



The Scottish
Government

Older People Living in the
Community - Nutritional Needs,
Barriers and Interventions: a
Literature Review

Health and Community Care



**OLDER PEOPLE LIVING IN THE COMMUNITY -
NUTRITIONAL NEEDS, BARRIERS AND
INTERVENTIONS: A LITERATURE REVIEW**

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CONTENTS

	PAGE
EXECUTIVE SUMMARY	i
1 INTRODUCTION	1
Summary	1
Aims of the literature review	1
Search criteria/review strategy	1
Background and context	3
Structure of review	3
2 PHYSIOLOGICAL EFFECTS OF AGEING	4
Summary	4
Weight changes and BMI in older people	4
<i>Weight gain</i>	5
<i>Weight loss</i>	5
Discussion	6
Body composition and functional status as a result of ageing	6
Changes in taste and smell	6
Oral health	7
Key findings	8
3 NUTRITIONAL NEEDS OF OLDER PEOPLE	9
Summary	9
Energy	9
Fat	9
Protein	10
Vitamin D	10
Fibre (Non-starch polysaccharide (NSP))	11
Fluid	11
Key findings	12
4 PREVALENCE AND INCIDENCE OF MALNUTRITION IN OLDER PEOPLE	13
Summary	13
Undernutrition	13
Overnutrition	15
Identifying malnutrition	15
Key findings	17

5 BARRIERS TO OLDER PEOPLE MEETING THEIR NUTRITIONAL REQUIREMENTS	18
Summary	18
Socio-economic factors (social and financial issues)	18
Geographical differences across Scotland	20
Social and physical factors	21
Mental health problems	21
<i>Depression</i>	22
<i>Cognition</i>	22
<i>Dementia</i>	22
Other health problems	23
<i>Impact of medications</i>	23
<i>Food safety</i>	23
Key findings	24
6 EVIDENCE TO SUPPORT CURRENT PRACTICES AND INTERVENTIONS	25
Summary	25
Protein – energy deficiency	25
<i>Increasing nutritional intake through diet alone</i>	26
<i>Increasing nutritional intake through dietary advice alone compared to dietary advice and supplements</i>	27
<i>Increasing nutritional intake through the use of supplements</i>	28
<i>Other macronutrient sources</i>	28
Discussion	29
Micronutrients (i.e. vitamins and minerals)	30
<i>Ability to perform activities of daily living in relation micronutrient status</i>	30
<i>Thought processes in relation to micronutrient status</i>	31
<i>Vitamin D</i>	32
Other nutrients – Fibre (Non-starch polysaccharide (NSP))	33
Key findings	34
7 EVIDENCE TO SUPPORT COMMUNITY INITIATIVES	36
Summary	36
Current policies	35
Provision of food services	36
Examples of initiatives within Scotland	37
<i>Recipe for life</i>	38
<i>Community health exchange (CHEX)</i>	39
<i>Community food and health (Scotland)</i>	39
Examples of initiatives outwith Scotland	40
<i>Escorted shopping service – Age Concern Norwich</i>	41
<i>Barton lunch club – Age Concern Oxon, Oxfordshire</i>	41
<i>Net neighbours – Internet shopping service, Age Concern, York</i>	41
Conclusion	42
Key findings	43

8 CONCLUSION	44
Aims of the review	44
Nutritional needs of older people	44
Barriers to older people meeting their nutritional requirements	44
Nutritional interventions for older people	44
Further research	45
Recommendations	45
REFERENCES	47
ANNEXES	56
Annex 1: Project Contacts	59
Annex 2: Summary of literature	57

List of Tables

Table 1.1	Terms and key words used in searches
Table 2.1	BMI classification in adults
Table 2.2	The prevalence of obesity in older people in Scotland
Table 5.1	Summary of factors influencing dietary intake
Table 5.2	The three main characteristics of food poverty
Table 5.3	Social and psychological factors which impact on dietary intake
Table 6.1	Summary of findings comparing dietary advice with no dietary advice
Table 6.2	Summary of findings comparing dietary advice with dietary advice and supplements
Table 6.3	Summary of findings from systematic reviews investigating the effect of vitamin supplementation on cognition and mood
Table 6.4	Summary of nutritional interventions and evidence base
Table 7.1	Policies which have the potential to impact on nutritional status
Table 7.2	Recipe for life interventions
Table 7.3	Examples of community food and health projects
Table 7.4	Key issues relevant to community food projects which support older people meeting their nutritional requirements

Glossary of terms

Body composition	proportions of fat, muscle and fluid
Body mass index	index of weight in relation to height (weight (kg)/height (m ²))
Cognitive ability	ability to process information
Dietary intake	nutrient intake from food alone
Dietary intervention	intervention which increases nutrient intake by the use of food
Functional status/ability	ability to perform activities of daily living
Macronutrient	fat, protein and carbohydrate
Malnutrition	an umbrella term which includes undernutrition, overnutrition and an imbalance of nutrients
Micronutrient	vitamin or mineral needed in small amounts for normal body function
Nutrient density	the amount of nutrients in relation to the energy content of food or diet
Nutritional screening	method of identifying people who are undernourished or at risk of becoming undernourished
Nutritional intake	intake of nutrients from all sources including food and supplements
Nutritional intervention	intervention to increase intake by the use of food and supplements combined
Nutritional supplement	addition to the diet which provides extra nutrients - in the context of this review it refers to supplements which contain macronutrients
Obesity/obese	classified as a BMI of $\geq 30\text{kg/m}^2$
Overnutrition	a result of an excessive food intake and/or restricted or limited activity
Overweight	classified as a BMI of 25 – 29.9kg/m ²
Undernutrition	a result of an inadequate food intake and/or the presence of metabolically active disease

Underweight

classified by WHO as a BMI of $<18.5\text{kg/m}^2$. The MUST explanatory Booklet page 5 categorises underweight as both <18.5 and $18.5-20$.

EXECUTIVE SUMMARY

Introduction

1. This literature review focuses on the nutritional needs of older adults living in the community, the barriers to them meeting their nutritional needs and interventions which may be successful in improving nutritional intake. Good nutrition plays a vital role in the wellbeing and health of older people but also helps delay and reduce the risk of developing disease.

Aims

2. The aims of the review are to:

- Identify the nutritional needs of older people living in the community and barriers to them meeting their nutritional requirements.
- Identify effective dietary and other interventions, including interventions to improve food access for older people (including cooking clubs, delivered meals/food etc) and use of supplements (of which vitamin D may be one), to improve health outcomes (including nutritional status) of this population group.

Methodology

3. The review focuses on the nutritional needs of older people living in the community in Scotland and in particular those people who are at risk of nutritional deficiencies. Those chronically ill with degenerative disease (e.g. cancer, dementia or Parkinson's disease) are not included.

4. Literature published between 1998 and 2008 was reviewed along with key relevant publications prior to 1998. Relevant studies from elsewhere in the UK and from the rest of Europe and the USA are also included where appropriate.

5. Medline and other databases found within OVID¹ were searched. Various organisations in the public and voluntary sector were contacted to obtain their latest reports and policies including examples of good practice².

Background

6. The ageing population in Scotland has implications for health planners. By 2031 it is predicted that the proportions of people aged 50 years and over will rise by 28% with the greatest increase being within the "older" old population (i.e. those over 75 years). Identifying the nutritional needs of older people, the barriers to them meeting these needs and the interventions to improve nutritional intake has the potential to reduce expenditure in social and health care by enabling them to stay at home.

¹ Ovid is an internationally recognized source of electronic medical, scientific, and academic research information solutions which includes over 1,200 journals, over 500 books, and more than 200 databases. It includes access to databases and full text for the HealthCare and Academic communities such as: AMED; British Nursing Index; Cinahl; Embase; IBSS; Inspec; PsycInfo & Journals@Ovid.

² These are listed in Annex 1.

Main findings

7. Ageing is associated with loss of muscle stores and increases in fat stores. A 10% reduction in muscle mass has been shown to decrease functional ability, increase risk of infection and is associated with increased levels of mortality. Additionally, increasing levels of chronic illness and disease, along with a deterioration in taste, smell and teeth can lead to and exacerbate poor nutritional status.

8. Increasing numbers of older people will retain their own teeth over the next 2-3 decades due to a reduction in extractions at younger ages and this along with increasing numbers of older people may have a significant impact on the provision of dental services.

9. The incidence of overweight and obesity increases with age and this is associated with an increased risk of a number of age-related disorders including type 2 diabetes, hypertension, cardiovascular disease and osteoporosis. Involuntary weight loss is associated with increased risk of falls, increased morbidity and increased mortality. Both over and undernutrition can result in complications and thus impact on a person's level of dependence and their ability to source and prepare food.

10. Generally, the nutritional requirements of the older adult are the same as those for the rest of the adult population, although there are some specific recommendations for older people. Energy requirements are generally lower in older people while vitamin and mineral requirements remain the same. The nutrient density of the diet in older people is therefore of prime importance to ensure that deficiencies do not develop.

11. Older people are at increased risk of developing conditions such as cardiovascular disease and constipation and as such it may be prudent to consider the total amount and type of fat provided in interventions, along with the amount of fibre and fluid. Like the rest of the adult population older people should therefore be encouraged to eat less saturated fat (i.e. animal type fat), eat more fibre (which can be found in wholegrain products, fruit and vegetables) and drink more fluid.

12. Malnutrition within the whole population is a significant financial burden for health and social care systems and with the incidence of obesity in Scotland rising, it is a serious public health problem. Little information is available on the incidence of undernutrition in older people living in the community. Undernutrition could be prevented or treated with the implementation of appropriate nutritional screening and management but the use of nutrition screening tools in the community in Scotland is limited. Nutrition screening tools may not detect all nutritional deficiencies in older people and the cost effectiveness and impact on outcome of nutritional screening in the community are not known.

13. There are a number of barriers experienced by older people living in the community in meeting their nutritional needs. Chronic illness and disability impacts on a person's ability to buy, prepare and eat food. Generally, people on low incomes have poorer diets than more affluent people and as 16% of pensioners in Scotland

live in poverty this is of concern. The location of food stores may also limit shopping opportunities.

14. Poor nutrient intake (i.e. energy, protein, vitamins and minerals) can impact on an older person's functional and cognitive ability and thus their ability to participate in activities of daily living. There is a serious lack of research in the use of dietary interventions (i.e. improving nutritional intake through the use of food) in older people living in the community. As a result it is not known if this would be either clinically effective or cost-effective in improving outcome. Where evidence is available it is inconclusive and so health practitioners should try using real food in the first instance. Where supplements are deemed to be necessary they should not be administered in isolation and appropriate dietary advice should also be given.

15. There is currently no evidence that vitamin and mineral supplements improve cognition or prevent cognitive decline in the older adult. However micronutrient deficiencies are common in older people and whilst supplementation does not have a role to play in cognition, nutritional interventions aimed at undernourished older people should consider micronutrient intake in addition to macronutrient intake to prevent micronutrient deficiencies.

16. It has however been recommended that all adults over 65 years should take a vitamin D supplement to enable them to meet the requirement of 10µg vitamin D daily. This is important as vitamin D deficiency has been implicated in a number of disease states including osteomalacia, cardiovascular disease, tuberculosis, multiple sclerosis and type I diabetes. There is concern that this recommendation is being overlooked by both health professionals and the general public. As older people are entitled to free prescriptions, this supplement could be prescribed thereby eliminating cost as a barrier to people taking up this recommendation. Tablet size has also been a concern in the past. This may need to be addressed.

17. When devising nutritional interventions and initiatives to enhance nutritional intake in older adults, improvements in both a person's ability to perform activities of daily living and their nutritional status should be considered the primary outcomes. To achieve this packages of care including diet and activity may be most effective as there is good evidence that encouraging physical activity has a positive effect.

18. There is evidence to support the encouragement of social eating e.g. lunch clubs or involving other family members as this has the potential to improve dietary intake and positively impact on quality of life. Where appropriate, and where possible, this should be tried before initiating supplements.

19. Policies and services are focusing on the community as the primary axis for long-term care for older people and this is reflected in the wishes of older people themselves. There are a number of national and local initiatives which have the potential to impact on older people's dietary intake although as yet the impact of these has not been evaluated. Examples of these are lunch clubs, food cooperatives, meal delivery services, free personal care and food trains.

20. To date no research has been undertaken to establish if current services are meeting the nutritional needs for older people and so it is unclear whether these

services are effective. A more coordinated approach to service provision and increased evaluation is recommended as a result of this review.

Conclusion

21. Due to the significant risk for older people, the quality of the diet is extremely important to ensure that both macronutrient (carbohydrate, fat, protein and energy) and micronutrient (vitamin and mineral) requirements are met. This can be difficult, particularly for the frail older person.

22. There is only limited evidence which evaluates the impact of dietary and nutritional interventions and most of the evidence which is available has been collected in the acute setting.

23. This review gives a baseline summary of available information, from a Scottish perspective, on the nutritional needs of older people and the barriers to them meeting their nutritional needs. These include encouraging more social eating, the use of peer educators and encouraging activity in older people. It also highlights the lack of an available evidence base to support effective interventions which may improve the nutritional intake of older adults in the community. There is an urgent need for such research.

24. Recommendations for further research are made in the areas of nutritional screening, overcoming the barriers that older people face in meeting their nutritional requirements and interventions which could improve nutritional intake and status. In addition recommendations are made in the areas of nutrition screening, dietary intake and supplementation and the outcome measures of nutritional research for the older population. These recommendations are summarised below.

25. In terms of nutritional screening, the recommendations include extending nutritional screening practices from the acute setting into the community setting, beginning with a pilot. In addition nutritional screening should consider not just nutritional status but also other factors such as barriers an individual has to meeting their nutritional requirements.

26. In terms of nutritional intake and supplementation, it is important to recognise that current recommendations (in particular for vitamin D) are not being followed. In view of this consideration should be given as to how to enhance the uptake of public health messages related to diet and nutrition in the older adult.

27. As nutritional care should incorporate information about both dietary intake and physical activity, nutritional research should aim to focus on an individual's ability to perform activities of daily living, preventing falls and independent living initiatives.

28. Based on limited existing evidence and areas of good practice there are many steps which can be taken by policy makers to improve the nutrition of older people still living at home in Scotland. In particular, steps could be taken to make sure existing recommendations about nutrition are adhered to.

1 INTRODUCTION

Summary

The introduction provides a general overview of the literature review including:

- the aims of the review
- the methodology used to undertake the review

In addition it provides relevant background and context regarding the changing demographic of the Scottish population and subsequent implications.

1.1 Good nutrition plays a vital part in the wellbeing and health of older people but can also contribute in delaying and reducing the risk of developing disease. In view of this the Scottish Government aims to prevent poor dietary habits and malnutrition which occur through changing life circumstances (Scottish Government, 2008a). Action to secure longer healthier lives for the people of Scotland is a priority (Scottish Government, 2009a).

1.2 Although there is a plethora of information on the nutritional needs of older people living in the community there are few succinct summaries of this evidence. In addition while the barriers to older people meeting their nutritional requirements are well documented there is little known about effective interventions which could be utilised to improve the nutritional status of older people living in the community. This literature review has therefore been undertaken to give a greater understanding of these areas and to provide future evidence to inform Scottish Government action.

Aims of the literature review

1.3 The aims of this literature review are to:

- Identify the nutritional needs of older people living in the community and barriers to them meeting their nutritional requirements.
- Identify effective dietary and other interventions, including interventions to improve food access for older people (including cooking clubs, delivered meals/food etc) and use of supplements (of which vitamin D may be one), to improve health outcomes (including nutritional status) of this population group.

1.4 This review will focus on the nutritional needs of older people living in the community, the barriers to them meeting their nutritional needs and the interventions which may be successful in improving nutritional intake. In particular those older people who are at risk of nutritional deficiencies will be discussed. This includes all those individuals who are malnourished, at risk of malnutrition, physically frail, cognitively frail, and who are living in the community.

Search criteria/review strategy

1.5 The World Health Organisation (WHO, 2002) define older adults as being people aged 50 years and older and so this review utilises this definition and includes those

people within this age range. A pragmatic review of the literature was undertaken with the emphasis on recent high quality reviews of the evidence.

1.6 To ensure currency, only literature published between 1998 and 2008 was reviewed. However, specific key reports and studies of high importance (which remain the current key position papers) published prior to 1998 are also included.

1.7 The review focuses on older people living in Scotland, however, relevant studies, reviews and policy documents from elsewhere in the UK and in some cases from the rest of Europe and the USA are also included.

1.8 Medline and other databases found within OVID³ were searched and results were sorted by quality of study. Various organisations in the public and voluntary sector were contacted (Annex 1) to obtain their latest reports and policies including examples of good practice in this area. There was very little return from these contacts other than direction to literature already known to the team.

1.9 Studies involving only institutionalised older people (e.g. care homes/sheltered housing) and those chronically ill with degenerative disease (including cancer, dementia or Parkinson’s disease) have not been included.

1.10 Table 1.1 shows the key words and phrases used in varying combinations when searching databases. These terms were searched as single words, as combinations of words (separated by ‘AND’, ‘OR’ and ‘NOT’) and individual or combined phrases. When the terms produced a large volume of information additional words were gradually introduced to focus the search. This resulted in titles and abstracts being identified which were of high relevance to the review. English language articles only were analysed and reviewed.

Table 1.1: Terms and key words used in searches

elderly	ageing	older people	older adult	diet
nutrition	malnourished	malnutrition	undernutrition	obesity
physiology of ageing	physically frail	cognitively frail	rural	urban
community	interventions	socio-economic status	social care	nutritional screening

1.11 The databases used to search for grey literature were Social Care Online, Intute, PsycInfo and Scopus. The key words used either individually or in combination were older adult, elderly, malnutrition, nutrition and community.

³ Ovid is an internationally recognized source of electronic medical, scientific, and academic research information solutions which includes over 1,200 journals, over 500 books, and more than 200 databases. It includes access to databases and full text for the HealthCare and Academic communities such as AMED, British Nursing Index, Cinahl, Embase, IBSS, Inspec & Journals@Ovid as well as Medline and PsycInfo

Relevant websites such as those of Community Food and Health, the Caroline Walker Trust, European Nutrition for Health Alliance, American Federation for Aging Research, Malnutrition Advisory Group and Medline Plus were also searched for relevant publications. Where data was found this has been included.

Background and context

1.12 The UK as a whole has an ageing population. In Scotland the total population is relatively stable but the numbers and proportions of older people are growing. In 1900 the life expectancy in Scotland was 40 years of age, in 2004, this had risen to just over 74 years of age for males and 79 years of age for women (Scottish Executive, 2007). Although life expectancy, health and health related behaviours have shown a steady improvement over the last 50 years, health inequalities within Scotland remain. More advantaged social groups have seen a faster improvement and this has resulted in a widening gap between the bottom and top of the social scales (Macintyre 2007).

1.13 Currently, in the UK as a whole, 33% of the population is over 50 years of age. In Scotland there are approximately 1 million people aged 60 years and over which translates into approximately 21.5% of Scotland's population. By 2031 it is predicted that the proportions of people aged 50 years and over will rise by 28%. In contrast the proportion of people aged over 75 years is predicted to rise by 75% (Scottish Executive, 2007).

1.14 This increase in the number of older adults residing in Scotland has important implications for health planners. The increasing age of the population will place large demands on health and social care systems. Indeed it is suggested that health and long term care will account for about half of the increase in age-related social expenditures between 2000 and 2050 (Gray, 2005). Although there is an inevitable increase in the use of healthcare systems with an ageing population, diet and nutrition play a fundamental role in optimising health. As such diet and nutrition can be targeted as a way of helping older adults reach their health potential (Scottish Government 2008a). Identifying and meeting the nutritional needs of older people has the potential to reduce this increase in social and health care expenditure.

Structure of review

1.16 The structure is outlined below.

Summary structure of the literature review

- Physiological effects of ageing
- Nutritional needs of older people
- Prevalence and incidence of malnutrition in older people
- Barriers to older people meeting their nutritional requirements
- Evidence to support current practices and interventions
- Evidence to support food access interventions in the community
- Conclusion

2 PHYSIOLOGICAL EFFECTS OF AGEING

Summary

This chapter provides an overview of the physiological consequences of ageing and the resultant impact this has on nutritional status and dietary intake.

It covers:

- Changes in weight as a result of ageing
- Changes in body composition and functional status as a result of ageing
- Changes in taste and smell as a result of ageing
- Impact of oral health and dentition on dietary intake

2.1 The older population is extremely diverse with large ranges in, not only age, but also levels of activity, fitness, frailty and dependency. In addition the ageing process *per se*, whether there is disease present or not, results in progressive and irreversible biological changes. It is associated with changes in body composition (i.e. changes in proportions of fat and muscle stores), a reduction in functional ability (i.e. ability to perform activities of daily living), altered sense of taste and smell and changes in the status of teeth. These changes impact individually and collectively on a person's ability to meet their nutritional requirements and thus their optimum nutritional status. It is, therefore, important to review the implications of these changes as this provides context when reviewing barriers to, and interventions for, older people meeting their nutritional requirements.

Weight changes and BMI in older people

2.2 Weight alone is a poor marker of nutritional status as it does not take into account a person's height. In view of this, weight is usually converted to Body Mass Index (weight (kg)/height (m²)). The standard World Health Organisation (WHO, 2009) classifications for BMI are shown in Table 2.1.

Table 2.1. BMI Classification in adults

BMI (kg/m ²)	Classification
< 18.5	Underweight
<16.0	Severe thinness
16.0 – 16.99	Moderate thinness
17.0 – 18.49	Mild Thinness
18.5 – 24.99	Normal Range
≥ 25.0	Overweight
25.0 – 29.99	Pre-obese
≥ 30.0	Obese
30.00 - 34.99	Obese Class I
35.00 - 39.99	Obese Class II
≥ 40.00	Obese Class III

WHO (2009) http://www.who.int/bmi/index.jsp?introPage=intro_3.html accessed 20.1.09

2.3 Despite BMI being regularly used as a marker of nutritional status it is only a crude marker of nutritional status and does not take into consideration body

composition or where fat is stored. This is important as visceral abdominal fat (i.e. fat stored around the abdominal area) is associated with increased risk of cardiovascular disease and type 2 diabetes (Cook et al., 2005; Grant et al., 2007).

2.4 Despite the older population being extremely heterogeneous there are clear trends identifiable in weight loss and weight gain which occur in advancing age.

Weight gain

2.4.1 Weight gain resulting in overweight and/or obesity occurs when a person’s energy intake exceeds their energy expenditure (through metabolism and daily activity). Older people expend less energy as a result of lower metabolic rates and changes in lifestyle with increased levels of sedentary behaviour (Phillips, 2003) resulting in weight gain. The levels of overweight and obesity (as measured by BMI) in adults in Scotland are shown in table 2.2.

Table 2.2: The prevalence of obesity in older people in Scotland

Age	Men		Women	
	Overweight (BMI: 25 – 30 kg/m ²)	Obese (BMI >30 kg/m ²)	Overweight (BMI: 25 – 30 kg/m ²)	Obese (BMI >30 kg/m ²)
16-24 years	26.9%	8%	23.2%	18.3%
25-34 years	44.2%	21.1%	30.9%	19.1%
35-44 years	44.1%	30.3%	34.1%	27.1%
45-54 years	47%	30.3%	36.5%	29%
55-64 years	43.7%	38.1%	39.1%	36.9%
65-74 years	45.5%	36.4%	38%	35.2%
75 + years	51.6%	23.5%	39.9%	27.4%

(Scottish Government 2009b)

Note

Overweight is a term used in clinical practice and is internationally recognised terminology to distinguish between BMI’s of 25 – 30 (overweight) and BMI >30 (obese) as these are associated with differing health risks. These categories are discrete and not subsets of each other.

2.4.2 As can be seen in table 2.2. the incidence of levels of overweight and obesity generally increase with age. Alongside this there is an increased risk of a number of age-related disorders including type 2 diabetes, hypertension, cardiovascular disease and osteoporosis (WHO, 2002). However, in the very old, increased BMI may have some protective effect. It has been demonstrated that in people aged 84–88 years mortality is increased when BMI is <22 kg/m² but not when BMI is >30 kg/m² i.e. obese (Rajala et al., 1990). While, it is generally accepted that in the adult population a BMI range of 18.5 – 25kg/m² is normal, this is not the case for an older person. Although the reason for this is not clear a review of good quality evidence by Beck and Ovesen (1998) suggest that a BMI of 24 – 29kg/m² is healthy for most older adults. Together with Rajala et al.’s (1990) finding that higher BMI decreases the likelihood of mortality in the very old, there seems enough evidence to say that a higher BMI up to 29kg/m² is acceptable for most people aged 70 years and over.

Weight loss

2.4.3 Weight loss is often seen in the older population and occurs as a result of wasting of body energy stores i.e. fat and muscle stores. Wasting is an involuntary loss of weight primarily caused by inadequate dietary intake which is often illness related. As people age their energy intake is often reduced and the National Diet and Nutrition Survey (NDNS) of adults over 65 (Finch et al., 1998) found that in free-living older adults (i.e. those not living in institutions), mean daily energy intakes were lower than the Estimated Average Requirements for energy (EARs). Reduction in food intake is caused by a variety of physiological, psychological, lifestyle and social factors leading to a reduced appetite, and/or a reduced ability to shop for or prepare food. This is discussed more fully in Chapter 5.

Discussion

2.5 There is a prevalence of overweight and obese people in the community as a whole. Being overweight or obese increases the risk of a number of age-related disorders including type 2 diabetes, hypertension, cardiovascular disease and osteoporosis (WHO, 2002). Involuntary weight loss is associated with increased risk of falls, increased morbidity and increased mortality (Alibhai et al., 2005). These all have implications on a person's level of dependence and an individual's ability to source and prepare food.

2.6 The implications for weight gain and weight loss are discussed more fully in Chapter 3.

Body composition and functional status as a result of ageing

2.7 As people age there are significant changes in body composition. There is an increase in fat mass and a reduction in lean body mass (usually muscle). This process is accelerated after the age of 60 years of age and fat mass continues to increase until around the age of 75 years (Kyle et al., 2001). Alongside this overall increase in fat mass, there are changes to body fat distribution, with an increase in visceral abdominal fat. The changes in body composition may not impact on weight and do occur whether BMI changes or not.

2.8 The reduction in muscle mass (known as sarcopenia) is primarily a result of losses from skeletal muscle and these losses significantly compromise functional ability and strength (Payette et al., 1998). A 10% reduction in muscle mass has been shown to decrease functional ability, increase risk of infection and is also associated with increased levels of mortality (Broadwin et al., 2001; Landers et al., 2001). In addition this age-related muscle loss is strongly associated with impaired mobility, increased incidence of falls, increased morbidity and poorer quality of life (Baumgartner et al., 1998, Roubenoff, 2000). These effects will determine a person's ability to live independently.

2.9 This loss in muscle mass and function also has an impact on a person's ability to chew food properly (particularly in frail older people) thus limiting food choice and contributing to an inadequate and poor quality dietary intake (Mioche et al., 2004).

Some older people may therefore require texture modification of food (i.e. altering the texture of food to make it easier to chew or swallow).

Changes in taste and smell

2.10 As part of the ageing process there are a number of complex mechanisms which occur and result in deterioration in a person's sense of smell. This is not just an overall reduction in the ability to smell but also an inability to discriminate between smells. There is a reduction in sense of smell from early adulthood into old age (Drewnowski, 2001). This decline continues in advancing age with a considerable loss of ability over the age of 70 and with more than 75% of people over the age of 80 years having evidence of major impairment in their sense of smell (Boyce & Shone, 2006). This may impact on a person's enjoyment of food, may reduce the appetising effect of food and may result in a decreased dietary intake.

2.11 Taste changes are less prevalent than changes in ability to smell and indeed what is often perceived as a change in taste is in fact a result of decreased ability to smell (Boyce & Shone, 2006). However, some taste changes do occur in older people with perception of bitter showing the greatest decline and sweet the least. In addition age-related loss in taste sensitivity is most noticeable in individuals on medication with a significant number of those commonly prescribed in older people being a particular problem e.g. antibiotics, antihypertensives, analgesics, anti-depressives. Exacerbating this further is the likelihood that older people are in receipt of multiple prescriptions for medications (Schiffman & Graham, 2000).

Oral health

2.12 The National Diet and Nutrition Survey for people over 65 (Finch et al., 1998) found that more older people had fewer of their own teeth with only 35% of people over 75 having any teeth of their own. Those people without their own teeth reported greater difficulty with chewing, more mouth dryness, a more restricted diet and thus had lower energy and micronutrient intakes compared to people of the same age who had their own teeth (Steele, 1998).

2.13 Many older people wear dentures and as weight changes there is an impact on how well the dentures fit. Older people who experience significant weight loss and frail older people commonly have poorly fitting dentures which impacts on their ability to chew foods properly and this causes a decrease in dietary intake and reduces the variety of foods available further exacerbating weight loss (Ritchie et al., 2000).

2.14 The oral health status of the UK population is changing rapidly with increasing numbers of people retaining their own teeth. It is predicted that this pattern will gradually spread in the next 20 – 30 years and will impact on rates of dental diseases in the older population (Stanner et al., 2009). This change in dental status along with increasing numbers of older people may have a significant impact on dental service provision with increasing demands being placed upon it.

Key findings

- Both weight gain and weight loss can lead to poorer health in older people.
- Ageing is associated with loss of muscle stores and increases in fat stores which can lead to a decline in functional ability and strength.
- Ageing is associated with increasing levels of chronic illness and disease which can lead to and exacerbate poor nutritional status.
- A high BMI is associated with less risk than a low BMI in 'older' old people.
- A BMI of 24-29kg/m² can be considered healthy in older people aged 70 years and over.
- A 10% reduction in muscle mass has been shown to decrease functional ability, increase risk of infection and increase risk of mortality.
- The texture and flavour of food may be particularly important for some older people to enable them to meet their nutritional requirements.
- There is a deterioration in taste, smell and the state of teeth with increasing age and these impact on dietary intake and nutritional status.
- Greater numbers of older people will retain their own teeth over the next 2-3 decades and this along with increasing numbers of older people may have a significant impact on the provision of dental services with increasing demands being placed upon it.

3 NUTRITIONAL NEEDS OF OLDER ADULTS

Summary

This chapter briefly describes nutritional requirements which are specific to the older population.

Like the rest of the adult UK population older people should:

- eat less saturated fat and salt
- eat more fibre
- have a minimum of 6-8 glasses of fluid each day

In addition older people should:

- take a vitamin D supplement

3.1 The nutritional requirements for healthy people in the UK are covered in depth by the COMA report (DH, 1991) and so are not included as part of this review. General guidance on a healthy diet for older people is provided by the Food Standards Agency (<http://www.eatwell.gov.uk/agesandstages/olderpeople/>) including the proportions of foods which should be eaten "The Eatwell Plate". (<http://www.eatwell.gov.uk/healthydiet/eatwellplate/>)

3.2 In the main the nutritional requirements of the older adult are the same as those for the rest of the adult population although there are some specific recommendations for older people (DH, 1991). As these recommendations may form the basis of some interventions they have been highlighted and are described below.

Energy

3.3 Due to a reduction in basal metabolic rate as a result of ageing, and a possible reduction in levels of activity, older people require less energy than younger adults. The level of energy required is dependant on a number of factors including age, gender, body composition, weight and activity levels. Generally energy requirements continue to decrease with increasing age due to loss of body muscle stores and reduction in activity levels. In those older people who have very low energy requirements there is a risk of their diet not meeting micronutrient (i.e. vitamin and mineral) requirements. The quality of the diet is therefore of prime importance to ensure that deficiencies do not develop. Like the rest of the UK adult population older people should be encouraged to meet their energy requirements through a healthy diet and some of the components of this are discussed below.

Fat

3.4 Although there are no specific recommendations outwith those for the adult population as a whole it is worth considering fat intake. Increased fat intakes are associated with higher levels of overweight and obesity, cardiovascular disease, some forms of cancer and diabetes mellitus. These conditions are associated with

increased levels of morbidity and mortality and as such could impact on a person's ability to live independently. The older population are already at a higher risk of developing these conditions and high fat intakes may exacerbate this further. This is particularly so for saturated fat (animal type fats) with unsaturated fats (pure vegetable type fats) not being associated with the same risk. In view of this older people like the rest of the adult UK population should eat less fat and in particular less saturated fat.

Protein⁴

3.5 The Reference Nutrient Intake (RNI) i.e. requirement for protein, is equivalent to that of the younger adult population. However as muscle mass decreases in older people this intake will result in a relatively higher intake per kg lean body mass compared to younger adults. The UK adult population currently consumes more protein than is required and there is some evidence that excessive protein intakes are associated with health risks (DH, 1991). Older people should therefore not eat excessive amounts of protein and their meals should instead be based around starchy foods.

Vitamin D

3.6 Vitamin D is primarily required for bone health in both children and adults with a deficiency resulting in rickets⁵ in children and osteomalacia⁶ in adults. Osteomalacia is associated with increased risk of fractures in older people. More recently low vitamin D status has been implicated in a range of diseases including osteoporosis, several forms of cancer, cardiovascular disease, tuberculosis, multiple sclerosis and type 1 diabetes (SACN, 2007).

3.7 The majority of people in the UK obtain most of their vitamin D as a result of exposure to sunlight (DH, 1991) and as little as 20% of the body's surface is sufficient to enable people to meet their requirements. This is difficult in the UK as there is no sunlight of appropriate wavelength from mid October to the beginning of April. During the remainder of the year 60% of effective UV radiation occurs between 11am and 3pm (although this will be less in Scotland due to a more

⁴ The recommended levels of nutrients (including protein) for the whole population including older people have been set by UK Government by COMA in 1991 and some recommendations have been updated by SACN. We need to be clear that older people should aim to meet these well considered evidence based recommendations which mean everyone eating less saturated fat, eating more fibre, and older people over 65 years should consider taking a Vit D supplement (SACN) and older people should drink more fluid (all this is on the FSA eatwell website). However, there is a minimum amount of protein set by COMA for the whole population, but not a maximum amount, which they state there is insufficient evidence for. Therefore this report is not advocating less protein across the board for older people as this has not been advocated by official sources. Notwithstanding, most people probably consume more protein that they actually need (which ends up getting used as an energy source). One of the problems is that if you advocate a reduced protein intake you also reduce calorie intake, what you replace the calorie deficit with is not that straightforward in older people.

⁵ Rickets is an abnormal bone formation in children resulting from inadequate calcium in their bones. Rickets is a failure to mineralize bone. The main cause of rickets is the deficiency of vitamin D caused in the body during childhood. Vitamin D acts as a hormone to regulate calcium absorption. (<http://bone-muscle.health-cares.net/rickets.php>)

⁶ Osteomalacia is a similar disorder to Rickets and occurs in adults. Then, it is caused by the inability of bone cells to calcify, or harden.

northerly latitude). Older people tend to expose less skin even when there is adequate sunlight which results in lower plasma levels of 25(OH)D (the marker for vitamin D status). The body relies on stores and dietary vitamin D during winter months and so these stores and dietary vitamin D may not be adequate in older people.

3.8 It is extremely unlikely that people will meet their vitamin D requirements from diet alone and so exposure to sunlight is necessary (for detail on food sources of Vitamin D see 6.12.9). In view of this the Scientific Advisory Committee on Nutrition (SACN) (2007) recommends that all adults aged over 65 years should take a vitamin D supplement to enable them to meet the requirement of 10µg vitamin D daily. (Vitamin D is discussed more fully in section 6.12.9).

Fibre (Non-starch polysaccharide (NSP⁷))

3.9 There are no specific recommendations for NSP (more commonly thought of as fibre) intakes in older adults outwith those for the adult population. However COMA (DH, 1991) recommends that those people who have a tendency to constipation are particularly encouraged to increase their NSP intake. As a result of slower gut movement, decreased activity levels and side effects of medications some older people could be considered to be a group who may have a tendency to constipation. Therefore, it is recommended that older people are advised to eat more fibre.

Fluid

3.10 Fluid requirements are not covered by the COMA report (DH, 1991) however low fluid intake is a cause for concern in the older population and is therefore included in this review.

3.11 Older people are at increased risk of dehydration for a number of reasons including increased losses through skin as a result of skin becoming thinner, diminished ability of the kidneys to concentrate urine and a less sensitive thirst mechanism (Hodak, 2005). The consequences of dehydration are many and varied and most of these consequences impact on dietary intake and nutritional status.

3.12 The effects of dehydration in older people which may impact on deterioration in nutritional status include: increased risk of pressure sores, unpleasant taste in the mouth, drowsiness, confusion, constipation, and increased risk of urinary tract infections. It is therefore essential that fluid intake is considered when managing the nutritional status of older people. The FSA (2009a) currently recommend that all adults should have a fluid intake of 6-8 glasses per day⁸.

⁷ Non-starch polysaccharide is a precisely measurable component of food and is the best measure of "dietary fibre". (DH, 1991)

⁸ In climates such as the UK, we should drink approximately 1.2 litres (6 to 8 glasses) of fluid every day to stop us getting dehydrated. The practice is 30 mls per kilo body weight so a person would have to be 40 kg X30 =1.2 litres. In hotter climates the body needs more than this. We also get some fluid from the food we eat. The recommendation from UK water is a min 1600mls and Care Commission generally say a min of 1500mls (three pints).

(<http://www.eatwell.gov.uk/healthydiet/nutritionessentials/drinks/drinkingenough/> accessed 23.1.09).

3.13 It is therefore recommended that older people are advised to drink a minimum of 6 glasses of fluid every day. This can be from a variety of sources but they also recommend that drinks with a high sugar content or caffeine content (e.g. tea and coffee) should not be drunk in excessive amounts.

Key findings

- In the main the nutritional requirements of older people are the same as for the rest of the adult population.
- Guidance on the types and proportions of foods people should eat are based on the Food Standards Agency "Eatwell Plate".
- Energy requirements are lower in older people but micronutrient requirements are unchanged therefore the nutrient density of the diet in older people is of prime importance to ensure that deficiencies do not develop (i.e. the diet should contain adequate nutrients in a smaller amount of energy).
- As older people are at increased risk of developing cardiovascular disease it may be prudent to consider the total amount of fat and the type of fat provided in interventions. In particular substituting saturated fat i.e. animal type fat with unsaturated fats i.e. vegetable type fat should be considered.
- Older people have a relatively higher intake of protein per kg lean body mass compared to younger adults. As there is some evidence that excessive protein intakes are associated with health risks excessively high intakes should be discouraged.
- Due to the increased risk of dehydration in older people fluid intakes should be considered as part of intervention strategies. Alongside this the increased risk of constipation in older people means that adequate fibre and fluid should be encouraged.
- People aged over 65 years should take a vitamin D supplement to enable them to meet the requirement of 10µg vitamin D daily and thus optimise their vitamin D status.

4 PREVALENCE AND INCIDENCE OF MALNUTRITION IN OLDER PEOPLE

Summary

This chapter defines malnutrition and discusses the incidence, consequences and financial implications of malnutrition. Both undernutrition and overnutrition are discussed along with methods for identifying malnutrition.

The focus is on malnutrition in the community although much of the research which has been published has been undertaken within the acute hospital setting. Despite this not being the focus of this review there is some relevance to the community setting and so it has been included where appropriate.

4.1 Malnutrition is an umbrella term which includes:

- Undernutrition: resulting from an inadequate food intake and/or the presence of metabolically active disease
- Overnutrition: resulting from an excessive food intake and/or restricted or limited activity
- Imbalance: resulting from a disproportionate intake (e.g. excessive alcohol intake)

It can therefore exist in those individuals who are both underweight or overweight.

4.2 Malnutrition has previously been defined in a number of different ways, however, for the purposes of this review the following definition will be used:

'A state of nutrition in which a deficiency, excess or imbalance of energy, protein and other nutrients causes measurable adverse effects on tissue, body form (body shape, size and composition), function, and clinical outcome' (Elia, 2003 pp 8).

Undernutrition

4.3 The studies in this section relate to undernutrition but terminology used in some of the studies discussed describe undernutrition as malnutrition. For accuracy of the review the studies have been reported using the terminology from the publication but this section does not refer to overnutrition.

4.4 Malnutrition is a significant clinical and public health problem. It predisposes to disease, delays recovery from illness, adversely affects wellbeing, quality of life and clinical outcome, and has major economic consequences (NICE, 2006). It negatively affects physical health and social well being and reduces the likelihood of independence. The causes of malnutrition are both social and clinical: they include underlying disease, decreased mobility, limited transport to local shops, social isolation and poverty (European Nutrition for Health Alliance, 2006).

4.5 Undernutrition is a significant financial burden to the healthcare sector. There is no financial information available specifically for the community setting but it has recently been estimated that the cost to the NHS as a whole of managing patients at

medium to high risk of malnutrition in 2003 was £7.3 billion in the UK (Elia et al., 2006). This cost includes treating the undernutrition itself and its consequences.

4.6 As there is no accepted single measurement for undernutrition it is difficult to determine the exact extent of the problem, although it is widely agreed that undernutrition is a common problem in an ageing population. Indeed one review of hospital patients estimated the incidence of undernutrition at anywhere between 29-61% (Corish, 2000). The European Nutrition for Health Alliance (2006), estimates that more than 10% of people aged 65 years and over are malnourished and that 70% of undernutrition in the UK goes unrecognised and untreated.

4.7 There have been few large scale studies to determine the exact extent of undernutrition in the community and in a review by McCormack (1997) it was noted that there was a surprising lack of evidence on the subject. Although outwith the dates of this review Lehman (1989) reviewed available UK data and found huge ranges (from 5-82%) in the incidence of malnutrition of older people living in the community with significant regional variations. More recently reports suggest that there is evidence of malnutrition in 10% of the general population (Elia, 2003).

4.8 There are no data available for the prevalence of undernutrition in the older community dwelling Scottish population but the British Association of Parenteral and Enteral Nutrition (BAPEN) undertook a large scale survey across the UK to screen patients on admission to hospital, mental health settings and care homes. The data was collected at the point of admission but not all these admissions were from the community setting. The survey found that 35% of people aged over 80 years, 20-30% aged 60-80 years and 25% aged less than 60 years were malnourished on admission (Russell & Elia, 2008).

4.9 It is well documented that nutritional status deteriorates during a patient's hospital stay (McWhirter & Pennington, 1994) and as a result many patients are discharged from hospital in a poorer nutritional state than they entered. This results in a further group of undernourished individuals being discharged into the community, with the likelihood of entering the frailty cycle. It is possible that such a problem could be prevented or treated with the implementation of appropriate screening and management within the community.

4.10 It should be noted that there are difficulties in comparing data from different areas in the UK to reference data for markers of nutritional status. A study in Edinburgh (Bannerman et al., 1997) demonstrated significant differences in indices of nutritional status between older people from different regions in Britain. Edinburgh residents were shorter than those people living in Nottingham, and had greater mid-upper arm circumference, triceps skinfold thickness, and arm muscle circumference compared to a population in Wales. Existing reference data for the nutritional assessment of older people in Britain is therefore not representative of all UK populations including Wales. These differences would impact on estimates of the prevalence of undernutrition in the community with the Edinburgh population appearing to be better nourished than other UK populations. The manner in which nutritional status was measured in these studies will therefore result in different levels of prevalence and makes comparisons with reference data difficult.

Overnutrition

4.11 As previously discussed in Chapter 2 the incidence of overweight and obesity is rising in the UK as a whole and is a particular problem in Scotland which has one of the highest levels of obesity in the world, second only to the USA (Grant et al., 2007). The prevalence of obesity in OECD (Organisation for Economic Co-operation and Development) countries varies considerably and in Scotland, the prevalence of obesity among adults is well above the OECD average. Although the prevalence is lower than the United States, it remains one of the highest of all OECD countries, above Mexico, Canada, the United Kingdom as a whole and Australia (Grant et al., 2007).

4.12 This is a major public health problem due to the risks associated with being overweight and obese. This is a problem for the whole of the population and is being addressed through policies such as Healthy Eating, Active Living: An action plan to improve diet, increase physical activity and tackle obesity (Scottish Government, 2008a).

4.13 Obesity has additional problems which are of particular concern for older people as ageing results in sarcopenia (muscle loss: see paragraph 2.8) which occurs whether there are changes in BMI or not. Older people who are obese develop sarcopenic obesity and this is a major determinant of poor health status in older people (Zamboni et al., 2007). This reduction in functional ability impacts on a person's ability to participate in activities of daily living and thus live independently.

Identifying malnutrition

4.14 Identifying malnutrition at an early stage would enable early nutritional intervention that should result in improved outcomes. However, identifying malnutrition is made complicated by the lack of a single accepted measurement. There has been an increase in the use of nutritional screening tools to detect protein energy malnutrition over recent years. These tools assist healthcare workers in identifying malnutrition or risk of malnutrition at an early stage but they are not without their problems. They generally use BMI as an indicator of malnutrition and as previously discussed in Chapter 2 different ranges for healthy BMI should be used in an older population. In addition BMI alone may result in malnutrition being overlooked in normal or overweight people and will not capture micronutrient deficiencies. It is therefore important that nutrition screening tools are reliable, valid and have appropriate care plans associated with them.

4.15 The most frequently used nutrition screening tool in the UK is the Malnutrition Universal Screening Tool (MUST) which was devised by The Malnutrition Advisory Group, a standing committee of British Association of Parenteral and Enteral Nutrition in 2004 with minor amendments in 2008. This tool was tested across a range of care settings (i.e. acute, care homes and community) and to date is the only validated tool across a range of care settings, including the community. Others have been validated within settings specific and may still be in use in some areas today.

4.16 Most tools have been developed to identify protein energy malnutrition however, these do not identify micronutrient status and this is of concern due to the

high level of marginal deficiencies of micronutrients in the older adult population. One tool developed by McNeill et al. (2002), identified specific questionnaire items which appear to be useful in identifying those at risk of micronutrient deficiency and in drawing attention to areas on which dietary advice could be focused. This tool does not appear to be widely used but this, or similar tools to identify micronutrient deficiency, should be considered as part of nutritional screening programmes.

4.17 The Food, Fluid and Nutritional Care Standards (NHSQIS, 2003) require all patients admitted to hospital in Scotland to be nutritionally screened within 48 hours of admission to identify those at risk of or already suffering from malnutrition. There are no such standards available for people living in the community although the British Association Of Parenteral And Enteral Nutrition recommend that a nutritional screening tool should be used with new patients attending their general practitioner, in vulnerable groups, and in those for whom there is clinical concern (e.g. those who are frail and elderly, the poor and socially isolated, and those with severe diseases and disabilities) (Elia, 2003). There is no published evidence to show that this is currently happening in Scotland.

4.18 The nature of healthcare provision in the community makes nutritional screening more difficult than in the acute or care home settings and this may partly explain why there is a lack of evidence to support its use. Indeed there are no published data from Scotland on current practices for nutritional screening in the community although there is anecdotal evidence to suggest that screening does take place in some areas.

4.19 A discussion paper produced by the Welsh Consumer Council (2008), following a one day roundtable event, identifies some of the barriers to nutritional screening in the community. These include identifying who should be responsible for screening, the resource implications, the need for adequate training, the effectiveness of screening tools and the need for appropriate care pathways. The paper did suggest some solutions for these problems which included utilising existing networks to raise awareness, the need for simple nutrition screening tools, evaluating outcomes and learning lessons for other clinical areas (e.g. the acute setting) and other groups of the population (e.g. work with schoolchildren). It is likely that the identified barriers and potential solutions would also be relevant to older people in Scotland.

4.20 In addition there are currently no published data which investigate the impact of nutritional screening in the community on clinical outcome. As part of a wide ranging review on nutrition support in adults, NICE (2006) have undertaken a cost-utility analysis to establish the cost effectiveness of nutritional screening. They found nutritional screening to be cost-effective for older people in a hospital setting but acknowledge that this may not be the case for the community setting. They therefore recommend more opportunistic clinical management by screening at the point of registration with a GP and then when there is clinical concern. With a lack of any other guidance for people living in the community in Scotland a similar strategy may improve nutritional screening practices.

Key findings

- Malnutrition is a significant financial burden for health and social care systems.
- The prevalence of overweight and obese people in Scotland is rising. This is now a serious public health problem.
- There are little data available on the incidence of undernutrition in older people living in the community in Scotland.
- It is possible that undernutrition could be prevented or treated with the implementation of appropriate screening and management within the community.
- Screening for undernutrition has been highlighted as important by the British Association of Parenteral and Enteral Nutrition but the use of screening tools in the community in Scotland may be limited.
- A systematic screening approach i.e. screening at the point of registration and then when there is clinical concern may improve nutritional screening practices in the community in Scotland.
- Screening tools may not detect all macro and micro nutrient deficiencies in older people.
- The cost effectiveness and the impact on outcome of nutritional screening in the community are not known.

5 BARRIERS TO OLDER PEOPLE MEETING THEIR NUTRITIONAL REQUIREMENTS

Summary

This chapter discusses the barriers older people living in the community in Scotland have in meeting their nutritional requirements and includes issues around:

- Their social situation
- Money worries
- Geographical differences across Scotland
- Physical and mental health factors including grief and depression
- The impact of medication
- Food safety issues

5.1 Reviews by Schenker (2003) and Denny (2008) identified a number of factors which affect the ability of older people, living in the community in the UK, meeting their nutritional requirements. These factors are summarised in table 5.1. These along with problems specific to the Scottish population (in particular geographical differences) are discussed below.

Table 5.1: Summary of factors influencing dietary intake

Poverty and economic uncertainty	Poverty can affect food choice and dietary diversity. Foods that are integral to a healthy diet (e.g. fruit, vegetables and fish) may be perceived as a luxury. Healthier alternatives to everyday foods can carry a price premium (e.g. wholemeal bread, spreads low in saturates). Food preparation facilities and skills may be limited in poorer households.
Mobility	Immobility may lead to difficulties with shopping, preparing, cooking and eating foods.
Mental health and well - being	Depression can lead to loss of interest in food. Dementia can impact on appetite and food intake.
Social support	Social isolation or emotional trauma can result in disinterest in food. Social interaction may encourage eating.
Other health problems	Illness and medications can result in reduced appetite and difficulties with shopping, preparing and eating food. Malabsorption conditions (i.e. gastritis & pernicious anaemia) reduce ability to absorb B ₁₂ from food. Problems with incontinence may stop individuals eating and drinking normally. Some medication can contribute to constipation.

(Denny, 2008; Schenker, 2003)

Socio-economic factors (social and financial issues)

5.2 Currently 25% of the population in Scotland are living in poverty and although the level of older people living in poverty has fallen in the past decade, 16% of pensioners continue to live in poverty (Palmer et al., 2008).

5.3 The Low Income Diet and Nutrition Survey (LIDNS) (Nelson et al., 2007) collected data on dietary habits and nutritional status of the low income population and includes data from older people with 33% of the sample population aged >50 years. The survey found that in poorer households:

- the average consumption of fruit and vegetables was half of the recommended five portions per day.
- saturated fat intake was above the (maximum) UK recommendations.
- intakes of non-starch polysaccharides (fibre) fell below the (minimum) UK recommendations.
- there was evidence of inadequate nutritional status for iron, folate and vitamin D.

5.4 Further analysis of the LIDNS data found that older men and in particular those who live alone may be at even more risk of an inadequate diet (Holmes et al., 2008).

5.5 All these findings are of critical importance as most of the nutrients highlighted are of concern for older adults and have specific recommendations set for them (see Chapter 3).

5.6 The Scottish Health Survey (Scottish Executive 2003) found significant differences in dietary intake between socio-economic groups. Those in lower income homes ate less fruit and vegetables, were more likely to have non-diet drinks, have savoury snacks daily and ate more chips and processed meats more frequently than those in higher income households. These poor dietary habits are related to an increased prevalence of overweight and obese people, increase in cardiovascular disease, hypertension and some forms of cancer and these risks continue into later life.

5.7 The Welsh Consumer Council (2006) have identified key characteristics of food poverty (summarised in table 5.2) with food poverty being defined as: 'the inability to obtain healthy affordable food' (<http://www.sustainweb.org/page.php?id=187>, accessed 24.11.2008). In addition they also identified potential solutions including assisted shopping schemes and door-to-door shopping services.

Table 5.2: The three main characteristics of food poverty

Characteristic	Influence of food intake
Affordability	Low/limited incomes may restrict ability to afford healthy food.
Accessibility	Proximity and ease of travelling to supermarkets. Smaller retailers offer a limited range of healthy foods. Poor and high cost of transport. Lack of home delivery services.
Education/cooking skills	Particularly older men, may lack the skills/or equipment to prepare healthy meals.

Welsh Consumer Council (2006)

5.8 In the past 20 years there has been a decentralisation of supermarkets to sites out of town centres. This has resulted in many older people experiencing difficulty in accessing food retailers (Wilson et al., 2004). These stores generally require people to have access to a car and in low income groups this is not always available. Although there are still small numbers of local convenience stores available they are generally more expensive and have a poorer variety of fresh produce compared to larger supermarkets.

5.9 In Scotland there is a high degree of variation in access to retail food provision but all inhabited areas do have access to a food store. Those areas with larger food

stores have access to a wider range of healthy foods at more affordable prices (Dawson, 2008).

5.10 Current trends show that as people age, they make less use of private cars and increased use of public transport (Scottish Executive 2007). Access to reliable and convenient public transport is therefore essential to provide older people access to among other things goods, services, and amenities and this enables them the ability to maintain their independence.

5.11 As most of the major food retailers now offer an on-line shopping service access to food has become easier in recent years for some. However, the convenience of on-line shopping may not be available to older people and particularly those in low income households. As there is generally a delivery charge for this service, the cost of the food bill is increased and more fundamentally the shopper requires access to a computer. The Scottish Household Survey found that, in 2007/8, 33% of the Scottish population did not use the internet at all (Scottish Government 2009c). Of the 60-74 age group 55% of men and 66% of women do not use the internet at all and this increased further to 83% men and 93% women aged 75 and over (Scottish Government 2009c).

5.12 The Scottish Government have acknowledged the need to support older people to improve access to, and use of, information technology. Information technology can impact positively and the Digital Inclusion Strategy is designed to help make Scotland a digitally inclusive society. It has been shown that when older people are educated to increase skills of internet use, online shopping is an area which is popular (Ward et al., 2008).

Geographical differences across Scotland

5.13 There are diverse population densities across Scotland but the difference in dietary intake between people living in urban and rural areas in Scotland is poorly defined. Those people living in rural Scotland have access to a smaller variety of foods, in particular fresh produce, have inconsistent food deliveries and the food which is available generally costs more (Skerratt, 1999). Whether this translates into a poorer nutritional status is not known.

5.14 Rural Scotland also has a higher percentage of 'older smaller' households, that is, with one or both adults of pensionable age (Scottish Government 2009d). This may be cause for concern for older people in rural areas for the reasons discussed in section 5.13.

5.15 In addition Levin & Leyland (2005) reported greater health inequalities in remote rural Scotland than urban areas for both males and females. How much of this can be attributed to differences in diet is unknown. As there is a paucity of data regarding differences in food intakes between rural and urban areas further research is required in this area.

Social and physical factors

5.16 The social and physical factors which affect food choice and eating patterns and thus nutritional status include: budgeting skills, cultural and religious beliefs, education, nutritional knowledge, cooking facilities, food preferences, time, previous food experiences, social isolation, depression and bereavement (Schenker, 2003). These are relevant to older people and have to be considered when devising interventions to improve nutritional status.

5.17 The presence of chronic illness and disability increases significantly with age and the Scottish Health Survey reports that two-thirds of people aged 75 and over have a longstanding illness (Scottish Executive 2003). For many this will result in a reduced ability to complete normal activities of daily living, and this is a particular problem for those living alone or with an ill or disabled partner. Specific individual needs should be taken into account and addressed with appropriate interventions, as provision of food and nutrients alone may not be adequate if a person has a limited ability to shop, prepare, cook or even chew the food provided.

5.18 The “Recipe for Life” project (Jones et al., 2005), a project which aimed to find better ways to support older people in Scotland to eat well, found a number of social and psychological factors which had an impact on dietary intake. These are shown in table 5.3.

Table 5.3 Social and psychological factors which impact on dietary intake

Social and psychological factors impact on dietary intake
<ul style="list-style-type: none">• eating with others• cooking for others• having a good quality meal cooked by someone else• eating food that looks appetising• smelling food as it is being cooked• getting out of the house• being active• having exposure to foods and food ideas• having a varied and suitable diet• being supported to be spontaneous with food• support to address losses, low mood or depression

(Jones et al., 2005)

5.19 This project also found that services may often be poorly set up to address the social and psychological factors contributing to an older person’s ability to eat well. If these factors are not considered they can provide significant barriers to older people’s ability to eat well. In addition to this, the report highlighted a need for further work to be undertaken to explore how services and communities can address these factors more systematically. Prioritising the physical needs of older people over their social and psychological needs may lead to inappropriate targeting of resources with little positive benefit (Jones et al., 2005).

Mental health problems

5.20 Mental health problems are not an inevitable part of ageing but are common in the older population. They include depression, anxiety, dementia, schizophrenia,

bipolar disorder and alcohol and substance abuse. The impact of depression and dementia on nutritional status is discussed below.

Depression

5.21 Depression is the most common mental health problem seen in Britain and it affects up to one in seven people over the age of 65. The causes in older people are often multi-factorial and may be as a result of biological, psychological or social factors including chronic diseases, functional disability, personality traits, inadequate coping strategies and stressful life events such as bereavement (Vink et al., 2008).

5.22 There are a number of symptoms associated with depression and these may be physical, psychological and/or social. These symptoms include apathy, anorexia, inability to make decisions and refusal of food and fluid (NHS Choices, 2009). As a result depression may significantly impact on activities of daily living and thus dietary intake which can then result in deterioration of nutritional status.

5.23 A number of nutrients have been linked with depression including vitamin B₁₂ and folate. Low levels of these, in combination with low homocysteine (an amino acid found in the blood) levels have been associated with depression in older people. In addition, poor nutritional status has been cited as a cause of depression (Rogers, 2001) but there is limited evidence to support this.

Cognition

5.24 Cognition is the process of thought and understanding. Cognitive decline increases with age, is almost universal, and can be expected in the majority of the oldest old (Park et al., 2003). It ranges from mild cognitive decline to dementia. Clearly as cognitive decline progresses there will be a resultant impact on a person's ability to fully participate in activities of daily living. Cognitive impairment is a major cause of disability in old age and thus has the potential to have a significant detrimental effect on nutritional status.

5.25 A number of nutritional deficiencies have been associated with cognitive impairment, in particular B vitamins and antioxidants, but the studies cannot determine whether a nutritional deficit is the cause or the consequence of impaired cognition (Del Parigi et al., 2006).

Dementia

5.26 Dementia is a collective term for a number of pathologies which affect the brain and is more common in older people than younger people. It is estimated that currently there are between 59,000 and 66,000 people in Scotland with dementia and this figure is expected to rise by 75% to between 102,000 and 114,000 by 2031 (Alzheimer Scotland <http://www.alzscot.org/pages/statistics.htm> accessed 28.11.08).

5.27 Although clinically the types of dementia vary considerably many of the effects which impact on dietary intake and nutritional status are the same. Early stages of dementia impact on nutritional intake through difficulty in shopping and storing food, forgetting to eat and changes in food preferences. As dementia progresses the

consequences for dietary intake may include food being hoarded in the mouth but not swallowed, increased activity levels and mealtimes being interrupted due to poor concentration levels. In very advanced stages problems may include food not being recognised, refusal to eat, inability to ask for food or drinks and an inability to swallow food and drinks safely due to a deterioration in the swallowing reflex.

5.28 All types of dementia therefore impact on dietary intake and weight loss and undernutrition are common. The cause of undernutrition is as a result of inadequate intake rather than the disease itself so it may be possible to correct this by providing adequate nutrition.

Other health problems

Impact of medications

5.29.1 Over the counter and prescribed medications have the potential to cause side effects which can impact on dietary intake. These side effects include altered sense of smell and taste (Brownie, 2006) fatigue, constipation, diarrhoea and anorexia. In addition a number of medications also interact with food (known as drug-nutrient interactions) and result in a reduction in absorption of nutrients. Both these problems have the potential to adversely effect nutritional status (Santos & Boullata, 2005). These problems are exacerbated in the presence of malnutrition or in people who have gastrointestinal tract dysfunction (Genser, 2008).

5.29.2 As older adults generally take more medications than younger adults the impact of medications on dietary intake and nutritional status could be significant.

Food Safety

5.30.1 Poor food hygiene practice can impact on dietary intake and nutritional status. Food poisoning often results in severe diarrhoea and vomiting which impacts on dietary intake and results in depletion of nutritional status. In extreme cases food poisoning can be fatal. It is therefore important to consider food hygiene in the over 65 year age group as this group of the population are consider to be one of the at risk groups for developing food poisoning.

5.30.2 A significant proportion of the population aged 65+ are prepared to eat food which is past its use by date (FSA 2009b) increasing the likelihood of developing food poisoning. Part of the problem lies in the fact that only 25% of older people aged 65 -74 and 17% of people aged 75 years and over said that food hygiene was important to them when deciding what to buy to eat at home. This is of concern as the number of cases of Listeria poisoning (the number one food poisoning killer) has increased dramatically in the over 65 age group over recent years. Ensuring good food hygiene practice will contribute towards maintaining health and nutritional status in the over 65's.

Key findings

- A number of factors impact on older people meeting their nutritional requirements which include financial, physical, social and psychological influences.
- 16% of pensioners live in poverty in Scotland. People with low incomes have a poorer diet than more affluent people.
- Changes to the location of food stores results in a need for access to private or public transport and thus can result in more limited shopping opportunities for older people.
- There is a high degree of variation in access to retail food provision in Scotland. Areas with larger food stores have access to a wider range of healthy foods at more affordable prices.
- There are limited data available on the differences in dietary intake and nutritional status between the older urban and rural community populations in Scotland.
- Those people living in rural areas have access to a smaller variety of foods and have inconsistent food deliveries which may result in poorer dietary intakes.
- Chronic illness and disability impacts on a person's ability to source and eat foods.
- The social and psychological needs of older people should be considered alongside their physical needs to optimise nutritional intake.
- There is limited evidence to support the link between diet and mental status.
- Poorer mental health impacts on a persons ability to meet their nutritional requirements.
- As older adults take more medications than younger adults there is the potential for this polypharmacy to exacerbate a poor nutritional status.
- As the over 65 year age group are considered to be one of the at risk groups for developing food poisoning it is important to ensure good food hygiene is practised.

6 EVIDENCE TO SUPPORT CURRENT PRACTICES AND INTERVENTIONS

Summary

This chapter discusses strategies which can be utilised to improve nutritional status in older people living in the community.

The effectiveness of interventions, based on evidence from systematic reviews, to manage problems with both macronutrient (protein and energy) and micronutrient (vitamin and mineral) deficiencies are discussed.

Problems with current practices are identified and opportunities to improve practice are highlighted.

6.1 Although the prevalence of overweight and obese people is high in the older Scottish population, strategies for managing weight gain have been discussed in depth elsewhere (Scottish Government, 2008a). This review therefore does not discuss interventions which are used to manage these conditions.

6.2 Diet plays a pivotal role in maintaining nutritional status and without appropriate levels of macronutrients (energy and protein) people will lose weight. Alongside this, if the quality of the diet is inadequate and provides only low levels of micronutrients (vitamins and minerals) then there is a possibility that micronutrient deficiencies will develop. These poor intakes will impact on an older person's functional and cognitive ability and thus their ability to participate in activities of daily living. As older people require less energy the quality of the diet they eat is vitally important. The texture of the diet should also be considered to compensate for changes in chewing and swallowing abilities in older people.

6.3 A community based study from the USA (Roberts et al., 2005) found that people aged over 61 ate a wider variety of foods and ate more micronutrient dense foods than those people aged 21 – 60 years. This finding was not true across all BMI ranges as older adults with a low BMI (<22kg/m²) ate less energy dense foods and less micronutrients than those people with a higher BMI. This is of concern as this poor dietary intake in the undernourished older adult may result in further deterioration of nutritional status. Although it is not known whether these results would be replicated in Scotland it has been shown that while older people on low incomes living alone have poorer diets, older people living in private households in Scotland do eat a healthier diet than younger age groups (Wood & Bain, 2001, Armstrong et al., 2009).

Protein energy deficiency

6.4 Although older adults should generally avoid excessive protein intakes there are occasions when encouraging an increased protein intake would be appropriate. Protein energy malnutrition occurs due to either reduced dietary intake or as a consequence of disease and both result in loss of body weight. The cause of weight loss will determine whether there is a greater loss of fat or muscle mass however the

management in terms of nutrition does not vary significantly. The provision of additional energy (calories) and protein is required to promote weight gain. The diet can be altered by providing additional energy dense meals or snacks or by fortifying the food which is eaten. Food fortification is achieved through the addition of energy and protein rich food ingredients e.g. oil, cream, butter, milk, cheese, sugar and skimmed-milk powder or through the addition of commercial energy or protein supplements. Alternatively, oral nutritional supplements can be provided. Artificial nutrition can also be considered but this is outwith the scope of this review. It is however, covered in depth by the National Institute for Health and Clinical Excellence (NICE) guidance (2006).

6.5 There are 4 key reviews which provide evidence for the effectiveness of interventions in the area of undernutrition: Stratton et al. (2003), Milne et al. (2009), NICE (2006) and Baldwin & Weekes (2007). The findings from these and additional current findings (where applicable) are summarised below.

Increasing nutritional intake through diet alone

6.5.1 The British Dietetic Association (BDA) recommends that improving nutritional intake via ordinary foods and beverages should be the first step in the process of providing nutritional support. Despite this there have been few studies investigating the impact of diet alone as a method of improving nutritional status.

6.5.2 Studies which have been undertaken are generally small, in a range of settings and in diverse patient groups. As the studies include groups of the population who are suffering from disease related malnutrition the results may not be entirely relevant to the older community population. The studies which have been undertaken and which have relevant outcomes have been reviewed by Baldwin & Weekes (2007) as part of a systematic review (the highest level of evidence available).

6.5.3 The randomised controlled trials systematically reviewed by Baldwin and Weekes (2007) in a Cochrane Review compared the impact of dietary advice to no dietary advice for illness related malnutrition. The studies varied in length of follow up from 6 weeks to 6 months and measured a variety of outcomes including mortality, change in energy intake, change in weight and readmission to hospital. The findings from this systematic review are summarised in table 6.1.

Table 6.1: Summary of findings comparing dietary advice with no dietary advice

Outcome	Results
Mortality	There was no significant difference between the groups at 6 months.
Change in energy intake	Intakes were significantly higher in groups receiving dietary advice at 6 months.
Change in weight	There was no significant difference at 3 months or 6 months. There was a significant difference observed at 12 months, with groups receiving dietary advice having a significantly greater weight gain than groups receiving no advice.
Admission or readmission to hospital	There were no significant differences between the groups at 6 or 12 months.

(Baldwin & Weekes, 2007)

6.5.4 From this review it appears that the use of diet alone can improve energy intake and promote weight gain over a prolonged period but it does not affect incidence of mortality. However the authors note that there is a lack of data which means that it is not possible to draw conclusions about the use of dietary advice alone in managing protein energy malnutrition.

6.5.5 The review did not differentiate between types or intensity of dietary advice i.e. between increasing meals and/or snacks or fortification of foods. Food fortification has some advantages in people with a poor appetite as it enables them to consume more energy and protein without increasing the volume of food they are required to eat. There is however, more food preparation required and this may be difficult for the population covered in this review. Increasing the number of meals and snacks eaten may also be difficult in a population who have a poor appetite. The advice regarding diet is therefore normally a combination of food fortification and increasing meal frequency whilst considering food preference.

6.5.6 As the review did not take into consideration the intensity of dietary advice given it is unclear whether this plays a role in its success. NICE (2006) do however suggest that the ability of staff to provide dietary advice in an appropriate manner is the most important factor in patient satisfaction with dietary advice.

Increasing nutritional intake through dietary advice alone compared to dietary advice and supplements

6.5.7 Oral nutritional supplements are multi-nutrient preparations which can be in either a liquid or solid form. They are prescribed (most commonly for disease related malnutrition) in line with guidance for borderline substances and are normally used in conjunction with dietary advice to improve nutritional intake.

6.5.8 Some studies reviewed by Baldwin & Weekes (2007) have compared outcomes between patients receiving dietary advice alone to patients who receive dietary advice and supplements. Again the studies are small in number, are primarily in the hospital setting and include groups of the population suffering from disease related malnutrition. The results should therefore be interpreted with caution when applying them to older people living in the community.

6.5.9 The studies included in the review varied in length of follow up from 6 weeks to 6 months and measured a variety of outcomes including mortality, change in weight and change in nutritional intake. The findings are summarised in table 6.2.

Table 6.2: Summary of findings comparing dietary advice with dietary advice and supplements

Outcome	Results
Mortality	There was no significant difference in mortality between the groups.
Change in weight	There was significantly greater desirable weight gain in groups receiving dietary advice plus nutritional supplements compared to dietary advice alone. It is unclear whether this weight gain translated into any clinical benefit.
Change in nutritional intake.	Groups receiving dietary advice and nutritional supplements had a significantly greater intake than groups receiving dietary advice alone.

(Baldwin & Weekes, 2007)

6.5.10 The results indicate that there may be an increase in nutritional intake, and weight gain, in patients receiving a combination of nutritional supplements and diet compared to those who had only dietary advice. One study (Payatte et al., 1998) in Canada investigated the impact of providing nutritional supplements to frail older people living in the community. The outcome measures were nutritional status, muscle strength, perceived health, and functional status. There was an increase in energy intake and weight (similar to the findings in the hospital population) but no change in muscle strength. Although this study was not undertaken in the UK, it is one of the few community based studies and there is no reason to assume that similar results would not occur in a Scottish population.

Increasing nutritional intake through the use of supplements

6.5.11 NICE (2006) reviewed studies which compared groups receiving either dietary advice in conjunction with nutritional supplements or no advice at all. Unsurprisingly, results showed a significant weight gain in the groups receiving advice on diet and use of nutritional supplements in comparison to the group receiving no care at all. A meta-analysis pooled the results of these studies and the findings showed not only an increase in weight but a significant reduction in complications and mortality. These studies were all undertaken in the hospital setting so it is not known whether similar results would be found in the community setting.

6.5.12 Milne et al. (2009) reviewed studies published up to the end of 2007 which utilised food fortification and supplements as a method of increasing protein and energy intakes. The studies included were from a range of settings and encompassed a wide variety of clinical conditions. The findings of this review were similar to the reviews described earlier. The authors do note in relation to older people living in the community that more evidence of benefit from supplements is still required.

Other macronutrient sources

6.5.13 There is anecdotal evidence that it is now common practice to provide a fat supplement (e.g. Calogen) to increase energy intake in undernourished people. This is commonly seen in the hospital environment and there is a suggestion that it also happens in the community setting. It is often given to people with disease related malnutrition who have a poor appetite and are therefore unable or unwilling to eat more food or take nutritional supplements.

6.5.14 As fat is a concentrated energy source it is possible to consume more energy in a much smaller volume. These supplements are therefore given to promote weight gain but the evidence to support the use of fat supplements to improve nutritional status and clinical outcome is lacking. There may be particular problems with this practice in the older undernourished population as fat in isolation may increase body weight but it is unlikely to increase muscle stores.

6.5.15 Fat should therefore be taken in combination with other nutrients and interventions utilising fat sources should be carefully considered and monitored to ensure that they are prescribed as part of a varied diet.

6.5.16 The type of fat (i.e. saturated versus unsaturated fats) may also be worth considering due to the increased risk of cardiovascular disease associated with ageing and both total and saturated fat intakes. To date however there have been no studies which have considered this within dietary interventions and so the evidence base to support this practice is currently lacking.

Discussion

6.6 A more recent review summarising a number of systematic reviews over a range of clinical conditions and in a range of settings (Stratton & Elia, 2007) suggests that there is a breadth of evidence to support the use of nutritional supplements in patients with a wide variety of clinical conditions. The evidence is strongest in the acutely ill, in older patients and undernourished patients. Clinical benefits cited include a reduction in mortality and complications, such as infections and pressure ulcers.

6.7 The evidence to support the use of nutritional supplements cannot be disputed but it is important to note that the body of evidence surrounding their use is considerably greater than the body of evidence to support the use of dietary measures. Although the evidence surrounding diet is lacking this does not necessarily mean diet is ineffective. As nutritional supplements are normally a source of both macronutrients and micronutrients, it seems likely that it is their energy and protein content which causes weight gain. In theory then, it should be possible to obtain a similar outcome by increasing dietary sources of protein and energy.

6.8 The benefits of prescribing nutritional supplements in the community are less clear. Commercial supplements are an expensive commodity and it is possible to provide the same nutrition through food sources more cost effectively. Indeed food may have advantages as it has the potential to provide greater variety and can be tailored to individual needs, preference and eating habits (NICE, 2006). Commercial supplements can be poorly tolerated due to a lack of variety of flavours, flavour fatigue and often restriction to sweet tasting drinks (Milne et al., 2005). They are however prescribed and so in a low income older population there is no additional economic burden to the individual by increasing nutritional intake and this is not the case for foods. In addition, supplements are generally prescribed for an undernourished population who may be frail and have decreased functional ability. The capacity to shop, prepare and cook foods will be diminished in this group and so

supplements may be the most appropriate and attractive intervention (even if it is more expensive to the NHS).

6.9 A further consideration is the outcome measures used in many of these studies. The principal nutritional outcome is weight gain or increase in BMI. This may not be the ideal outcome as weight gain alone does not translate into functional improvements. A gain in weight may translate into a gain in fat stores and this will be of no functional benefit. The desirable outcome of weight gain would coincide with an increase in muscle stores in an attempt to improve strength and functional ability. There is a paucity of research which investigates the role of diet and/or supplements and the impact on weight, body composition and functional outcome in the undernourished elderly population living in the community.

6.10 Nutritional status is linked to a number of factors of which diet is only one. The role of activity should also be considered as there is clear evidence that physical activity (albeit in a healthy older people) correlates positively to the functional status of older adults. Those individuals who are more active have fewer limitations than those who are less active (Simonsick, 1993). A systematic review by Beswick et al. (2008) investigated the effectiveness of community-based complex interventions in the preservation of physical function and independence in older people. The studies included in this review did not use nutrition as an intervention. Findings show that physical activity interventions increase the likelihood of living at home and decrease the likelihood of functional decline and falls.

6.11 There are clearly benefits for functional status through improving diet and physical activity in older people. However there have been no studies which have combined these as interventions in the older malnourished community population. There are opportunities for multi-disciplinary research in this area and there is the potential for enhanced effects with a combination of interventions.

Micronutrients (i.e. vitamins and minerals)

6.12 As has been discussed previously in Chapter 3 older people require less energy due to decreased metabolic rate and decreased activity levels. As a result of this, physiological changes impacting on their appetite and the barriers to them meeting their nutritional requirements (identified in Chapter 5) the amount of food they eat is often reduced. Although this may be important to prevent weight gain, it does impact on the quality of the diet and can lead to the intake of micronutrients being less than requirements resulting in micronutrient deficiencies. A number of micronutrient deficiencies impact on the health of older adults and these are discussed below.

Ability to perform activities of daily living in relation to micronutrients status

6.12.1 Although the greatest impact on functional decline in older people is due to a loss of muscle mass, poor micronutrient status could impact on an older person's ability to adequately participate in activities of daily living.

6.12.2 Low blood concentrations of vitamins B₆, and B₁₂ and selenium in woman have been used to predict subsequent disability in activities of daily living (Bartali, 2006). In addition, there is a significant positive correlation between blood antioxidant concentrations and physical performance and strength in the elderly.

Alongside this, it has been reported that higher dietary intakes of antioxidants, especially vitamin C, have been found to be associated with greater skeletal muscle strength (Cesari, 2004). Evidence from randomised controlled trials would be required to establish whether correcting micronutrient deficiency alone can improve functional status in older people.

6.12.3 There are no studies which have investigated the role of micronutrient supplementation (either by enriching the diet or through supplements) of community dwelling older adults and changes in functional status. One study in the Netherlands (Chin et al., 2002) however, has investigated the role of micronutrient supplementation in comparison to exercise on general well being in the frail older adult population. The results from this study were inconclusive and so further research in this area is required.

6.12.4 In undernourished people, providing micronutrients without appropriate levels of energy and protein is unlikely to be effective in maintaining functional ability. In those people who are of normal weight additional micronutrients may be of benefit. As functional ability is affected by activity levels this should also be considered.

Thought processes in relation to micronutrient status

6.12.5 Cognitive decline is a natural part of the ageing process (see Chapter 5) however, there have been associations found between nutritional status and in particular B vitamins, folate, antioxidants and fatty acid status and cognition in observational studies of older people (Jia et al., 2008). This is probably because these nutrients are essential for neurological (and thus ultimately cognitive) function. This is of concern as the National Diet and Nutrition Survey (NDNS) for adults over 65 years (Finch et al., 1998) found that more than 15% of people living in the community were deficient in one or more micronutrient. It is currently unclear whether nutritional status impairs cognition or whether as a result of cognitive decline people become undernourished.

6.12.6 A number of studies have investigated the role of micronutrient deficiencies on cognition and mood. Low levels of vitamin B₁₂ and folate in particular have been associated with both cognitive decline (Malouf & Grimley Evans, 2008) and with depression (Tiemeier et al., 2002) in older people. There are a number of systematic reviews in this area. These reviews have primarily focused on single nutrient supplementation in people with or without cognitive impairment: i.e. vitamin B₆ (Malouf & Grimley Evans, 2003), vitamin B₁₂ (Malouf & Areosa Sastre, 2003) and omega-3 fatty acids (Lim et al., 2006). A further review comparing vitamin B₁₂ with or without folic acid (Malouf & Grimley Evans, 2008) has also been undertaken. More recently a review by Jia et al. (2008) investigated the role of a combination of vitamin, mineral and fatty acid supplementation on the prevention of cognitive decline.

6.12.7 These systematic reviews, which are summarised in table 6.3, demonstrate that there is little evidence to support the use of vitamin supplementation to improve cognitive decline associated with ageing. It is apparent that micronutrient deficiencies are common in older people and this should not be ignored as it is still uncertain whether preventing these deficiencies can slow down the natural cognitive

decline as a result of ageing. Eating a well balanced, varied diet with adequate fruit and vegetables would help prevent micronutrient deficiencies in older people. However, as previously discussed this can be difficult in an older population (and in particular a frail older population) due to the physiological effects of ageing (see Chapter 2) and the barriers to meeting nutritional requirements (see Chapter 5).

6.12.8 Nutritional interventions aimed at undernourished older people should therefore not only focus on improving macronutrient status but should also consider micronutrient intake.

Table 6.3: Summary of findings from systematic reviews investigating the effect of vitamin supplementation on cognition and mood

Topic	Findings
Vitamin B ₆ for cognition (Malouf & Grimley Evans, 2003)	No evidence for short-term benefit from vitamin B ₆ in improving mood or cognitive functions. More randomized controlled trials are needed to explore possible benefits from vitamin B ₆ supplementation for healthy older people and for those with cognitive impairment or dementia.
Vitamin B12 for cognition (Malouf & Areosa Sastre, 2003)	Insufficient evidence of efficacy of vitamin B ₁₂ in improving the cognitive function of people with dementia.
Folic acid with or without vitamin B12 for the prevention and treatment of older people (Malouf & Grimley Evans, 2008)	No consistent evidence that folic acid, with or without vitamin B ₁₂ , has a beneficial effect on cognitive function in healthy or cognitively impaired older people.
Folate for depressive disorders (Tiemeier et al., 2002)	Folate may have a potential role as a supplement to other treatments for depression.
Omega 3 fatty acid for the prevention of dementia (Lim et al., 2006)	There may be a protective effect of omega 3 PUFA against dementia however the evidence is not strong enough to support the use of dietary or supplemental omega 3 PUFA for the prevention of cognitive impairment or dementia.
Combination of vitamin, mineral and fatty acids to prevent cognitive decline (Jia et al., 2008)	There was little evidence of a beneficial effect from taking B vitamins or antioxidant supplements on global cognitive function in later life. Larger-scale randomized controlled trials of longer duration in selected age groups are needed.

Vitamin D

6.12.9 The primary source of vitamin D is skin photosynthesis. There are a few dietary sources which include oily fish (e.g. salmon, mackerel, sardines), and fortified foods e.g. margarines and some breakfast cereals. Smaller amounts are available from red meat and egg yolks (see section 3.7-3.8).

6.12.10 Dietary intake does play a small part in vitamin D status however the National Diet and Nutrition Survey (NDNS) for adults over 65 (Finch et al., 1998) found that vitamin D intake was well below requirements in both men and women. As a result older adults also have low plasma concentration levels of plasma 25(OH)D. The Health Survey for England also identified low plasma vitamin D status in this population (Hirani & Primatesta, 2005).

6.12.11 Vitamin D deficiency results in rickets⁹ and osteomalacia¹⁰. It is recognised that a high prevalence of low vitamin D status exists among older people although there are no population-based estimates of incidence. It is likely that many cases do not reach clinical attention (SACN, 2007). In view of this it has been recommended by COMA (DH, 1991) that all adults over 65 years should consume 10µg of vitamin D daily. More recently the Scientific Advisory Committee on Nutrition (SACN) (2007) reiterated this advice and further recommended that all adults over 65 years should take a vitamin D supplement to enable them to meet the requirement of 10µg vitamin D daily. However, it is acknowledged that the cost and tablet size of vitamin D supplements have tended to limit their usefulness in the past. Although cost may be an issue in some populations it is unlikely to be for older people as they are entitled to free prescriptions and vitamin D could be prescribed.

6.12.12 There is clear evidence to support this recommendation however there is concern that these recommendations are being overlooked by both health professionals and the general public (SACN, 2007).

Other nutrients – Fibre (Non-starch polysaccharide (NSP))¹¹

6.13 Constipation is a well recognised and frequently occurring problem in older people. The causes are multi-factorial and include: poor non-starch polysaccharide (NSP) intake, a variety of different types of medications, poor fluid intake and reduced levels of activity. As these are all common in an older population the prevalence of constipation in older people living in the community is reported to be around 20% (Pettigrew et al., 1997).

6.14 The most common treatment for constipation is the use of laxatives and as a result the cost of prescriptions for laxatives dispensed in the community in Scotland in 2007-8 was £7,404,635 (ISD Scotland, 2008) although how much of this expenditure was in older people is not known. Despite laxatives being a common treatment for constipation increasing fibre intake (with or without increasing fluid intakes) and improving activity levels also have a positive effect on bowel function and help to alleviate constipation. The effects of other non-medical interventions e.g. increasing fluid in the absence of increasing fibre intake have not been proven (Frizelle & Barclay, 2007).

6.15 Increasing fibre through dietary sources in people who have a poor appetite is difficult. Foods high in fibre are generally low in energy and their consumption results in a prolonged feeling of fullness reducing energy intake. However, foods which are high in fibre e.g. fruit and vegetables are valuable sources of other nutrients and dietary sources of fibre should not be considered as merely sources of

⁹ Rickets is an abnormal bone formation in children resulting from inadequate calcium in their bones. Rickets is a failure to mineralize bone. The main cause of rickets is the deficiency of vitamin D caused in the body during childhood. Vitamin D acts as a hormone to regulate calcium absorption. (<http://bone-muscle.health-cares.net/rickets.php>)

¹⁰ Osteomalacia is a similar disorder to Rickets and occurs in adults. It is caused by the inability of bone cells to calcify, or harden.

¹¹ Non-starch polysaccharide is a precisely measurable component of food and is the best measure of “dietary fibre”. (DH, 1991)

fibre. Some oral nutrition supplements have fibre added so if older people are being prescribed supplements it may be worthwhile considering those which contain fibre.

6.16 There are non-food sources of fibre available which come in either powder or tablet form. These can be taken as a supplement to the diet with the powders being added to food and liquids to increase both fibre and fluid intake. The manufacturers of these products have presented evidence to show that these products can improve constipation. The studies to support this are however limited.

6.17 Constipation is known to reduce appetite and may result in nausea which impacts on dietary intake and nutritional status. Equally, high fibre intakes are associated with increased satiety and reduced dietary intake. It is therefore possible that consuming more fibre will improve constipation and its associated side effects but may have little or no effect on nutritional status. However if relieving constipation improves a patients perceived health it may still a valuable intervention.

6.18 There is a lack of evidence on the impact of increasing fibre intake in undernourished older people to manage constipation and how this affects dietary intake and nutritional status.

6.19 A summary of nutritional interventions and the quality of evidence to support these is shown in table 6.4

Table 6.4: Summary of nutritional interventions and the evidence base

Intervention	Evidence	Source
Dietary interventions without supplements	There is limited research on dietary interventions without supplements. Where there is evidence, dietary interventions improved dietary intake and weight gain at 1 year. There is no improvement in mortality or hospital admission rates.	Systematic Review
Dietary interventions with supplements	People who took supplements in addition to dietary advice had higher nutritional intakes and greater weight gains but there was no difference in mortality rates.	Systematic Reviews
Multi-nutrient supplements	Nutritional supplements have been shown to promote weight gain and reduce complications and mortality rates. However more evidence to support their use in older community dwelling individuals has been called for.	Systematic Review and review of reviews
Vitamin supplementation for cognition	There is no benefit of vitamin supplementation to prevent or improve cognitive decline in older people.	Cochrane Reviews
Single nutrient supplementation	Vitamin D: A vitamin D supplement should be provided to people over 65 to enable them to meet requirements.	Reviews by SACN and COMA

Key findings

- There is evidence to support the use of oral nutritional supplements in hospital settings, but there is limited evidence for the benefit of these in the community setting.
- Dietary advice together with supplements seems to be effective in managing undernutrition.
- Weight gain alone should not be considered the primary outcome in research in the area of nutritional interventions. The ability to perform activities of daily living should also be considered
- Fat in isolation should not be used as a supplement.
- There is clear evidence to support the recommendation for vitamin D supplementation but there is concern that this recommendation is being overlooked by both health professionals and the general public.
- A package of care including diet and activity may be more effective in improving the ability to perform normal day to day activities than diet alone.

7 EVIDENCE TO SUPPORT COMMUNITY INITIATIVES

Summary

This chapter summarises relevant Scottish policy documents which impact on the nutritional needs of older people living in the community.

It also discusses community initiatives which have been implemented across the UK. There is an acknowledgement that information regarding initiatives in Scotland is limited and a more coordinated approach (which includes evaluation work) is recommended to encourage sharing of best practice.

7.1 Many older people in western society indicate a desire to stay at home and remain independent for as long as they can. More recently, policies and services are focusing on the community rather than on institutions as the primary axis for long-term care for older people (Cox, 2005; McDonald, 2004).

Current policies

7.2 There have been a number of policies produced within Scotland in recent years which have the potential to impact on the nutritional status of older people living in the community. These are summarised in table 7.1.

7.3 There has been a shift in the provision of both health and social care in recent years with more care now being provided in the community setting. Indeed the policy of free personal care for those aged 65 and over in Scotland has succeeded in keeping many frail and dependent older people at home with over 50,000 older people across Scotland benefiting (Scottish Government, 2008b).

7.4 This shift in care is not without its problems which has been highlighted in significant debate about the definition of food preparation as part of the free personal care policy. Some areas charge for food preparation and provide only assistance with eating and drinking. This has significant implications for the nutritional intake of older people on low incomes who are unable to prepare their own food. It is reassuring that the Scottish Parliament is considering legislative changes to agree a consistent approach to the provision of food as part of free personal care.

7.5 Other policies summarised in table 7.1 have similar goals in encouraging a more systematic and integrated approach to managing the increasing number of older people living in their own homes. As the focus is on health promotion and as nutritional requirements to prevent undernutrition are clearly understood, dietary and nutritional needs of older people should be addressed when managing older people living at home.

7.6 There does not appear to be any evidence to show whether these policies have had an impact on the nutritional status and dietary intake of older people living in the community. Evaluation of these policies would help inform future directions for managing the nutritional care of older people living in the community.

Table 7.1 Policies which have the potential to impact on nutritional status

Policy	Impact
Free personal care (Scottish Government, 2008b)	People living in Scotland, aged 65 and over, can access free personal care at home which should include assistance with food preparation and the fulfilment of special dietary needs.
All our futures: Planning for a Scotland with an ageing population (Scottish Executive, 2007)	Older people should be supported to live full and fulfilling lives. Poor dietary habits and malnutrition should be prevented by introducing best practice guidelines promoting food preparation.
Building a health service fit for the future (The Kerr Report) (Scottish Executive, 2005a)	NHS Boards should have a systematic approach to caring for the most vulnerable with long term conditions and aim to manage their conditions at home or in the community.
Community Care a Joint Future Agenda (Scottish Executive, 2000a) Rebalancing Care of Older People (Scottish Executive, 2000b)	There should be better integrated and more uniform community care services focusing on care at home. Joint services should be available through partnership working to meet the increasing needs of older people as they become more frail or because they have additional needs.
Better Health, Better Care: Action plan (Scottish Government, 2007)	Councils and their NHS partners should plan for the expected increase in demand with the balance of care shifting to more intensive care packages delivered in people's homes (Audit Scotland, 2004).
National Care at Home Standards - Care at home (Scottish Executive, 2005b), National Care Standards: Support services. (Scottish Government, 2005)	The Scottish Government has developed standards for support services encompassing day care facilities with diet being considered within these. Standards for people receiving care at home have also been developed and diet should be considered within these.
Healthy Eating, Active Living. An action plan to improve diet, increase physical activity and tackle obesity. (Scottish Government 2008a)	The focus of this policy is to tackle the increasing numbers of people who are overweight or obese. It aims to improve the nation's diet, encourage greater physical activity and begin to establish a base for tackling obesity through targeted interventions and by support for all to achieve and maintaining a healthy weight.
Recipe for Success. Scotland's National Food and Drink Policy. (Scottish Government 2009e)	This policy aims to address a number of key areas including supporting the growth of food and drink industry in Scotland, ensuring healthier sustainable choices are made, sustainable food procurement in the public sector, making food available and affordable to all and ensuring that the Scottish people understand more about the food they eat.

Provision of food services

7.7 Food projects are in a good position to help older people overcome the people meeting their nutritional requirements. Initiatives such as lunch clubs, shopping activities, transport provision, social activities, cooking classes or food co-ops could be effective in not only ensuring good health and access to food, but also providing a social environment and addressing general well being (Wilson, 2009).

7.8 The provision of food for older adults living at home varies across Scotland with some council areas using frozen meals and some using the more traditional "meals on wheels". Whatever the method, the food provided is not always aimed specifically at the older population. Indeed in some areas meals on wheels are provided using the same menus which are used for school meals. The nutritional needs in terms of nutrients and texture of food required by these two populations are extremely different with the result that older people are may not be able to eat the food provided.

7.9 To ensure meals meet the nutritional needs of older people, standards are available to inform the nutritional content of meal provision both in the community (National Association of Care Catering, 2005; Caroline Walker Trust, 2004) and in the hospital setting (Scottish Government, 2008c). Despite this there are no collated data for food provision for older people living in their own homes in Scotland.

Examples of initiatives within Scotland

7.10 No areas of evaluated good practice to improve dietary intakes of older people living in the community were identified through the literature searching process, but an internet search has identified some community initiatives which have the potential to impact on the dietary intakes of older people. There is no evidence that these have been independently evaluated and so the success of these in improving dietary intakes in older people is not known. In view of the difficulties in identifying initiatives a more coordinated approach to collating this data would be helpful to encourage and enable sharing of good practice. The initiatives which have been identified are described below.

Recipe for life

7.10.1 *Recipe for life* was a three year project aimed at finding better ways to support older people to eat well (Jones et al., 2005). The project ran in two phases, phase one being the research phase which gathered data on people's views and experiences about factors that help and hinder older people's ability to eat well. Phase two of the project developed and explored interventions, designed to optimise the nutritional and food related well-being of older people who live alone and have difficulty leaving home (Coull et al., 2008). These interventions are summarised in table 7.2.

Table 7.2: Recipe for life interventions

Intervention	
Developing a community kitchen	The main aim of the community kitchen was to address barriers to older people eating the foods that they used to enjoy but are now unable to. In addition, it was intended to facilitate older and younger people working together in the community to share skills and knowledge about food and eating. Although it is reported that the project was viewed positively by all involved there is no additional information available about whether the main aims were met.
Good Practice Booklet	The primary aim of the booklet was to support frontline social work staff in a home care team, to share good practice and to develop ways of working that meet the needs of frail older clients who live alone and have difficulty leaving home to eat well.
The 'Nutrition in Later Life' training resource	<p>A training resource for home care workers on aspects of nutrition in later life was developed. This intervention addressed the importance of assessing older people's food related needs. This resource consists of three elements:</p> <ul style="list-style-type: none"> • a training course on food and nutrition for home carers • an accompanying leaf resource pack on nutrition in later life for home carers • a leaflet giving information about nutrition in later life, intended for older people and their carers <p>Two recommendations have arisen from this intervention.</p> <ol style="list-style-type: none"> 1. if a home care client has nutritional needs, then longer home care time slots could be allocated 2. when an older person is assessed to have nutritional needs, the leaflet or resource pack should be given to family members.

(Coull et al., 2008)

Community health exchange (CHEX)

7.10.2 The CHEX resource is part of the Scottish community development centre and is funded by NHS Health Scotland which supports community development to improve health and challenges health inequalities. It facilitates a network of initiatives developing good practice and influencing health and social policies and although the initiatives are not aimed specifically at older adults *per se* these projects run in conjunction with local communities or healthy living centres. More information is available at: <http://www.chex.org.uk/> (accessed 6.12.08).

Community food and health (Scotland)

7.10.3 Community Food and Health (Scotland) funded by the Scottish Government aims to ensure that everyone in Scotland has the opportunity, ability and confidence to access a healthy and acceptable diet for themselves, their families and their communities. A database of projects is available and examples of those which impact on older people living in the community are show in table 7.3.

Table 7.3 Examples of community food and health projects

Project	Activity
Islay Disabled Endeavours and Action Ltd	Lunch clubs for the elderly and a community garden which supplies produce for the lunch clubs and to local people
Outer Hebrides Speciality Food Producers Association	Organise the Outer Hebrides food trail and food events
Pentland Food Co-operative	Sell fresh fruit and vegetables to the local community
East Lothian Roots and Fruits	Food co-op and provision of 5 a day bags via GP's
Annexe Healthy Living Centre	Healthy eating café providing a community focal point and healthy eating workshops for older people
Health All Round	Sells low cost produce and runs walking and exercise groups
Broomlands Bourtreehill Age Concern	Drop-in centre and meal delivery service for elderly and disabled people
The Food Train	Delivers groceries to older and disabled people
Renfrewshire Food Federation	Meal delivery service and community café
Mearns Healthy Living Network	Home delivery and accompanied shopping service and lunch clubs for older people in a rural area
Craighall Co-op	Provides affordable good quality fruit and vegetables
Pentland Community Food Initiative	Runs a food co-op with small, easy to carry quantities
Guid Fettle Project	Exercise and health related project for older people
Renfrewshire Community Health Initiative	Healthy cooking on a budget classes
Partnerships for Wellbeing	Promotes healthy eating to low income and vulnerable groups
Bellsbank Community Café	Provide cheap meals
Croy Village Food Co-op	Food delivery service
Acredale House	Community food co-op within a day centre

<http://www.communityfoodandhealth.org.uk/plugins/directorysearch/index.php> (accessed 6.12.08)

7.10.4 There are many other activities ongoing in Scotland which aim to support the nutritional needs of older people in the community (e.g. meals on wheels, lunch clubs etc.). However, it is very unlikely that these have been developed as part of a research study and therefore have measured outcomes which can contribute to the evidence base. Future research may identify the community based activities which may be useful to develop or replicate on the basis of 'evidence informed good practice' rather than 'evidence-based good practice'.

Examples of initiatives outwith Scotland

7.11 There a number of local initiatives which have also been identified in England and Wales aimed specifically at the nutritional needs of older people which include a food poverty map in Oxford, healthy meals on wheels in West Sussex, Eat Well Stay Well, the Young at Heart award and Eat well, Eat safely. More information about these schemes can be found at: <http://www.foodvision.gov.uk/pages/older-people> (accessed 6.12.08).

7.12. In addition to the above services a study by The Caroline Walker Trust (Wilson, 2009) identified a number of projects in England which have the potential to improve the nutritional intake of older people and assist them in overcoming barriers to meeting their nutritional requirements. Some examples of these services are described below but more comprehensive information is available at: http://www.ageconcern.org.uk/ageconcern/documents/115_0609_preventing_malnutrition.pdf (accessed 8.10.09).

Escorted shopping service – Age Concern Norwich

7.12.1 This service, run by Age Concern, provides transport and volunteer escorts for older people visiting a supermarket. The service, which is currently used by 65 older people, allows them to access a large supermarket on the outskirts of town on a weekly, fortnightly or monthly depending on their needs. The supermarket also has a café where the service users can meet after shopping to have a drink and a chat helping with not only shopping but social isolation.

Barton lunch club – Age Concern Oxon, Oxfordshire

7.12.2 This lunch club has been in existence for over 20 years, with meals initially being provided by a school. This developed into a service where frozen meals were provided by social services. The centre now has a community cafe and meals are cooked on the premises fresh each week. To enable older people to attend the centre transport is also provided. Although this is primarily a lunch club volunteers also shop for small provisions for the members. Many people who attend live alone and so this service plays an important role in not only ensuring the members are eating properly but also in providing some social contact.

Net neighbours – Internet shopping service, Age Concern, York

7.12.3 This scheme grew from a hospital support project which provided shopping services to older people being discharged from hospital. Despite some older people having access to a hot food service they still need food for other meals and household goods. This service bridges that gap by enabling older people to take advantage of internet shopping, even without their own computer. A staff member or volunteer phones the older person on a preset day and takes their 'shopping list' and then places the order with a supermarket who delivers the shopping to the older person's home. The project pays for the shopping initially and is then reimbursed by cheque by the older person. While the shopping service is vital the telephone befriending aspect complements the shopping scheme with the regular telephone contact relieving isolation for the older person.

7.13 In a study by Hyland et al. (2007) people aged 60 years and over have been recruited in the North East of England and trained as peer educators in nutrition interventions with older people. Their role was to facilitate food clubs in sheltered accommodation schemes. While there are some issues to consider, training peer educators as community nutrition assistants to lead appropriate dietary interventions may have potential benefits in improving nutritional intakes in older people.

7.14 A study in the Netherlands assessed the effect of family style meals in older adults without dementia (Nijs et al., 2006). They found that social eating prevented a decline in quality of life, performance and body weight in the participants. Although this study took place outwith the UK and in a care home setting it is reasonable to assume that the benefits of social eating would also be seen in a community setting.

7.15 It is difficult to generalise all findings from community intervention studies outside Scotland or the UK to the Scottish population and circumstances. However

some of these studies have resulted in positive outcomes for older people and there may be potential for developing similar interventions in the older community population of Scotland. The Caroline Walker Trust (Wilson, 2009) have identified a number of key factors which should be considered when developing foods services and these are shown in table 7.4. Although this research was not undertaken in Scotland there is no reason why these findings would not be relevant in Scotland.

Table 7.4 Key issues relevant to community food projects which support older people meeting their nutritional requirements.

Key findings	
1.	Community food projects provide vital support to vulnerable older people around eating well. Funding of these third sector projects should be seen as a priority by local authorities.
2.	Users of community food projects should be fully consulted when services are initiated or developed.
3.	Appetite and eating well are strongly linked to social interaction and projects which include both are most successful.
4.	Older people, volunteers and community food workers need access to simple, consistent information about the importance of healthy eating and the risks of malnutrition.
5.	Project coordinators and volunteers need to be supported with training where necessary.
6.	It is vital to continue to develop services which address the range and changing needs of older people.
7.	Access to food, food shopping and regular meals must be included as a key part of the essence of care for older people.
8.	The development of the personalisation agenda must allow for older people to access services which provide them with food shopping and enough food to ensure they can eat when hungry and food is always available; just supplying a hot/frozen meal once a day is not enough.
9.	Food and nutrition do not exist in isolation from other influences on health and well being and access to food and nutritional health needs to be fully integrated into care packages and risk assessments made on vulnerable older people.
10.	Food is a multidisciplinary issue and needs to be understood as such by policy makers, social services, health professionals and GPs among other.

(Wilson, 2009)

Conclusion

7.16 There are a number of policy documents and initiatives taking place within Scotland which have the potential to influence the dietary intake of older people in the community. In addition there are a number of lessons which can be learnt from initiatives outwith Scotland. The initiatives in Scotland do not appear to have been evaluated and so how they impact on the outcome of older people is not known. This research is urgently needed. In addition, future research may identify community based activities which may be useful and these could then be developed or replicated on the basis of 'evidence informed good practice'.

Key findings

- There are a number of national and local initiatives which have the potential to positively impact on older people's dietary intake.
- There has been no research or evaluation work to establish if services are currently meeting the needs for older people.
- A more coordinated approach to service provision and increased evaluation is recommended.
- Training peer educators as community nutrition assistants may have potential benefits in improving nutritional intakes in older people.
- Social eating e.g. lunch clubs or involving other family members has the potential to improve dietary intake and positively impact on quality of life.
- Home care workers assisting older people with nutritional needs should be allocated longer time slots
- Meals developed for other groups of the population e.g. children are unlikely to meet the nutritional needs of older adults.

8 CONCLUSION

8.1 Older people are at significant risk of nutritional difficulties for a variety of reasons. There are well documented strategies for identifying and treating malnutrition in the hospital setting but this is not true for the community setting.

Aims of the review

8.2 The aims of this review were to identify the literature which exists for older people living in the community in the areas of:

- their nutritional needs
- the barriers to them meeting their nutritional requirements
- interventions which exist to improve health outcomes

The findings from this review are to be used to inform further data collection.

Nutritional needs of older people

8.3 In the main the nutritional requirements of the older adult are the same as those for the rest of the adult population although there are some specific recommendations for older people (DH, 1991). Like the rest of the adult UK population older people should eat less saturated fat, eat more fibre and have a minimum of 6-8 glasses of fluid each day. In addition older people should take a vitamin D supplement (SACN, 2007). This could be prescribed, and so free for older people.

8.4 The quality of the diet eaten by older people is extremely important to ensure that both macronutrient and micronutrient requirements are met. This can be difficult, particularly for the frail older person.

Barriers to older people meeting their nutritional requirements

8.5 There are a number of identified barriers to older people meeting their nutritional requirements. These barriers can be physical, social, psychological, geographical, health-related or financial. Each of these should be considered when developing intervention strategies to improve nutritional intake.

8.6 A further barrier to older people meeting their nutritional requirements could be that they do not know they have a problem. The literature suggests that many older people at nutritional risk in the community are not being identified. However, there is a serious lack of research in terms of both clinical effectiveness and cost-effectiveness, to support the use of nutritional screening in the community. As a result it is not known whether nutritional screening can improve nutritional outcomes.

Nutritional interventions for older people

8.7 There are a number of policies available which could impact on the nutritional needs of older people in the community. There are also a number of localised initiatives which have been developed to improve the diet of older people living in the community. The impact these initiatives have on nutritional status and dietary intake

has not been evaluated. A more coordinated approach to collate data and evaluate these initiatives would enhance sharing of good practice across Scotland.

Further research

8.8 There is only limited evidence evaluating the impact of dietary interventions and most of the evidence which is available has been undertaken in the acute setting. There is an urgent need for research into nutritional interventions which optimise nutritional status of older people living community.

8.9 Further data collection should consider the following areas:

Nutritional screening:

- how this is being used in a community setting.
- whether micronutrient status should also be considered in nutritional screening of older adults.
- whether it appears to improve nutritional care of older people.

Barriers to older people meeting their nutritional requirements:

- what assistance older people need to overcome the barriers to meeting their nutritional needs from the perspective of health care professionals, carers, social care and most importantly older people themselves.
- whether there are different barriers for older people living in rural areas compared to those living in urban settings.

Interventions:

- what is required to improve food provision for older people including purchasing and preparing food and fully prepared and delivered meals.
- whether the quality and texture of foods are considered in food provision for older people.
- whether older people are taking vitamin and mineral supplements and in particular vitamin D supplements.
- whether older people have access to dietary advice to improve their nutritional status.
- if dietary advice is provided what is the preferred format for older people.
- whether a systematic approach exists for the prescription of nutritional supplements and whether diet is considered as part of this.
- what community services have had an impact on improving food provision to older people and what more is required in this area.
- the impact of packages of care which take into consideration diet and activity combined.
- the impact of the manner dietary advice is delivered by staff on dietary intake.

Recommendations

8.10 Although there is an urgent need for research to be undertaken in the areas identified, there are opportunities to change current practices to enhance the nutritional health of older adults in Scotland.

8.11 Consideration should be given to extending nutrition screening practices from the acute setting to the community setting taking into account the particular needs of the community population. Screening practices should not only consider nutritional status but should perhaps also consider the barriers an individual has to meeting their nutritional requirements.

8.12 Current recommendations for dietary intake and supplementation (in particular for vitamin D) are not being followed and consideration should be given as to how to enhance the uptake of public health messages related to diet and nutrition in the older adult.

8.13 Enhancing nutritional intake and nutritional status should not be considered in isolation but should be considered alongside optimising people's ability to perform activities of daily living, preventing falls and independent living initiatives.

8.14 Based on existing evidence and areas of good practice, there are many steps which can be taken by policy makers to improve the nutrition of older people still living at home in Scotland. In particular, steps could be taken to improve advice on diet and to make sure existing recommendations are adhered to.

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ANNEX 1: Project Contacts

Age Concern Scotland	
Community Dietetic Services Manager,	Bristol Royal Infirmary
Allied Health Professions Officer	Directorate of Nursing, Health Department, Scottish Executive
Alzheimer Scotland	
Better Government for Older People	
British Dietetic Association	5th Floor, Charles House, Birmingham B3 3HT
Cambuslang & Rutherglen CHI	
Centre for International Public Health Policy	University of Edinburgh
Centre for Older Peoples Agenda	Queen Margaret University, Edinburgh
Chair in Public Health	University of Aberdeen
CHEX	
Church of Scotland	George St, Edinburgh
Communities Scotland	
Community and District Nurses Association	Clinical Nurse Manager, Astley Ainslie Hospital, Edinburgh EH9 2HL
Community Dietitian, NHS Lanarkshire	
Community Food Initiatives	Scottish Consumer Council Glasgow G1 3DN
Community Planning & Health Improvement Specialist,	East Ayrshire Council
Corporate Services Policy Officer, City of Edinburgh Council	
Dementia Services Centre	Stirling University
Dept of Nutrition & Dietetics	Doncaster Royal Infirmary
Dept of Nutrition & Dietetics	Liberton Hospital, Edinburgh
Development Officer, Community Food & Health (Scotland)	
Dietetic Consultant in Public Health Nutrition	NHS Tayside
Dietetic Department	Amersham Hospital, Amersham, Buckinghamshire
Dietetic Department	Kent & Canterbury Hospital
Director of Public Health	Forth Valley NHS Board
Director, Scottish Centre for Intergenerational Practice	

Dumfries and Galloway Council	
Edinburgh Community Food Initiative	
Executive Director, Community Food Initiatives	
Fife Users Panel	Fife User Panels, Age Concern Scotland, Kirkcaldy KY1 1XN
Health Economics Research Unit	University of Aberdeen
Health Improvement Adviser	Fife Council
Health Improvement Coordinator	Falkirk Council
Health Improvement Coordinator	Midlothian Council
Health Improvement Manager	East Renfrewshire Council
Health Improvement Officer	Argyll & Bute Council, Dundee City Council, East Lothian Council, Inverclyde Council, North Ayrshire Council, Perth & Kinross Council, Scottish Borders Council
Health Improvement Officer (Strategy)	Aberdeenshire Council, Moray CHSCP
Health Improvement Policy Officer	Comhairle nan Eilean Siar Council Orkney Island Council
Health Improvement Programme Officer – Food & Health	NHS Health Scotland, Thistle House, Edinburgh EH12 5HE
Health Living Network Project Worker	Burnfoot Project
Health Policy & Planning Officer	Clackmannanshire Council
Health Promotion Manager	Borders Healthy Living Network
Healthy Living Network Project Worker	Philpfaugh Community School
Help the Aged, Scotland	
HERU	University of Aberdeen
HIO & Choose Life Coordinator	Perth & Kinross Council
HIO	East Dunbartonshire Council
Institute of Healthcare Management	
Jewish Care Scotland	
Lead Dietitian for Care of the Elderly	County Community Hospital, Invergordon
Lead Officer Health Improvement	West Dunbartonshire Council
Leith Community Treatment Centre	
Meals on Wheels	Aberdeen, Angus, Kilmory and Stirling

MHWBLL NHS Health Scotland	Rosebery House, Edinburgh EH12 5EZ
National Co-ordinator for General Practice Nurses	
NHS Lanarkshire	
Older People and Age Team, Scottish Government	
Orbiston Neighbourhood Centre	
Planning Manager Health	South Lanarkshire Council
Policy Manager	Highland Council
Policy Planner (Health Improvement)	Renfrewshire Council
RSVP, CSV Chair National Volunteering Forum for Scotland	Retired/senior and Volunteer Service, CSV, Edinburgh
Scottish Mental Health Foundation, Glasgow	
Scottish Social Services Council	
Service Development Officer Health Improvement,	West Lothian Council
Sheltered Housing	
South Lanarkshire Council	
St George's West Church, Church of Scotland	
Sustain	94 White Lion Street, London, N1 9PF
Tayside Institute for Health Studies	University of Abertay
The Food Train	Annandale & Eskdale Branch, Dumfries, Newton Stewart and Stranraer
WRVS	

ANNEX 2: SUMMARY OF LITERATURE

Authors	Type of article and research location	Aims	Participants	Method	Main findings
Baldwin & Weekes (2007)	Systematic review	Examine the effects of dietary advice to improve nutritional intake given by a dietitian or other health care professional to adults with illness related malnutrition.	36 studies N = 2714 12 trials compared dietary advice and supplements with no advice	Randomised Controlled Trials (RCT's) of dietary advice in people with illness-related malnutrition compared with no advice, oral nutritional supplements; and dietary advice plus oral nutritional supplements.	There was no significant difference in mortality between. Energy intake was significantly higher in groups receiving dietary advice at 6 months There was no significant difference in weight change at 3 months or 6 months but there was a significant difference observed at 12 months, with groups receiving dietary advice having a significantly greater weight gain than groups receiving no advice.
Bartali et al. (2006)	Longitudinal study USA	Assess link between levels of nutrients and development and course of disability.	Community dwelling women 65 years and over N = 643	Prospectively assessed at 6 month intervals.	Low serum B6 and B 12 and selenium predict disability in activities of daily living.
Beck & Ovesen (1998)	Review	Discuss whether different cut-off points regarding BMI and weight loss should be considered in hospitalised elderly when assessing risk.		Not reported.	Using cut-offs of BMI < 20 will probably identify older people who are already undernourished. BMI 24-29 should be considered healthy in an older population.
Beswick et al. (2008)	Systematic review and meta analysis Carried out in UK	Asses effectiveness of community based complex interventions on physical function and independence in elderly people.	Mean age 65 years Living at home 98 trails / N=97984	Search of RCT's assessing community based multi-factorial interventions.	Interventions reduced the risk of not living at home and admission to hospital but not death. Falls and physical functional decline was lower in the intervention groups. Interventions can help elderly people live safely and independently and could be tailored to meet individual needs.

Authors	Type of article and research location	Aims	Participants	Method	Main findings
Cesari et al. (2004)	Part of InCHIANTI study – population based study Italian participants	Assess correlation of plasma antioxidants with muscle strength.	Aged 65 years and over N= 986	Performance tests, plasma antioxidants and dietary intake.	Plasma antioxidants correlate positively with performance and strength. Vitamin C intake has strong correlation with muscle strength.
Chin et al. (2001)	Randomized placebo controlled trial	Examine the effects of an exercise programme and an enriched food regimen on physical functioning of frail elderly in the community.	Mean age = 78.8 N=150 independent living in the community N= 39 participated in a twice week exercise group N=42 ate enriched foods	Functional status based on 6 performance tests Physical fitness based on 7 fitness tests Disabilities based on self-reported ability to perform 16 activities.	Enhanced physical performance improved fitness in a population of frail elderly. However, daily consumption of micronutrient enriched foods showed no functional benefit within 17 weeks.
Denny (2008)	Review	Explore the role of diet in the ageing process.		Not stated.	Good nutrition is essential for healthy ageing and has implications for quality of life and public health.
Hirani and Primatesta (2005)	Survey carried out between Oct 1994 - 1995. Carried out in England	Assess vitamin D status and examine associations of deficiency with risk factors among older people in England.	N= 1,766, men and women aged > 65 years Living in institutions or private housing.	Vitamin D sample was obtained from 1,766 informants as part of the Health Survey for England (HSE) (2000).	Average levels of the amount of vitamin D in the blood was lower and there was also a higher number of people with actual deficiency across people living in institutions. Regression analysis showed women were more likely to be vitamin D deficient than men (odds ratio (OR) 2.1) and deficiency was associated with limiting longstanding illness (OR 3.57), manual social classes (OR 2.4), poor general health (OR 1.92) and body mass index <25 kg/m ² (OR 2.02), and was 67% more likely in the winter/autumn.

Authors	Type of article and research location	Aims	Participants	Method	Main findings
Jia et al. (2008)	Systematic Review and meta-analysis	Review evidence on the effect of nutrient supplementation on cognitive function in people aged ≥ 65 years.	22 trials included N=3442 Many studies were small, short duration and of poor methodology.	RCTs with standardised measure of cognition, supplementation included at least one nutrient, evidence of random allocation with a control.	There was no effect of B vitamin or antioxidant vitamins on global cognitive function. There was insufficient evidence to evaluate the effect of omega-3 fatty acids on cognition.
Lim et al. (2006)	Systematic review	Review evidence of omega 3 in cognitive function.	2 RCT's Aged 60 years and over with no cognitive impairment.	RCT's placebo controlled double blind trials on effects of B ₁₂ on cognitive function with minimum duration 6 months.	No evidence that omega 3 PUFA reduces risk of cognitive impairment of dementia.
Malouf & Areosta Sastre (2003)	Systematic review and meta-analysis	Examine effects of vitamin B ₁₂ supplementation on cognitive function	3 RCT's – varying intervention periods Elderly people	RCT's placebo controlled double blind trials on effects of B ₁₂ on cognitive function	No benefit of vitamin B ₁₂ supplementation on cognitive function of people with low vitamin B ₁₂ levels.
Malouf & Grimley Evans (2008)	Systematic review	Examine effects of folic acid supplementation in preventing cognitive impairment.	8 RCT's Elderly people	RCT's investigating folic acid supplements with or without vitamin B ₁₂ Pooling of data was not possible.	No adequate evidence of benefit of folic acid supplementation with or without vitamin B ₁₂ .
Malouf & Grimley Evans (2003)	Systematic review	Assess efficacy of vitamin B ₆ supplementation on cognitive function.	2 RCT's – small in size Elderly people	No RCT's on impact of B ₆ supplementation in dementia found 2 RCT's of B ₆ supplementation in healthy people included.	There is no evidence that vitamin B ₆ supplementation has any effect on mood or cognitive function.

Authors	Type of article and research location	Aims	Participants	Method	Main findings
Milne et al. (2005)	Systematic review Studies from Europe, USA, Canada, Australia and Hong Kong included	Assess effects and acceptability of oral dietary supplements in hospitalised older people and older people in the community.	Participants aged > 65 Groups exclusively in critical care of recovering from cancer were excluded 49 studies Most included trials had poor study quality N = 4790	RCT's with random allocation of subjects, compared a protein-energy supplement with no intervention, placebo or alternative supplement and assessed 1 or more relevant outcome.	The pooled weighted mean difference [WMD] for percentage weight change showed a benefit of supplementation of 2.3% (95% confidence interval (CI) 1.9 to 2.7) (34 trials). Reduced mortality in the supplemented group compared with control groups (relative risk (RR) 0.74, CI 0.59 to 0.92) (32 trials). No significant difference risk of complications (14 trials) (RR 0.95, 95% CI 0.81 to 1.11). Few trials were able to suggest any functional benefit from supplementation. WMD for length of stay from 10 trials showed no statistically significant effect (WMD -1.98 days, 95% CI -5.20 to 1.24).
Roberts et al. (2005)	Cross sectional analysis of survey data USA	Establish if low dietary variety in is a risk factor for low energy intake and low BMI in old age and establish how dietary variety differs between younger and older adults and the impact of this on protein and micronutrient status.	N=1174 men and women aged 21-90 years Community dwelling Caucasians There were multiple exclusion criteria	Reported energy intake protein intake, micronutrient intake using multiple pass 24 hour recall method BMI from self reported weight and height.	Adults aged 61 years or older consumed a greater total variety of foods had a greater variety of micronutrient-dense foods and energy-weak foods compared with younger adults ages 21 to 60 years (p < .05). Older adults with low BMIs (< 22 kg/m ²) consumed a lower variety of energy-dense foods compared with older adults with higher BMIs (p < .05). A higher percentage of older persons had inadequate micronutrient intakes compared with younger persons (p < .05) especially vitamin E, calcium, and magnesium, but consumption of a particularly wide variety of micronutrient-rich foods helped counterbalance these trends (p < .05).

Authors	Type of article and research location	Aims	Participants	Method	Main findings
Simonsick et al. (1993)	Analysis of epidemiological study data	Examine the association between recreational physical activity and functional status.	3 studies N= 5177	Pooled data for physical activity	Physical activity offers benefits to physically capable older adults in reducing risk of functional decline and mortality. Future work requires more objective methodology.
Stratton & Elia (2007)	Review of systematic reviews and meta-analysis	Assess and consolidate the key findings from systematic reviews and meta-analysis of trials of nutritional supplements.	Systematic reviews of supplements versus routine care	13 systematic reviews and meta-analysis	There is increasing evidence to support the use of supplements in clinical practice particularly in acutely ill and older patients.
Tiemeijer et al. (2002)	Population based study Rotterdam	Examine association of vitamin B ₁₂ , folate and homocysteine with depression	Aged > 55 years N=3884 screened	Subjects screened for depressive symptoms Those who had positive screening (N = 262) had a psychiatric workup N=112 diagnosed with depression N=416 randomly selected controls.	Only vitamin B ₁₂ deficiency appeared to be independently associated with depressive symptoms. The strength of evidence in this study means it has only limited application.
Zambooni et al. (2007)	Review	Examine the main studies regarding sarcopenic obesity in the elderly.		Not reported	Identification of sarcopenic obesity may identify a group of subjects with health risk, and the concept of sarcopenic obesity may help to clarify the relationship between obesity, morbidity and mortality in the elderly.

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