to the doctor).	Appealing to GP's, public health and policy makers. Main use for primary care settings. Easily used by non-clinicians. Limitation significant missing mortality data. No validity in secondary care settings. Self report a potential problem due to cognitive ability, proxy?
Song et al (2010)	National Population Survey of Canada(NPHS)	2,740 people 65-102 years	60.8% female	Canada	Quant	Longitudinal Prospective cohort study. 10 Canadian provinces, 10 year follow-up.	Self reported health information to construct a frailty index. Proportion of accumulated deficits over 10 years. Mortality as outcome. 36 variables assessing health attitudes, medical conditions, symptoms and functional impairments. <3/36 deficits = non-frail, >9/36=frail and 4/36-8/36=intermediate.	Frailty increases with advancing age. More prevalent in women than men. 2.6 x more people classified as frail when compared to the Fried criteria. Deficit accumulation approach classified mortality risk more accurately. Does not contain an age predictor which recognises the health of individuals will vary at comparable ages. The extent of frailty improvement is possible and how that is related to age are motivating inquiries.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Ávila-Funes et al, (2011)	Mexican Study of Nutritional and Psychosocial Markers of Frailty	475 people 70+ years community	256 female	Mexico	Quant	Cross sectional	Association of CHS frailty criteria and cognitive impairment, IADL, ADL	Cognitive impairment and low physical activity are the main contributing factors of frailty to disability. Better understanding of frailty sub-dimensions to different adverse health outcomes may help provide adequate management of frailty.
Davis et al, (2011)	Canadian Study of Health and Aging (CSHA)	1295 people 70+ years. Community	37.9% male	Canada	Quant	Prospective cohort study	Frailty Index scores were constructed from the Comprehensive Geriatric Assessment Relationship between impaired balance, morbidity and frailty related to risk of death.	Changes in balance and mobility against other state variables such as attention, concentration, social engagement and state transition may lead to a more complete understanding of frailty.
Dray et al (2011)	None	298 people 65+ years community	Not given	Germany	Quant	RCT Interventional, two different strength training modalities resistance v power + literature review	Application of modified Fried criteria and physical activity questionnaire for recruitment process for pre-frail people into RCT. Literature review of 4 other studies using modified Fried.	116 pre-frail, 1 frail. Most significant criterion was exhaustion (24%) followed by handgrip (20%). Good applicability with refinement needed in 3 criteria, particularly exhaustion and physical activity to enhance clinical usefulness.
Ensrud et al, (2011)	None	1606 people 65+ years community	Men only	USA.	Quant	Cross sectional longitudinal	Vit D levels and frailty status. Mod CHS repeated after 4.6 years. Study of Osteoporotic Fractures (SOF).	Lower levels of vit D (<20.0 ng/mL) are associated with greater frailty levels (1.5 x odds ratio) at baseline but do not predict future increased risk at 4.6 years.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Forti et al, (2011)	Conselice Study of Brain Aging (CSBA).	1016 people 75% over 65 years	44.6 % men	Italy	Quant	Prospective longitudinal survey.	Modified Study of Osteoporotic Fractures (mSOF). Age related cognitive disorders. Conselice Study of Brain Aging (CSBA).	CSBA (lower specificity much higher sensitivity) multidimensional is better predictor of frailty than unidirectional mSOF.
Jacobs et al, (2011)	Jerusalem Longitudinal Cohort Study (JLCS)	840 people community	47.6%	Israel	Quant	Longitudinal cohort study	Fried phenotype. Cognitive impairment was assessed with Mini Mental State Examination (MMSE). Frailty status and cognitive impairment at age 85 and the 5 year mortality rate. Mortality data collected age 85-90.	19.5% frail, 56% pre-frail and 24.5% non-frail, with lower cognition 53.3%, 15% and 7.4% respectively. Frailty status was significantly associated with cognitive impairment. 5 year mortality 44.5%, 20.5% and 13.6%. frailty status was significantly associated with cognitive impairment; frailty alone was predictive of mortality.
Shi et al (2011)	Beijing Longitudinal Study of Aging (BLSA)	3275 people 55+ years community	51.1% female	Chinese	Quant	Longitudinal	To develop an index to evaluate the relationship between age and deficit accumulation in Chinese people. Demographic characteristics SES, function, life style, medical service use, diseases, psychological and cognitive status.	35 deficits identified. Frailer the person the greater the depressive features and cognition. Mortality greater in men than women. A dose response relationship was observed as frailty increased.
Sirola et al, (2011)	HELSINKI Businessmen Study (HBS)	1934 men Mean age 73 years community	Men only	Finland	Quant	Prospective cohort study 26 year follow-up	Postal questionnaire based on fried criteria.	Both pre-frail and frail status were predictors of mortality at 8 years.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Evenhuis et al, (2012)	Healthy Ageing and Intellectual Disability Study (HA-ID)	848 people 50+ years community using Intellectual Disability services		Dutch	Quant	Cross sectional population based	Fried criteria. To obtain insight into prevalence and correlates of frailty in older people with ID.	Prevalence of frailty was 11% at age 50-64 and 18% at age 65 and older. Age Down syndrome, dementia, motor disability, and severe ID were significantly associated with frailty. Future studies should address health outcomes, causes, and prevention of frailty in the ID population.
Gill et al, (2012)	Precipitating Events Project (PEP)	754 people community 70+ years	Not given	USA	Quant	Prospective longitudinal	Fried criteria. To investigate the relationship between hospitalisation and transitions between frailty states over time. Measured every 18 months for 108 months.	Hospitalisation each 18 month interval was 19.7 non-frail, 32.9 pre-frail and 57.2 frail. Hospitalisation had less consistent and more modest effect on transition from states of lesser frailty to greater frailty. Transition from non-frail to frail states were uncommon in the absence of hospitalisation.
Ní Mhaoláin et al, (2012)	Technology Research for Independent Living Clinic in Dublin	301 people 60 + years community	76.3%	Ireland	Quant	Cross sectional	Fried criteria and questionnaires to assess anxiety, depression, loneliness, personality factors and cognition. To understand the fear of falling in fallers transitioning to frailty to identify strategies to reduce falls.	Fear of falling increased with increased frailty status. Age, female gender and lower cognitive scores were associated with greater fear of falling in the robust group.

Author/ date	Study name	Population	Female/male	Country	Type	Design	Measure of frailty used/developed and general notes	Results/outcomes and recommendations
Woo et al, (2012)	None	4000 people 65+ years community	Not given	China (Hong Kong)	Quant	Cohort study longitudinal over 5 years.	To compare 3 bedside tools to predict mortality and physical limitation after 4 years.(1) Fried phenotype. (2)Fatigue, Resistance, Ambulation, Illness and Loss (FRAIL). (3) Frailty Index (Hubbard).	All predicted adverse outcomes. More people categorised into pre-frail and frail by Fried than the other two tools. Sensitivity fell and specificity increased to over 90% with increasing frailty levels. FRAIL tool is comparable to other measures. Addition of physical performance to screening tools may increase predictive accuracy.

Table 2.2- Psychological Aspects of Frailty (listed in country of origin)

Author/ date	Study name	Population	Country	Design and methods	Measure general notes	Results/outcomes /recommendations
Buchman et al, (2007)	Rush Memory and Aging Project	832	USA	Mixed methods donation of brain, spinal cord and muscle/nerve tissue at death.	longitudinal pathologic investigation into chronic diseases to assess the association between incidental Alzheimer's disease, cognitive impairment and frailty	Follow-up showed that an annual rate of change in frailty status was associated with an increased risk of incident Alzheimer's disease. A tenth of a unit scale change in frailty was associated with a 9% increased risk of Alzheimer's disease and cognitive decline. These results suggest that frailty and Alzheimer's disease share similar aetiologies but not cognitive decline.
Boyle et al, (2010)	Rush Memory and Aging Project	761	USA	Mixed methods mixed effect model annual clinical evaluation and donation of brain, spinal cord and muscle/nerve tissue at death. Phenotype and MMSE	To examine the association between frailty and the rate of change of cognition with the risk of increased cognitive impairment.	1 unit in physical frailty was associated with a 63% increased risk of cognitive impairment.
Ertel et al, (2007)	The Families in Recovery from Stroke Trial	(n = 290) over the age of 45 years	USA	Randomised Controlled Trials care as usual and intervention. The intervention was conducted over 6 months totalling 16 meetings in their own homes, and included the participant, primary and professional care givers, friends and family.	Psychological impact of an intervention to improve the IADL, physical performance and cognition. psychologist or social worker trained in family systems and cognitive behavioural therapy	The intervention was conducted over 6 months totalling 16 meetings in their own homes, and included the participant, primary and professional care givers, friends and family. no evidence of any benefits to frail participants in the intervention group with some possible unspecified harmful effects reported.

Author/ date	Study name	Population	Country	Design and methods	Measure general notes	Results/outcomes /recommendations
Cano et al, (2012)	Hispanic Established Populations for the Epidemiologic Study of the Elderly (EPESE)	3050 Mexican Americans aged over 65 years in 5 south western US states.	USA	Mixed methods phenotype of frailty MMSE	The relationship between cognitive impairment, frailty and 10 year mortality.	Cognitive impairment and frailty are risk factors for mortality when taken individually, but when added together frailty alone was significant for risk of death. The authors conclude that in Mexican Americans careful considerations must be made to establish pathways of increasing frailty and cognitive impairment, mortality and quality of life.
Ávila-Funes et al, (2011)	The Mexican Study of Nutritional and psychological Markers of Frailty	Stratified sample of community dwelling people (n = 475), aged over 70 years were drawn from 16 districts	Mexico	Mixed methods a battery of questionnaires to assess health and cognitive status through face to face interviews at home.	Investigated the association of the frailty phenotype combined with a measure for cognitive impairment, and the ability to perform basic Activities of Daily Living (ADL) and Instrumental Activities of Daily Living (IADL).	IADL was independently associated with physical frailty. However, lower physical scores were associated with cognitive impairment alone. the main contributing factors for phenotypical frailty are cognitive impairment and low physical activity. However, they conclude that more consideration of the 5 independent frailty sub-dimensions should be individually investigated separately.

Author/ date	Study name	Population	Country	Design and methods	Measure general notes	Results/outcomes /recommendations
Mitnitski et al, (2011)	Canadian Study of Health and Aging	9,266 people aged 65	Canada	Mixed methods prospective cohort study frailty index of 40 deficits and the MMSE using a multistate transition model.	Cognitive changes of years in relation to frailty status	Frail people were at a higher risk of mortality and that the multistate model can be used to analyse cognitive changes, improvements, decline and death in relation to frailty and other covariates.
Auyeung et al, (2011)	None	4000 Chinese people over the age of 65 years	China	Mixed methods The phenotype of frailty was used with the MMSE	The relationship between frailty and cognitive function over 4 years.	Cognitive decline over 4 years in men were associated with weaker grip strength, sarcopenia, shorter gait and slower chair stand. Weaker grip strength alone was associated with cognitive decline for women.
Lee et al, (2011)	None	4000 Chinese people aged 65 years and older living in Hong Kong communities	China	Mixed methods Prospective cohort study the phenotype of frailty for frailty status, cognitive impairment was assessed with the Community Screening Instrument of Dementia (CSI-D), clinical history	Association between metabolic, atherosclerotic disease, cognitive impairment, mortality and physical frailty independent of sarcopenia.	Results suggest that hypertension was associated with physical frailty in men only. Metabolic and atherosclerotic risk factors were not significant for increased cognitive impairment

Author/ date	Study name	Population	Country	Design and methods	Measure general notes	Results/outcomes /recommendations
Jacobs et al, (2011)	The Jerusalem Longitudinal Cohort Study	840 people aged 85 years	Israel	Mixed methods phenotype of frailty and the MMSE for 5 years.	Association between cognitive impairment and frailty	Cognitive impairment and frailty were significantly associated, and that frailty alone was predictive of mortality.
Matusik et al, (2012)	None	66 women 20 male) over the age of 66 years	Poland	Mixed methods medical health documentation/histories, MMSE and a frailty index	Risk of falls, disability, hospitalisation and death in relation to frailty	12 month follow-up frailty, dementia or cognitive impairment when considered separately were not associated with increased mortality rates. They conclude that a risk assessment of disabled geriatric people should incorporate functional (frailty index with ADL, IADL categories) and cognitive measures jointly.

Author/ date	Study name	Population	Country	Design and methods	Measure general notes	Results/outcomes /recommendations
Ávilla-Funes et al, (2009)	Three city study	5,644 women and 3,650 men	France	Mixed methods 4 year cohort study multicentre cohort study phenotype of frailty (MMSE).	To investigate the risk of cognitive impairment and dementia. To evaluate improved predictive validity of the phenotype of frailty for adverse health outcomes with the addition of cognitive impairment measures.	Cognitive impairment improves the predictive ability of the phenotype of frailty. people classified as frail had lower cognitive function and was more at risk of developing disability over the 4 years
Ávilla-Funes et al, (2012)	Three city study	5,480 people over 65 years of age	France	Mixed methods 7 year prospective longitudinal study The phenotype of frailty was used to assess frailty status, MMSE for cognitive status and face to face interviews to collect data on lifestyle, socio-demographics and self reported chronic diseases	To investigate the relationship between frailty and attributable risk factors for incident vascular dementia to evaluate the risk of cognitive decline	Increased frailty status was found to be a major risk factor incident vascular dementia independent of cognitive impairment and Alzheimer's disease.

Author/ date	Study name	Population	Country	Design and methods	Measure general notes	Results/outcomes /recommendations
Ní Mhaoláin et al, (2012)	Technology Research for Independent Living (TRIL)	(n = 301) over 60 years of age	Ireland	Mixed methods Frailty status was measured using the phenotype model measures of anxiety, depression, loneliness, personality factors and cognition	Fear of falling of fallers transitioning to increased frailty status to evaluate the psychological factors	Profoundly frail person displayed greatly increased depressive levels. People transitioning to frailty who are fallers would benefit from increased psychological support
Ní Mhaoláin et al, (2012a)	Technology Research for Independent Living (TRIL)	People aged over 60 years of age (n = 567)	Ireland	Mixed methods cross-sectional study Frailty status was measured using the phenotype model Anxiety was assessed using the Hospital Anxiety and Depression Scale and depression was assessed using the Centre for Epidemiologic Studies Depression scale.	The relationship between clinically significant anxiety and depression and its association with frailty	Within pre-frail and frail groups higher depression and anxiety rates were observed requiring pharmacology

Table 2.3- Qualitative Studies into Frailty

Author/ date	Population	Design and methods	General notes	Results/outcomes /recommendations
Puts et al (2009)	25 Community dwelling Dutch non-frail and frail people	Grounded theory Semi-structured interviews	Meaning of frailty to older people	Frailty-poor health, walking difficulties, feeling down, being anxious, few social contacts and being unable to do the things you want to do. Men physical dimension, women-elaborated on psychological and social components. Definitions should reflect the meaning of frailty for older people.

Author/ date	Population	Design and methods	General notes	Results/outcomes /recommendations
Nicholson et al (2013)	15 frail people 85 years or older living in the UK (inner London).	Psychosocial narrative approaches and psycho-dynamically informed observation x 4 interviews over 17 months. psychosocial analytical methods	To understand the experiences of home dwelling frail older people to enhance the evidence base for person centred care. Frailty determined by clinical multidisciplinary intermediate care team.	Findings challenge the way frailty is negatively viewed in predominant models. It is understood by frail older people in terms of potential capacity-a state of imbalance in which people experience accumulated losses whilst working to sustain and perhaps create new connections. The presence of others to engage and listen to their stories, recognising and valuing their daily rituals anchors their experiences and is vital to retaining capacity and quality of life.

Author/ date	Population	Design and methods	General notes	Results/outcomes /recommendations
Nicholson et al (2012)	17 frail people living at home in the UK	In-depth interviews over 17 months 2 psychosocial narrative approaches- biographic narrative interpretive method and free association narrative interview method	Descriptions of living in the margin with little recognition of or support for the work of living and dying during the ageing process.	The experience of aging with frailty operates in binary modes: social and health; independence or dependence; living or dying and hinders ways to negotiate smooth transitions. Physical limitations and functional loss makes end of life concerns real. Effort to develop and sustain connections to physical environment, routines and social network help maintain continuity with present.

Author/ date	Population	Design and methods	General notes	Results/outcomes /recommendations
Grenier (2006)	Frail older women number/age not given.	Not given, interviews.	To explore the lived experience of older women and the distinction with the professional construct of frailty. To understand the emotional aspects that lies within the experience of impairment, disability and decline in older age.	Women's experience of feeling " <i>frail</i> " and identity of self serve as protective mechanisms from becoming frail. Understanding and addressing the emotional aspects of what healthcare professionals understand as frailty could improve the likelihood of appropriate professional responses to managing frail older people.

Author/ date	Population	Design and methods	General notes	Results/outcomes /recommendations
Chater (2002)	Older frail people, age/gender/number not given.	Lived experience of frail older people.	To explore the language of ageing used by nurses and policy makers and frail older people.	Perceptions of frailty are compared to references of older/younger family and friends. Physical characteristics (wrinkles, grey hair, slow, unsteady gait, decline in function and energy) are socially constructed symbols. Frail people do not acknowledge getting old or feeling old, but slowing down. Frailty is not always associated with sickness or disease. Ageing was described as feeling worn out/tired and was not equated with frailty of disease. Healthcare and policy makers overemphasis the biomedical aspects of health status , negatively over-medicalise aspects of health status and is at odds with the lived experience of frailty.

Author/ date	Population	Design and methods	General notes	Results/outcomes /recommendations
Stephenson et al (1999)	19 men 20 women Canadian's 67-100+ years of age living alone independently	Interviews 2 separate sets with same protocols but changing gender of interviewer	Concept of independence and assessing differences between two sets of conversations.	Independence is culturally derived construct that does not reflect the views of frail people. Social support, routines and continuity of lifestyle promotes autonomy and independence; this factor influence the lives of frail people but does not equate to being frail and can be present when a person is frail.

Appendix F - Research Diary

This has been included to show an audit trail by giving evidence of the researcher's journey through the project. This diary is not exhaustive: a snapshot throughout the research process. I have in all honesty often forgotten to write it, but it does demonstrate a journey through the research process. I understood the importance to document and reflect what I am feeling at every stage of the research process in order to be truly reflexive and create a credible audit trail.

August 2011

I have been thinking about my reasons for undertaking research. I wanted a professional qualification with lots of scope for diversity of employment. I remember the impact that participating in research had on my learning at the end of my health promotion degree. Probably the most important is my wish to study and gain a higher qualification. This is perhaps not considered a suitable reason for beginning a research project, yet I think that without admitting to myself that this is a driving force I am hardly being honest.

I care deeply about people and wanted to effect change but I never felt a deep compulsion to be the person doing the caring, or I would have entered nursing. I think it is important to remind myself that I am driven and my '*self worth*' derived entirely from what I personally achieve, and my perceived status. When I started my clinical physiology degree I was so disappointed to find that there was contention over whether physiologists are professionals and more so that they were not considered as such to afford them mandatory state registration to practice, but voluntary registration. Physiologists autonomy is sometimes dubious and often non-existent, it is one thing to say that one is supposed to be an autonomous, independent practitioner but if all circumstances of employment prevent this, one is not. Because of my strong wish to be professional and autonomous I fully intended to pursue a career within teaching aligned with physiology and academia. During my training I was obliged to travel to all NHS trusts throughout Wales, I was pleasantly surprised by the difference in the way that some physiologists were perceived and treated and their ability to work as autonomous professionals, granted these were highly specialised roles but they offered future hope and aspiration. The research I was a participant in was about my familial hypercholesterolemia a genetic, inherited condition. I felt that this research would in time benefit me.

Thinking about frailty

When I first started this journey I had little knowledge of the concept of frailty. Now however, I am beginning to understand that it is a highly subjective term that may mean something different to another person, particularly frail people. This realisation has made it apparent that my experiences of frailty through clinical practice and personal observations may inadvertently form a bias perspective. Therefore, I have considered my own thoughts and feelings so that I am aware.

I have no grandparents as they all died when I was very young, and thus, I have no memory of them. My experience of frailty extended to my father's illness and cancer treatment, which ultimately caused his untimely death. My professional background has been within the

specialism of clinical physiology, specifically cardiology, health promotion and wellbeing, and latterly teaching the former subjects. Ultimately, I had no professional knowledge or understanding of frailty at the inception of the research. In fact, virtually none of my friends within physiology even acknowledge the term, and I must admit I was like them at the projects inception. I have spent a great deal of energy explaining to health care professionals what frailty is, I now just say older people instead when confronted with a glazed look or bewilderment. However, my impression of older people was one of increased inability to look after themselves and often being alone. Indeed my aunt who is in her 8th decade has bilateral hip replacements, looks malnourished and lives with my cousin since the death of my uncle. I undertook this study because of my lack of understanding of the concept of frailty meaning that I could approach it without preconceptions as to its nature. This, I believe, has helped me to look from the outside into the depths of frailty to understand its meaning to health care professionals and frail people alike.

December 2011

I have reviewed the current literature pertinent to this study, the tables are formed and organised into themes. I have been thinking about what methods and methodologies have been used previously. I find it difficult to understand how the data drawn from such large cohorts could identify and separate the things that make a person frail from things that make little difference to being frail or not. It would be impossible to assess such large cohorts and simply looking for the most common diseases / disorders with the rational that because these things are more prevalent among older people then that's what makes them frail. I feel that this is highly simplistic and a new approach is needed. I have realised that to find out what makes a person frail is to separate people into frail and compare with non-frail. It seems common sense to me! If you want to find a difference you must compare two things, this is how I was taught science at school. I was talking to my elderly aunt recently and she did not complain about her painful joints or being in a wheelchair, I had assumed that it would. It is obvious to me that the literature does not involve the views of frail people themselves. We health and social care professionals assume that certain things are the more important for older people, I don't recall any of them being asked. I've decided to design the study to look at these aspects with the hope that it helps our understanding.

August 2012

I have just returned from Singapore after my first presentation ever at an international conference. I am still in shock and keep looking at the certificate for best student paper. I now feel that I have something that could make a difference and have renewed energy going forward. This has been particularly beneficial to Michelle, because she now understands what I'm trying to achieve and the passion I have for the subject. I had not felt as nervous until I looked into the audience and seen her sitting at the front. I did not realise how important it was for me to have her approval and support.

I have a double celebration; the long awaited permission from ABHB has arrived. So faculty ethics submission can be approved, finally!

May 2013

The final ethical permission has arrived, ADSSC have taken almost 12 months to approve access to their services. Data collection can now begin and the frustration of waiting stops. I have been looking forward to gathering the data for a long time. I am intrigued as to what I might find out, something new? Will it work? I have been defending my rational and

methodology, so will this prove the point? I'm certain that it will help me understand frailty and more importantly what really helps frail people. I eager to get stuck into this phase, its quite exciting!

Oct 2013

Gwent R&D have completed their audit and returned my site file. I am relieved that they have such positive comments. To be told that my file has been used in the department as an exemplar of how site files should be organised displayed and kept was very satisfying indeed. I think I have been the first researcher to be audited from the University and the supervisory team were nervous about it, I shared that anxiety with them.

Jan 2014

I have started back after the festive break again to further analyse the interview transcript, I have decided to transcribe the recording again and compare it with the first draft. It has proven very worthwhile doing this again. I have the same words but more detail from including pauses, laughing and other nuances that add detail. I have looked back into my diary to remind myself of the thoughts and rational long forgotten to help me understand why I coded certain things and what I thought I understood at that time. I now realise the value and importance of keeping a diary or these thoughts feelings and emotions would have been lost to me.

It has occurred to me that people often seemed quick to blame others for their situations in which they found themselves, however, 'A' had not done this, for example, his early family life and the hardship they faced with his father being absent. I found it difficult to remember why I had written identity in the initial coding. Looking into my diary I understood that 'A' has self worth and empowerment over his situation. Then I wondered how this felt I know that when something happens to me I feel powerless and this leads me to question my sense of self and independence. However, I also sometimes excuse myself from feelings because if I did not then the identity questions that the feeling raised would be too enormous to cope with. A simple example of this might be of course I have so much to do, I'm working full time, have to write on weekends, by saying this I do not need to question my time management or family responsibility but merely am able to blame a situation which was not my choice, which it is of course.

This diary is not complete, in that I stopped writing it when I no longer found it necessary. Towards the end of my studentship, I was writing my thesis and working on it at every possible moment. Consequently, there was not a need to remind myself what I had do The process of writing up the thesis did not need to be documented in order to evidence an audit trail

Reflections on research process – to show audit trail by giving evidence of decision making and some experiences of the researcher

Sampling

Whilst the population of older people is easily available, the number of frail people is unknown, although the Gwent Frailty Service (GFS) has had 20,000 patients referred to them. I am fortunate to have access to frail people assessed by the GFS and Social Services (SS). This makes the choice of purposive sampling the most effective recruitment strategy, since it is the only way I am able to easily identify non-frail and frail people. I have decided not to use posters to help recruitment because the GFS, SS and then GP surgery receptionist will identify suitable candidates, provide a leaflet for them to read and if a positive response will provide me with their contact details.

SS are located in the adjacent office have been most supportive providing first contacting frail people to ask for permission for me to contact potential participants who in the main are of younger age than those recruited via the GFS. I have been visiting the GP surgery regularly, this has helped the staff understand my needs and they are fully co-operative: making them tea /coffee has worked well. I was in luck when I started to recruit the non-frail cohort via the GP surgery as it was flue jab season, and the surgery had a steady flow of people attending.

Data collection and interview

I was anxious about making the first phone call, what should I say? I deliberated for some time how I should make my approach, in the end I realised that I was becoming more 'wound-up' the more I thought about it and decided to just dial the number. I introduced myself and it all just, came out! A date and time was then agreed and I was away.

I have found it difficult to arrange patient files through the hospital. I have decided to approach the records department direct. I happened to meet with two members of the medical records team one has just completed her PhD and so was most co-operative and the patient files appeared within 3 days of requesting them. CRT, SS and GP data was easily available electronically after training on the databases. I soon realised that it is far easier to develop a collection tool based on the data found as the supervisory team had suggested.

The day of the interview, I travelled to the participant's house for the final time after two previous visits to discuss the study and then meet with the family and provide them with the interview schedule. I was early and I was aware that my thoughts were occupied with my teenage daughter who had the day before undergone surgery for an acute appendicitis. This strangely helped calm my nerves, after all this was the first interview I had ever done. I had previously tested the equipment and as I sat down hoped I would remember how it worked. I made sure I consented with a witness present, switched on the recorder and asked the first question. It was remarkable easy to listen to this gentleman and I relaxed into the interview. Thinking about his experiences, I could identify with much that he said, although I was surprised with the clarity with which he recounted his life and experiences. I found myself wanting to sort of, counsel and support him, but I resisted the temptation knowing that this was not my remit and professional distance was essential to remain objective.

I left the interview and sat outside the participant's home, for a few minutes I was elated and relieved with the results of my first interview. I then realised that I had not checked whether I had managed to record anything or if it could be heard and transcribed, I was relieved when I played back to find that the recording was clear and audible. Next I felt a sudden feeling of despair, with the apparent limitations and suffering 'A' was undergoing every day. I had little appreciation for this aspect and it hit me hard, I did not expect this at all.

Ethics

I believe that a qualitative research interview should be a beneficial encounter for the participant as well as the researcher. With this in mind I felt that the participant should be allowed to discuss what he felt was relevant and I should listen empathetically. I felt that I did listen in this way during the interview. However, I almost felt that in order to make the interview as empowering I should talk further with the participant about his feelings surrounding his chronic pain. With hindsight I am glad that I did not do this. The participant may have had a more beneficial and empowering experience by having been allowed to talk about his feelings without anyone giving him advice or information.

Reflexivity

I feel that the interview I have undertaken has provided the participant with a balance of information, which is provided through being empathetic, non-judgemental and providing positive regard (listening). I have subsequently changed the way I behave in my work and at home, I am now more inclined to listen to the people for a lot longer before offering suggestions or advice. This has allowed me to identify and understand their issues, what they would really like or what their problem really is.

Model for reflective practice (Johns and Freshwater, 1998)

Description:

Write a description of the experience.

What are the key issues within this description that I need to pay attention to?

Aesthetics:

What was I trying to achieve?

Why did I act as I did?

What are the consequences of my actions, (1) for the patient and family, (2) for myself, (3) for people I work with?

How did I feel about this experience when it was happening?

How did the participant feel about it?

How do I know how the participant felt about it?

Personal:

What internal factors influenced my decision-making and actions?

What external factors influenced my decision-making and actions?

What sources of knowledge did or should have influenced my decision making and actions?

Ethics:

Could I have dealt better with the situation?

What other choices did I have?

What would be the consequences of these other choices?

Reflexivity:

How can I make sense of this experience in light of past experience and future practice?

How do I **NOW** feel about this experience?

Have I taken effective action to support myself and others as a result of this experience?

How has this experience changed my way of knowing in practice?