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A Community Dietetics Intervention to Improve the Use of Oral Nutritional Supplements in the Community Setting

Sharon Kennelly
*Technological University Dublin*

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A Community Dietetics Intervention to Improve the Use of Oral Nutritional Supplements in the Community Setting

By

Sharon Kennelly

BSc. Human Nutrition & Dietetics

A Thesis for the Degree of
Doctor of Philosophy (PhD)

Dublin Institute of Technology

Supervisors:
Dr. Clare Corish
Dr. Nicholas Kennedy
Ms. Sheila Sugrue

School of Biological Sciences

January 2012
Abstract
Evaluation of a community dietetics intervention to improve oral nutritional supplement prescribing practices in the community.

Background: Healthcare professionals working in the community do not always prescribe oral nutritional supplements (ONS) according to best practice guidelines and expenditure on ONS has increased. The aim of this study was to investigate ONS prescribing practices and to determine the impact of a community dietetics intervention on these practices and expenditure one year later.

Methods: At baseline ONS prescribing practices were investigated by patient interview with a community dietitian. The intervention involved an education programme for general medical practitioners (GPs), practice nurses, nurses in nursing homes and community nurses together with the provision of a new community dietetics service. Changes in healthcare professionals’ practices and knowledge were determined by self-administered questionnaires immediately after and six months after the intervention, and by examining community dietetics records one year after the intervention. ONS prescribing volume and expenditure were assessed using data from the Primary Care Reimbursement Service of the Irish Health Service Executive.

Results: Seventy-eight and 42 patients were included in the study pre and post-intervention respectively. Ninety-six healthcare professionals participated in the nutrition education programme (including seven of ten principal GPs). Six months post-intervention improvement in healthcare professional nutritional knowledge was observed (P<0.001). One year post-intervention, screening for malnutrition risk was better (62% vs 0%, P < 0.001), dietary advice provided more often (90% vs 26%, P < 0.001), and ONS prescribed for a greater proportion of patients who were at „high risk” of malnutrition than before (88% vs 37%, P < 0.001). There was a trend (not significant) towards fewer patients being prescribed ONS (18% reduction, P = 0.074) and there was no significant change in expenditure on ONS by participating GPs (3% reduction, P = 0.499), despite a 28% increase nationally by GPs on ONS.

Conclusion: The community dietetics intervention improved ONS prescribing practices by healthcare professionals, in accordance with best practice guidelines, without increasing expenditure on ONS during the year after intervention.
Declaration

I certify that this thesis which I now submit for examination for the award of PhD, is entirely my own work and has not been taken from the work of others, save and to the extent that such work has been cited and acknowledged within the text of my work.

This thesis was prepared according to the regulations for postgraduate study by research of the Dublin Institute of Technology and has not been submitted in whole or in part for another award in any Institute.

The work reported on in this thesis conforms to the principles and requirements of the Institute's guidelines for ethics in research.

The Institute has permission to keep, lend or copy this thesis in whole or in part, on condition that any such use of the material of the thesis be duly acknowledged.

Signature ___________________________ Date ___________

Sharon Kennelly Candidate
Acknowledgements

The completion of this workplace based research on a part-time basis while also working as a community dietitian has been a long journey of over six years and has overlapped with many changes both in my personal and working life. Since 2005 when this research began, I have moved office four times, changed job description at least four times, been promoted, moved house six times, bought my first home and got married.

It would not have been possible to complete this research without the support of many kind people along the way, only some of whom it is possible to give particular mention here.

To my supervisors:
Firstly I cannot overstate my gratitude to my academic supervisors Ms Sheila Sugrue, Dr. Clare Corish (School of Biological Sciences Dublin Institute of Technology) and Dr. Nicholas Kennedy (Department of Medicine Trinity College Dublin) who provided not only expert advice but constant support and encouragement, and who were very generous with their time especially when difficulties arose.

This research simply would not have happened without the dedication and vision of Corina-Glennon Slattery (Community Dietitian Manager Dublin Mid-Leinster Health Service Executive) who oversaw every aspect of this research from securing funding to dissemination of the results. I would also like to thank Grainne –Flanagan Rughoobur (Dietitian Clinical Specialist for Older Persons Health Service Executive), who allowed me to continue the work that she Corina and Dorothy Loane started in 2002 and provided expert opinion and encouragement during this research.
To the staff of Dublin Institute of Technology Kevin Street:

Thanks you particularly the library staff, the staff of the Statistics Support Unit, and the Office of Graduate Studies. I am also grateful to Dr. Mary McNamara who was very supportive and encouraging of this research.

To the staff of the Health Service Executive:

Within the Health Service Executive, I am indebted to my community dietitian colleagues both current and past who were with me every step of the way throughout this research. I would also like to acknowledge the support and of Mr. Pat O Dowd (HSE Assistant National Director Health Service Executive and Dr. Pat Dooley (HSE National Director of Public Health). I would wish to thank the staff of the HSE Primary Care Reimbursement Service particularly Mr. Patrick Burke (CEO) and the staff of the Statistics Unit for their invaluable help. Also thank you to staff of the Clinical Audit and Research Department for their advice (Health Service Executive Dublin Mid-Leinster).

To the study participants:

I would like to thank the healthcare professional study participants including the practice nurses, community nurses and nursing home staff nurses and their management teams for taking parting the research. This research would not have happened without the participation of the General Practitioners (GPs), I would like to thank them engaging in this research. Finally I would I would also like to say a very special thank you to the patients and their families and carers who kindly took part in this research.
To my family and friends:

I wish to thank my good friends and housemates over the last six years especially for their support, and empathy during this research.

I would like to thank my family, especially my parents Marian and Jerry Kennelly who have always given me fantastic support throughout my education and my life, and also thank you to my five younger brothers and sisters Caroline, John-Paul, Diarmuid, Caitriona and James for their interest, support and encouragement throughout this research.

Finally and most importantly a special word of gratitude and appreciation to my (badly neglected) new husband Gary Byrne for his understanding, patience, support and love, all of which have helped me to finish this piece of work. I could not have done it without you.
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<th>Description</th>
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<tr>
<td>€</td>
<td>Euro</td>
</tr>
<tr>
<td>£</td>
<td>Pound (United Kingdom)</td>
</tr>
<tr>
<td>ACBS</td>
<td>Advisory Committee on Borderline Substances</td>
</tr>
<tr>
<td>BAPEN</td>
<td>British Association for Enteral and Parenteral Nutrition</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>Body Mass Index (kg/m²)</td>
</tr>
<tr>
<td>BNF</td>
<td>British National Formulary</td>
</tr>
<tr>
<td>CHD</td>
<td>Coronary Heart Disease</td>
</tr>
<tr>
<td>CME</td>
<td>Continuing Medical Education</td>
</tr>
<tr>
<td>CNP</td>
<td>Clinical Nutritional Product</td>
</tr>
<tr>
<td>CSO</td>
<td>Central Statistics Office</td>
</tr>
<tr>
<td>DIT</td>
<td>Dublin Institute of Technology</td>
</tr>
<tr>
<td>DPS</td>
<td>Drugs Payment Scheme</td>
</tr>
<tr>
<td>ESPEN</td>
<td>European Society for Parenteral and Enteral Nutrition</td>
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<tr>
<td>GMS</td>
<td>General Medical Services</td>
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<tr>
<td>GP</td>
<td>General Practitioner</td>
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<td>h</td>
<td>Hour</td>
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<tr>
<td>HSE</td>
<td>Health Service Executive</td>
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<tr>
<td>IQR</td>
<td>Inter Quartile Range</td>
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<tr>
<td>kcal</td>
<td>kilocalorie</td>
</tr>
<tr>
<td>LTI</td>
<td>Long Term Illness Scheme</td>
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<tr>
<td>MAG</td>
<td>Malnutrition Advisory Group</td>
</tr>
<tr>
<td>MAMC</td>
<td>Mid-Arm Muscle Circumference</td>
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<tr>
<td>MCQ</td>
<td>Multiple Choice Questionnaire</td>
</tr>
<tr>
<td>MIMS</td>
<td>Monthly Institute of Medical Specialities</td>
</tr>
<tr>
<td>mL</td>
<td>millilitre</td>
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<tr>
<td>MNA</td>
<td>Mini Nutritional Assessment</td>
</tr>
<tr>
<td>MUST</td>
<td>Malnutrition Universal Screening Tool</td>
</tr>
<tr>
<td>n</td>
<td>Number</td>
</tr>
<tr>
<td>NHS</td>
<td>National Health Service</td>
</tr>
<tr>
<td>NICE</td>
<td>National Institute for Health and of Clinical Excellence</td>
</tr>
<tr>
<td>NPC</td>
<td>National Prescribing Centre</td>
</tr>
<tr>
<td>NSW</td>
<td>Nutrition Screening Week</td>
</tr>
<tr>
<td>ONS</td>
<td>Oral Nutritional Supplement/s</td>
</tr>
<tr>
<td>PCRS</td>
<td>Primary Care Reimbursement Service</td>
</tr>
<tr>
<td>PCT</td>
<td>Primary Care Trust</td>
</tr>
<tr>
<td>ROI</td>
<td>Republic of Ireland</td>
</tr>
<tr>
<td>SD</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>TSF</td>
<td>Triceps Skinfold Thickness</td>
</tr>
<tr>
<td>UK</td>
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3. **Fiosraigh Award Dublin Institute of Technology 2010** Best Paper in the area of Science Engineering and Technology for the following paper.

1. INTRODUCTION

Underlying the provision of high quality, cost effective healthcare is the necessity that healthcare professionals’ practice is guided by evidence-based recommendations. This is especially pertinent when resources are scarce. The background to this research project was the increase in clinical use and expenditure on oral nutritional supplements (ONS) by the Irish Health Service Executive (HSE) and the growing evidence to suggest that ONS prescribing by many general practitioners did not adhere to best-practice guidelines.

This PhD research project was undertaken over a six and a half year period (beginning April 2005) by a community dietitian (SK) working in the Community Nutrition and Dietetic Service of the HSE Dublin-Mid-Leinster (Midlands Area). The research was the first of its kind in the Republic of Ireland (ROI) and one of a few international studies to evaluate the effects of a community dietetics intervention on the prescribing of ONS in the community.

This thesis is divided into nine chapters. Chapter 1 provides an introduction to the PhD thesis while Chapter 2 lists the aims and objectives of the research project. The main body of the thesis is presented from Chapter 3 onwards. Chapter 3, the literature review, is divided into four sections. The first section describes the problem of malnutrition in the community, the second section reviews the nutrition and dietetic options for the treatment of malnutrition, the third section considers issues related to the prescription of ONS, including an appraisal of previous studies which have investigated ONS prescribing practices and interventions to change ONS prescribing practices. The fourth and final sections of the review outline the evidence for interventions to change the practices of healthcare professionals, including interventions to change the
prescribing of medicines, the provision of dietary advice and nutrition screening practices.

A number of issues required consideration at the outset of this research, including the need for stakeholder co-operation, and ONS governance and control structures in place in the ROI which influenced the study design and methods. These matters are discussed in detail in Chapter 4 of this thesis.

The next three chapters of this thesis, Chapter 5, Chapter 6 and Chapter 7, are presented as peer-reviewed academic papers which have been published in the British Journal of Human Nutrition & Dietetics.

Chapter 5 describes the baseline (pre-intervention) study which was carried out in 2005; this study describes the patient group prescribed ONS in the community and investigated the factors influencing their need for ONS. The study also aimed to determine the proportion of prescriptions in line with evidence-based criteria. The preliminary evaluation (immediately after and six months after) the community dietetics intervention to improve ONS prescribing practices is described in Chapter 6. Changes in knowledge and the reported nutrition care practices of healthcare professionals were measured along with the healthcare professionals’ satisfaction with the intervention. The longer term (after 1 year) evaluation of the community dietetics intervention is provided in Chapter 7. In order to verify the reported improvements in practice by healthcare professionals six months after the intervention, patient dietetic records were reviewed to evaluate actual changes in practice. Centrally held data were also analysed to determine changes in ONS volume and expenditure following the intervention.

A discussion of the outcomes of the three studies described in Chapter 5, Chapter 6 and Chapter 7 is provided in Chapter 8. Limitations of the work along
with possible areas for further research are explored. Finally, the dissemination of the
research results and how these were exploited are described in Chapter 9.
2. AIMS AND OBJECTIVES

Aim

The aim of this study was to investigate ONS prescribing practices and to determine the impact of a community dietetics intervention on these practices and expenditure one year later.

Objectives

1. To investigate the current oral nutritional supplement prescribing practices of healthcare professionals working in the community compared to the evidence for best practice in the use of these products (Chapter 6).
2. To examine the demographic profile of patients that are prescribed oral nutritional supplements (Chapter 6).
3. To investigate the acceptability of a community dietetics intervention involving a nutrition education programme and the introduction of a community dietetics referral service for patients at risk of malnutrition in the community (Chapter 7).
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7. To investigate the effects of a community dietetics intervention on oral nutritional supplement prescribing volume and expenditure one year after the intervention (Chapter 8).
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3. LITERATURE REVIEW

Introduction

The population of elderly people in Ireland is increasing (Central Statistics Office, 2007) and, as malnutrition is more prevalent among the ageing population, the costs associated with treating malnutrition are likely to place increasing demands on the health services both in hospital and community settings (Elia et al., 2005b; Elia & Stratton, 2010). Expenditure on oral nutritional supplements (ONS), one of the most commonly used treatments for malnutrition, has been increasing in the past number of years in both the Republic of Ireland (ROI) and the United Kingdom (UK) (Barry, 2009; Barron, 2010; Wilkie & Forrest, 2011).

To help put the studies undertaken for this thesis into context, a literature review of relevant topics was carried out. This review includes a description of malnutrition including the definition, aetiology and prevalence of malnutrition, an account of the consequences of malnutrition and a discussion of the methods to identify malnutrition. The evidence for means commonly used to treat malnutrition, including dietary advice, other nutritional care interventions and ONS are fully reviewed along with the indications for prescribing ONS in Ireland and the UK and the costs associated with ONS. Previous investigations of ONS prescribing practices are reviewed in detail.

Finally, previous interventions which attempted to change general prescribing practices, ONS prescribing practices or aimed to improve nutritional care practices, including nutrition screening, are examined and discussed in depth.
3.1 The importance of malnutrition in the community

3.1.1 Definitions of malnutrition

The term malnutrition most is most commonly used to describe undernutrition or a deficiency in nutrients, however it can also be used to describe overnutrition or an excess in nutrients (Lochs et al., 2006) such as overweight and obesity. There is no universally accepted definition of malnutrition that is associated with deficiency although a number of different terms associated with malnutrition are used interchangeably in the literature. These terms include disease-related malnutrition, protein-energy malnutrition, underweight, under-nutrition and nutritional frailty. The lack of standardised terminology can lead to difficulty when comparing epidemiological and clinical data between studies (Olde Rikkert & Rigaud, 2003; Milne, 2009). Body Mass Index (kg/m²) (BMI) is the most common criterion used to classify malnutrition and a number of cut-off values for BMI to determine malnutrition have been suggested by different authors and expert groups ranging from a BMI less than 17 kg/m² to a BMI less than 24 kg/m² in elderly patients (Stratton et al., 2003).

However, more recent definitions have included the effects of malnutrition on body composition as well as functionality. The most recent definition published by the European Association for Enteral and Parenteral Nutrition (ESPEN) states that:

"Malnutrition is a state of nutrition in which a deficiency or excess (or imbalance) of energy, protein and other nutrients causes measurable effects on tissue/body form (body shape, size, and composition) and function and clinical outcome’ (Lochs et al., 2006).

In addition, more recent definitions consider the fact that despite normal BMI, recent unintentional weight loss may indicate sub-optimal nutrition for an individual. Guidelines published in 2006 by the National Institute of Health and Clinical
Excellence (NICE) in the UK classified protein-energy malnutrition as any of the following: “a BMI of less than 18.5 kg/m², unintentional weight loss of greater than 10% within the last 3-6 months, a BMI of less than 20 kg/m² and unintentional weight loss of greater than 5% within the last 3-6 months”. These criteria were used to define malnutrition in the studies described in this thesis.

3.1.2 Aetiology of malnutrition

In developing countries, malnutrition can occur as a result of famine, natural disasters and war which affect the food supply causing hunger and disease. In contrast, in developed countries food is widely available; nevertheless, malnutrition still exists in certain high risk population groups due to multi-factorial underlying causes such as decreased or inadequate dietary intake, and the effects of disease such as malabsorption, increased metabolism and catabolism (Stratton et al., 2003).

Decreased food intake has many causes including those that are physiological and non-physiological. ‘Anorexia of aging’ has been described as a physiological effect of the natural ageing process possibly due to the decreased energy expenditure that can occur simultaneously during ageing. Malnutrition may develop over a period of time when energy expenditure remains greater than energy intake (MacIntosh et al., 2000).

Non-physiological causes of decreased food intake include social factors such as living alone and social isolation, poverty, self neglect, difficulties cooking and shopping, financial constraints affecting ability to buy food, psychological factors such as depression and dementia, alcoholism and medical factors such as polypharmacy (i.e the practice of prescribing multiple medications for an individual at one time (MacIntosh et al., 2000; Stratton et al., 2003; Alibhai et al., 2005). Polypharmacy may contribute to poor nutritional status by causing loss of appetite, gastrointestinal
problems, and other changes in body function. A review of published studies in 2012 by (Jyrkkä et al., 2012) found that there was growing evidence to support the association between increasing number of prescribed medications and malnutrition in older persons. The prevalence of malnutrition due to polypharmacy is not known and longitudinal studies to investigate the association between polypharmacy and malnutrition are required.

Malnutrition which is caused by the effects of chronic disease gives rise to the term „disease-related malnutrition”. The treatment of disease e.g. chemotherapy or radiation therapy may also contribute to either the development of malnutrition or further compound pre-existing malnutrition. The underlying mechanisms by which disease states cause malnutrition include increased metabolism e.g. chronic obstructive airways disease where total energy expenditure can be increased, catabolism which occurs as a component of the metabolic response to trauma, infection and inflammation, and malabsorption seen most commonly in diseases of the gastrointestinal (GI) tract e.g. Crohn’s disease (Stratton et al., 2003).

Other physical effects of disease or treatment which may cause decreased dietary intake include difficulties swallowing, dry mouth, painful mouth conditions, taste changes, nausea and vomiting, diarrhoea, constipation, bloating, abdominal pain and GI reflux (Stratton et al., 2003).

Decline in body weight, especially in older people, is generally associated with decline in lean body mass i.e. muscle mass which may give rise to a number of adverse effects such as loss of strength, decreased mobility, increased risk of falls and decreased quality of life (MacIntosh et al., 2000; Waters et al., 2010). It has been recognised that all forms of decline in body mass are not the same and, in 2010, special interest groups of the European Society for Parenteral and Enteral Nutrition (ESPEN) published an
opinion paper which established consensus definitions and terminology for a number of syndromes including sarcopenia and sarcopenic obesity, cachexia and pre-cachexia (Muscaritoli et al., 2010). There are challenges for healthcare practitioners in the early identification of and effective treatment of these syndromes. Cachexia and pre-cachexia involve an inflammatory response and are common in chronic diseases such as cancer, chronic obstructive airways disease, chronic heart failure, liver disease and rheumatoid arthritis. Sarcopenia is associated with decreased muscle mass and muscle function and is a feature of ageing seen in both healthy and ill older persons in different degrees. Not all malnourished patients are cachectic, but all cachectic patients are malnourished to some degree (Muscaritoli et al., 2010). Similarly, not all sarcopenic patients are malnourished according to the international criteria previously described (NICE, 2006). Declining muscle mass may be masked by increasing fat mass which is associated with ageing; hence, body weight may remain unchanged. BMI is not sensitive to shifts in body composition (Waters et al., 2010); therefore, BMI is not a good approximate measure by which to identify sarcopenia (Muscaritoli et al., 2010).

Studies of treatment programmes for sarcopenia in older persons comprise combinations of different forms of exercise, including resistance and aerobic exercise, and dietary interventions. Dietary interventions involving dietary protein manipulation and Vitamin D supplementation have shown some benefits to date in treating sarcopenia, mainly increases in muscle strength. However, further research is needed to determine which approaches are most beneficial and practical, particularly in the community setting for homebound adults to prevent and treat sarcopenia and related syndromes (Waters et al., 2010).
3.1.3 Prevalence of malnutrition

In developed countries the prevalence of malnutrition among the general population is low but in certain population groups, such as older persons and those with chronic disease, the prevalence has been shown to be much higher. To put the data relating to the prevalence of malnutrition in the ROI in context, UK and international data will be discussed for comparative purposes.

In the ROI, the prevalence of underweight (defined as a BMI < 18.5 kg/m²) among adults living in their own homes in the community (18-64 years) is estimated to be low at 0.3% for men and 1.0% for women (Irish Universities Nutrition Alliance (IUNA), 2011). Furthermore, the prevalence of underweight (BMI < 18.5 kg/m²) among older adults living in their own homes in the community (> 65 years) was estimated to be similarly low (0% men and 0.7% women). In comparison, data from the Survey of Lifestyle Attitudes and Nutrition in Ireland (SLÁN) published in 2008 showed that 1% of men and 2% of women > 65 years of age were underweight (defined as BMI < 20kg/m²) (Morgan et al., 2008). Results reported by IUNA in 2011 are based on actual weight and height measurements while the SLÁN study (Morgan et al., 2008) used reported weight and height measurements which may account for differences in results between these two studies.

The biggest nutritional problem identified by national surveys in healthy free-living older adults (aged over 65 years) is not malnutrition but increasing overweight and obesity, with 62% of males and 47% of females (aged more than 65 years) classified as either overweight (BMI ≥ 25 kg/m²) or obese (BMI ≥ 30 kg/m²) in the ROI (Morgan et al., 2008). More recent data from the National Adult Nutrition Survey (IUNA, 2011) indicated that 83% of males and 73% of females (aged more than 65 years) were either overweight (BMI ≥ 25 kg/m²) or obese (BMI ≥ 30 kg/m²). This may
account for Irish government policy makers seemingly placing a lower priority on malnutrition than on diseases such as obesity and type two diabetes mellitus, and the problem of malnutrition receiving relatively less media attention.

However, the surveys discussed above were carried out on older persons living in their own homes and, therefore, are more likely to reflect the nutritional status of relatively well older persons. To date, there has been no large scale Irish study undertaken to estimate the prevalence of malnutrition among adults of all ages with chronic disease in the community, but there is evidence from several small studies which provide some insight. Doyle and colleagues (1998) reported a prevalence of malnutrition among adults attending their GP of 16%. A study of older persons living in their own homes receiving meals-on-wheels found that 38.5% were „at risk of malnutrition” using the Mini Nutritional Assessment (MNA) screening tool (O’ Dwyer et al., 2009).

A number of studies from the hospital setting give an indication as to the probable extent of malnutrition in the community. Corish and colleagues (2000) described the prevalence of malnutrition among adults (defined as BMI < 20kg kg/m² and a triceps skinfold (TSF) thickness or mid-arm muscle circumference (MAMC) below the 15th percentile) admitted to acute hospital care from the community as 11% (13.5% had a BMI < 20kg/m²) with over 40% of these patients classified as „at risk of malnutrition” using two different nutrition screening tools (Corish et al., 2004).

More recent data on the prevalence of malnutrition were published in 2011. Twenty-seven Irish hospitals and residential care homes participated in the annual nutrition screening week (NSW) survey organised by the British Association for Enteral and Parenteral Nutrition (BAPEN) which took place in the ROI for the first time in 2010. The study collected anthropometric data from 1602 patients who were recently
admitted to an acute hospital and 154 patients recently admitted to a residential care home (the study criteria stated that patients included should not have been initiated on nutrition support prior to the study) (Russell & Elia, 2011).

These data showed that, in the hospital setting, the mean BMI of patients was 27.2 kg/m² (n = 1401). Eight percent of patients had a BMI less than 20 kg/m² (4% less than 18.5 kg/m²), 32% a BMI between 20 and 24.9 kg/m² and 60% had a BMI ≥ 25 kg/m² (27% had a BMI ≥ 30 kg/m²). Using the Malnutrition Universal Screening Tool (‘MUST’) (Elia, 2003), 33% of patients were identified as being at risk of malnutrition (25% at high risk, 8% at medium risk). There was a higher prevalence of risk of malnutrition seen among patients who were admitted from another care setting (38% from another hospital, 54% from another ward and 54% from a care home) than among patients admitted from their own home (30%) (Russell & Elia, 2011).

Although the number of patients on which data were collected in the care home setting was relatively small in the NSW survey (n = 152), the data provide some useful information. In the care home setting, the mean BMI was 24.3 (sd 5.7) kg/m² which was lower than that reported in the hospital setting. Twenty-three percent of residents had a BMI below 20 kg/m² (15% below 18.5 kg/m²), 36% a BMI between 20 and 24.9 kg/m² and 41% had a BMI ≥ 25 kg/m² (12% having a BMI ≥ 30 kg/m²) (Russell & Elia, 2011). Thirty-two percent of residents surveyed could be classified as at risk of malnutrition according to ‘MUST’ criteria (Elia 2003) (16% at high risk and 16% at medium risk) (Russell & Elia, 2011).

Both the proportion of patients at risk of malnutrition and the proportion of patients with a BMI < 20 kg/m² on admission to hospital is lower in the NSW dataset compiled by Russell and Elia (2011) than the proportion reported by Corish and colleagues (2000, 2004), possibly due to the different nutrition screening tools used to
assess risk of malnutrition in the two studies. The difference is also possibly due to body compositional changes in the Irish population over the 10 years between the two studies i.e. the prevalence of obesity increased from 20.1% to 25.8% for men and from 15.9% to 21.3% for women (aged 18-64 years) over a ten year period between 2001 and 2011 (IUNA, 2001; IUNA, 2011). Changes in nutritional care practices in hospital and the community settings are also likely to have changed during this period which may have influenced the findings. However, it is not possible to quantify the magnitude of the influence these changes may have had on the prevalence of malnutrition.

Data from 2010 on over 10,000 UK individuals (collected during NSW as described above) and reported by (Russell & Elia, 2011) showed that 34% of patients in the acute hospital setting, 37% in the care home setting and 18% in mental health units were at risk of malnutrition on admission according to „MUST” criteria (Elia, 2003). These values are similar to those reported in the ROI and described above.

The prevalence of malnutrition among older persons living in the community in the UK had previously been described by Margetts and colleagues (2003) in a study which investigated the nutritional status of 1368 community dwelling older persons (> 65 years) which reported that 7.2% of the population studied had a BMI < 20 kg/m² and 14% could be classified as at risk of malnutrition according to „MUST” criteria (Elia, 2003).

The prevalence of malnutrition in both hospital and community settings on an international basis has been investigated using a merged database of older persons who had been assessed using the Mini Nutritional Assessment (MNA) screening tool from all five continents (although the majority of the data are from Europe) (Kaiser et al., 2010). Pooled data from the community setting on nearly 1000 patients showed that the average BMI was 23.1 kg/m² (sd 4) for men and 25.6 kg/m² (sd 6.4) for women.
However, 5.8% (9.5% men, 5.3% women) of older people in the community were malnourished and a further 31.9% (52.6% men, 29% women) were at risk of malnutrition according to MNA criteria (six question screening tool covering food intake, weight loss, mobility, clinical stress factors, neuropsychological problems and BMI). Fewer patients in the community setting were malnourished than in either the hospital or nursing home setting where 38.7% and 13.8% of patients respectively were reported to be malnourished.
3.1.4 Consequences of malnutrition

While malnutrition may not be as common among the general population as overweight and obesity in the ROI (Irish Universities Nutrition Alliance, 2011), it has been estimated that the economic burden of malnutrition may be approaching the costs of obesity. In the ROI the annual cost of deaths from obesity has been estimated to be €4 billion (Department of Health and Children, 2005) and the cost of malnutrition has been estimated to be €1.5 billion (based on 2007 data, N. Rice, 2010 unpublished data). Elia and colleagues reported that the cost of malnutrition may be higher than that of obesity in the UK (Elia, 2005b) and that the economic burden is predominantly due to health care utilisation costs which significantly increase with increasing risk of malnutrition (Elia, 2005b).

The consequences of disease-related malnutrition for the individual are extensive. The primary structural and functional consequences for the body are loss of both lean and non-lean tissue which presents as body weight loss. Other effects include impaired immune function. The clinical consequences of these structural and functional changes can negatively affect clinical outcomes resulting in increased mortality (Liu et al., 2002), incidence of complications, length of hospital stay and prolonged rehabilitation (Stratton, 2005).

The consequences in terms of increased healthcare utilisation include a higher number of GP visits, more prescriptions, more frequent need for admission or readmission to hospital or nursing homes, a lower rate of return to independent living and a greater likelihood of requiring home healthcare (Stratton et al., 2003).

Elia and colleagues (2005b) carried out a detailed statistical analysis of the health care costs associated with disease-related malnutrition in the UK. They estimated that the annual health care cost (including GP visits, outpatient visits and
inpatient admissions) for a patient aged 65 years at ‘medium’ or ‘high risk’ of malnutrition was approximately £2333 (€3381), compared to £1102 (€1597). for a patient of similar age at ‘low risk’ of malnutrition according to ‘MUST’ criteria (Elia, 2003). The annual cost of treating malnutrition and its associated diseases was first estimated to be more than £7.3 billion (€10.5 billion) in the UK in 2003 (Elia et al., 2005b) but this estimate had risen to £13 billion (€19 billion) per annum (cost calculation based on 2007 monetary values, Stratton & Elia, 2010). Because of the negative effects of malnutrition which, in turn, increase health service utilisation costs significantly, it is imperative that malnourished individuals are identified and treated at the earliest opportunity possible in the community setting.

3.1.5 Identification of malnutrition

There is evidence that malnutrition is under-diagnosed in both hospital and community health care settings. Elia and colleagues (2005a) reviewed the evidence for the under-diagnosis of malnutrition in different health care settings and reported that between 60-85% of malnourished patients in UK hospitals were undetected and untreated, and 50% of malnutrition in long term residential care homes was undetected (Elia et al., 2005a). Individual studies which reported the under-diagnosis of malnutrition include that of Wilson and colleagues (1998) which reported that malnutrition was undetected by healthcare professionals in 67% of older patients in the out-patient setting. Abbasi & Rudman (1993) reported that as few as 7% of malnourished patients in some nursing homes were correctly identified by healthcare professionals.

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1 Sterling (£) to Euro (€) conversion based on average exchange rate values 2003 (European Central Bank, 2011)
2 Sterling (£) to Euro (€) conversion rate based on average exchange rate values 2003 (European Central Bank, 2011)
3 Sterling (£) to Euro (€) conversion rate based on average exchange rate values 2007 (European Central Bank, 2011)
In the hospital setting, a study by Fikree and colleagues (2010) found that only 20% of all patients (56/279), and 15% (15/100) of malnourished patients had nutrition screening carried out despite the presence of a policy on nutrition screening in the hospital for all new admissions. Similar findings were reported by Volkert and colleagues (2010) who reported that that clinical judgement was used by nurses to identify malnutrition rather than formal nutrition screening for the majority of patients, BMI (kg/m²) was not routinely calculated and nutritional problems were not adequately documented.

In order to identify malnutrition, healthcare professionals need evidence-based, validated nutrition screening and assessment tools that can reliably screen for risk of malnutrition and/or aid the recognition of malnutrition. Green & Watson (2005), in a review of nutrition screening and assessment tools, identified over 70 different tools in the published literature. However, the authors reported these tools varied greatly in their validity, reliability, ease of use and acceptability (Green & Watson, 2005).

Recent guidelines by expert bodies such as the National Institute for Health & Clinical Excellence (NICE, 2006) and the European Association for Enteral and Parenteral Nutrition (ESPEN) (Volkert et al., 2006) have recommended the use of the Malnutrition Universal Screening Tool („MUST”) developed by BAPEN as a suitable screening tool for adult patients in the community setting. The definitions put forward by NICE for both malnutrition (as defined by BMI < 18.5 kg/m², unintentional weight loss >10% within the last 3-6 months, a BMI < 20 kg/m² and unintentional weight loss>5% within the last 3-6 months,) and risk of malnutrition (as defined by having eaten little or nothing for more than 5 days and/or likely to eat little or nothing for the next 5 days or longer or poor absorptive capacity, and or high nutrient losses and or increased nutritional needs from causes such as catabolism)’ are in close agreement
with „MUST’ criteria for risk of malnutrition (NICE, 2006). The „MUST’ involves a calculation of BMI (kg/m²), a calculation of the percentage of body weight loss in the last three to six months, and interpretation of recent food intake. Each of these three variables relates to a separate score, and the scores can then be added to determine the total score and overall risk of malnutrition category as either low, medium or high. (Elia, 2003).

The „MUST’ is a relatively new tool but there are a growing number of published studies on its use in both different patient populations and different settings (Elia, 2003).

The „MUST’ has been studied as a nutrition screening tool in both hospital inpatients and outpatients and has been found to be a useful tool in these patient groups (Stratton et al., 2004; Kyle et al, 2006; Gerasimidis et al., 2007; Ruxton et al., 2008; Porter et al., 2009). The „MUST’ has also been found useful by community nurses and in long stay community hospitals (Godfrey, 2004; Ruxton et al., 2008; Lee et al., 2009) and as a nutrition screening tool for patients living in sheltered housing (Harris et al., 2008). Risk of malnutrition identified using the „MUST’ criteria has been found to be linked to other healthcare related variables such as deprivation and mortality (Stratton et al., 2006; Henderson et al., 2008), mental health symptoms (Kvamme et al., 2011a), and health related quality of life (Kvamme et al., 2011b).

The majority of studies using „MUST’ (Elia, 2003) have shown it to be a useful tool in identifying malnutrition among patients in different disease categories; however, there are some exceptions. For example, Elkan and colleagues (2007) reported that that the „MUST’ was not a useful tool to identify risk of malnutrition for patients with rheumatoid arthritis. Patients with rheumatoid arthritis were found to have a relatively low fat free mass and therefore BMI (kg/m²) is not a useful indicator of malnutrition in
this patient group, which in turn affects the usefulness of „MUST’ with this patient group (Elkan et al., 2007).

Few published studies using „MUST’ (Elia, 2003) carried out in the ROI are available. One example is a study by Keaskin and colleagues (2010) who compared the „MUST’ to three other nutrition screening tools in a group of patients (n = 50) with a diagnosis of respiratory disease. The authors reported that the „MUST’ was found to perform best in terms of sensitivity and specificity in this patient group (Keaskin et al., 2010).

The NICE guidelines, published in 2006, advocate initial nutritional screening in the community in three situations; firstly, on admission of a resident or patient to a care home; secondly, in patients registering at a general practice and, thirdly, in any situation where there is clinical concern. However, nutritional screening on registration at general practice as recommended by NICE (2006) may not be effective for patients who are registered with the same GP practice from childhood or adulthood to old age and, therefore, would not qualify for nutrition screening. Annual screening of high risk groups in the community such as patients aged over 75 may be a more effective approach (Elia, 2003).

When a patient has been identified as malnourished or at risk of malnutrition, the next step is the provision of nutrition support by a trained healthcare professional.

3.2 Nutrition and Dietetic Options in the Management of Malnutrition

When either malnutrition or risk of malnutrition has been identified, the first step for healthcare professionals should be to identify the possible underlying causes for the development of malnutrition (Elia, 2003; Alibhai et al., 2005).
Once the underlying causes have been identified and addressed, appropriate nutritional interventions or supports need to be instigated. The ESPEN guidelines published by Lochs and colleagues (2006) define ‘nutrition support’ as follows:

*Nutrition support includes food fortification, ONS, tube feeding and parenteral nutrition. It aims for increased intake of macro- and or micro-nutrients. It is different from ‘special diets’ which might be indicated in diseases like coeliac disease’.*

The underlying evidence for nutrition support is that malnourished patients show clinical and functional benefits when adequate feeding is provided (NICE, 2006). However, there are situations where nutrition support is not indicated, particularly where the burden or risk to the patients of instigating nutrition support outweighs the potential benefit (NICE, 2006).

There are a greater number of studies that provide evidence for artificial nutritional interventions i.e. the evidence for enteral feeding and ONS is stronger than for nutritional interventions involving dietary management strategies for example the provision of additional meals and snacks and food fortification (Stratton *et al.*, 2003) many of which have been poorly designed (Weekes *et al.*, 2009).

Data from the British Artificial Nutrition Survey (BANS) indicate that the most common form of nutritional support in the UK is ONS, which is used three times more frequently than enteral and parenteral nutrition support combined. Currently, data on the frequency with which the different methods of nutrition support are used throughout Ireland are unavailable although it is recognised that both dietary advice and ONS are used by General Practitioners and Community Nurses to treat patients who are malnourished or at risk of malnutrition (Loane *et al.*, 2004).
3.2.1 Dietary advice

Food is a basic human need as well as a therapeutic treatment and is associated with cultural and social aspects of life which go far beyond its health properties. In some respects, the need to carry out studies to prove that food nourishes people seems unwarranted.

Unfortunately, the availability or provision of ordinary food alone does not always prevent malnutrition or remedy existing malnutrition. Therefore, in order to prevent and treat malnutrition, dietary advice and other nutritional care interventions are implemented by healthcare professionals and institutions (Baldwin & Weekes, 2008).

It is necessary to describe what is meant by dietary advice. Currently, there is no universally accepted definition although it has been described by Baldwin and Weekes (2008) as ‘instruction in modification of food intake given with the aim of improving nutritional intake by a dietitian or other health care professional’. Similarly, dietary advice has been described as ‘advice to increase food intake, and advice to modify food constituents’ (Baldwin & Parsons, 2004). Dietary advice has also been described in the literature as ‘dietary counselling’ (Stratton et al., 2003) and ‘nutritional counselling’ (Okene et al., 1995).

In addition to dietary advice, a number of other nutritional care interventions have been described by Weekes and colleagues (2009). These include nutrition screening, nutrition assessment and nutritional care planning, meeting individual patient requirements (by adequate catering provision and dining environment in residential care settings, addressing patient specific issues such as positioning for feeding and changing clinical practices such as fasting prior to medical procedures), improving monitoring and documentation, discharge planning and transfer of care and staff training (Weekes et al., 2009).
The dietary advice given to patients who are malnourished or at risk of malnutrition aims to improve the total protein and energy content of an individual’s diet (unless there are specific clinical contraindications). The two main strategies which are advised are firstly, to eat more food i.e. additional meals and snacks, and secondly, to increase the nutrient density of foods eaten through the addition of energy and protein rich food ingredients including oil, milk, cream, sugar and skimmed milk powder to the normal diet (Stratton et al., 2003). The latter strategy is commonly referred to as dietary fortification or enrichment (Stratton et al., 2003) and food enrichment (Anker & Cederholm, 2001) in the published literature.

There is an important distinction to be made between dietary advice (or dietary counselling) which involves a trained health care professional providing spoken and/or written advice to a patient on how to meet their nutritional requirements as described by Stratton and colleagues (2003) and direct food provision to patients as described by Weekes and colleagues (2009) which may include offering additional meals and snacks to the standard menu in the hospital or nursing home setting or the provision of fortified food products as part of a meals-on-wheels service in the community (Stratton et al., 2003). These two interventions are not necessarily interchangeable and could not be assumed to have the same outcomes; this requires consideration when reviewing the evidence for dietary advice.

3.2.1.1 Evidence for dietary advice

In the last ten to fifteen years there has been ongoing debate in the literature about which is the superior treatment for malnutrition, artificial means i.e. ONS or dietary management strategies such as nutrition counselling. Some authors have compared the relative evidence of dietary advice versus ONS in treating malnutrition
(Stratton et al., 2003; Stratton et al., 2005; Baldwin & Weekes, 2008). Stratton and colleagues (2003) commented that many studies to measure the effectiveness of ONS also involved nutritional care interventions e.g. dietary counselling, dietary fortification and feeding assistance which was not always adequately reported and which may favourably affect the outcomes seen in these studies (Stratton et al., 2003).

Despite defining dietary advice clearly, Baldwin & Weekes (2008) in their review of the evidence for dietary advice in the treatment of malnutrition, grouped both nutritional counselling interventions and other nutritional care interventions such as feeding assistance together under the overall heading „dietary advice’ making it difficult for the reader to determine the effects of individual interventions.

While their first Cochrane review of the evidence for dietary advice (Baldwin et al., 2001) reported that there was no effect of dietary advice on mortality, length of hospital stay or readmission to hospital, body weight or BMI, clinical or functional outcomes or cost (based on 5 studies), their subsequent review (Baldwin & Weekes, 2008) reported differently. The 2008 review included eight studies versus the five reported in 2001 and the authors reported a significant effect of dietary advice (compared to no advice) on a number of variables including body weight gain at 12 months follow-up, significantly increased nutritional intake and improvement in some clinical parameters such TSF thickness and MAMC (Baldwin & Weekes, 2008).

Stratton and colleagues considered the evidence separately both for dietary counselling (or advice) and the provision of food which they referred to as „dietary fortification’ as part of a larger systematic review examining the evidence for ONS and enteral feeding in different settings (Stratton et al., 2003). The authors reviewed a small number of studies which suggested that both dietary counselling and dietary fortification may have benefits in treating malnutrition such as increased body weight
and body weight maintenance, increased energy, protein and micronutrient intakes, increased TSF thickness and MAMC and fewer side effects of treatments (Stratton et al., 2003).

Weekes and colleagues in their 2009 review did not consider the evidence for dietary advice or ONS but, instead, evaluated the evidence for the other nutritional care practices listed above. The two most effective interventions noted by these authors were nutrition screening and provision of feeding assistance for patients. However, it was argued by the authors that implementation of nutrition screening alone without follow-up treatment strategies for patients was unlikely to have any benefits on patient care (Weekes et al., 2009). Baldwin and Weekes concluded that the best evidence for improved outcomes is for the provision of ONS in conjunction with dietary advice for patients who are malnourished, which may be more effective than dietary advice alone (Baldwin & Weekes, 2008).

Reviews of the evidence for dietary advice for adults have also been carried out by expert groups as part of the creation of guidelines (NICE, 2006; Volkert et al., 2006) which have been able to consider good evidence and expert opinion as well as randomised controlled trials in order to provide practical guidance to healthcare professionals. The NICE guidelines for nutrition support (2006) argue that producing a similar increase in nutrient intake by either ONS or dietary means should lead to similar clinical benefits and, therefore, until further evidence is available, people with weight loss secondary to illness should be referred to a dietitian or trained healthcare professional to receive appropriate dietary advice.

Two studies were found which reviewed the combined evidence for oral protein and energy supplementation from both ONS and the provision of food (Anker & Cederholm, 2001; Milne et al., 2009). As the majority of the studies included in both of
these reviews involved the use of ONS, the results are discussed below under the heading. 3.2.2.1.

Stratton and colleagues (2003) make a case that the quality of dietary counselling given to patients depends on the communication and motivational skills of the person providing the counselling, whether written instructions are provided in addition to verbal advice and the ability of the patient to accept the advice and make appropriate changes e.g. education and clinical status are important considerations (Stratton et al., 2003).

Nutritional counselling is provided by healthcare professionals such as doctors and nurses as well as by dietitians. In the Irish community setting, it has been reported that general practitioners (GPs) and community nurses give dietary advice to patients at risk of malnutrition and that the advice given may not always be in keeping with current evidence (Loane et al., 2004). It has also been reported that many healthcare professionals receive minimal undergraduate training in nutrition and have poor knowledge about nutritional care practices (Moore et al., 2003; Mowe et al., 2008).

3.2.1.2 Non-clinical aspects of dietary advice

Other important aspects of patient care to be considered which are associated with the provision of food and dietary advice to patients who are malnourished or at risk of malnutrition are patient and family preferences. A study by Simmons and colleagues in 2003 investigated the preferences of family members for nutrition interventions to improve the nutritional intake of their relatives in nursing homes. Family members highly rated dietary management strategies such as improving the quality of the food and assistance with feeding but gave lower ratings to the use of ONS or medications to stimulate appetite.
In the community setting, social circumstances such as living alone and social isolation, difficulties cooking, shopping and feeding oneself and financial constraints affecting ability to buy food, depression, dementia and substance abuse e.g. alcohol, are factors which may affect the nutrition status of patients (Brownie, 2006; Sahyoun & Zhang, 2005). These factors need to be considered when devising appropriate nutritional interventions. The provision of dietary advice alone for patients who are affected by these social factors may be of limited value if it cannot be implemented by the patient. This is reiterated in the study by Gall and colleagues in 2001 who stated that for some patients, social circumstances did not allow for modification of food intake and, in such cases, ONS should be used as first line nutritional treatment.

3.2.2 Oral Nutritional Supplements

The term oral nutritional supplement(s) (ONS) is not a legal term but a term used in scientific journals and guidelines published by expert groups to describe a group of similar nutritional products. A practical definition can be found in the Monthly Index of Medical Specialities (MIMS) in which ONS are defined as „high energy and/or protein oral supplements in liquid, pudding or powdered form, commercially manufactured to be taken under medical or dietetic supervision only’ (Letoha, 2002).

In response to lack of consistency in the literature on how these products are defined and to aid further research, a number of definitions of ONS have been published by expert groups since 2005. NICE in the UK describes an oral nutritional supplement or ONS as „a product for use in oral nutrition support given with the aim to increase nutritional intake’. In the 2006 ESPEN guidelines, this form of nutritional support is defined as „supplementary oral intake of dietary food for special medical purposes in addition to normal food. ONS are usually available in liquid form, but are also
available in other forms such as powder, semi-solid or dessert style or bars. They are also often referred to as „sip feeds’ (Lochs et al., 2006).

Under European legislation, ONS are classified under Directive 2009/39/EC of 6 May 2009 (the 'Framework Directive', recast of Directive 89/398/EEC), and within the larger classification of „Foods for Particular Nutritional Uses’ also known as „PARNUTS’. Within „PARNUTS’, ONS come under the specific category of „Foods for Special Medical Purposes’ or „FSMPs’ which can be further divided into three categories as follows: nutritionally complete foods, nutritionally incomplete foods and foods with a nutrient-adapted formulation specific for a disease, disorder or medical condition (European Union, 2009).

In 2005, there were approximately 65 different types of ONS suitable for adults listed by the HSE National Shared Services Primary Care Reimbursement (PCRS) (PCRS, 2005, personal communication) in a variety of flavours i.e. sweet, savoury and neutral. The majority of ONS available are described as sip feeds, available in liquid form with a 200 ml pack size. Other types of ONS include dessert or pudding style products which are semi-solid in consistency and usually come in plastic containers similar to yogurt cartons. Other products include „powdered drinks’ which come in sachets that must be made up with milk or water according to set instructions and „modular products’ which are mainly powdered or liquid products that come in different flavours and are designed for addition to normal food in order to increase its nutritional value, although many can also be taken alone. ONS usually contain protein, fat, carbohydrate, vitamins and minerals whereas modular products generally contain a combination of just one or two macronutrients i.e. protein, carbohydrate and fat (General Medical Services Payments Board, 1999).
3.2.2.1 Evidence for the use of Oral Nutritional Supplements

A growing number of meta-analyses and expert groups have reviewed the evidence for the efficacy of ONS as a treatment for malnutrition. Two of the most frequently published authors in recent years have been Rebecca Stratton & Marinos Elia (Institute of Human Nutrition, School of Medicine, University of Southampton, UK). Together with co-authors, they have published a number of review papers (Stratton & Elia, 1999; Stratton & Elia, 2000; Stratton, 2005; Stratton & Elia, 2007; Stratton & Elia, 2010) and one volume (Stratton et al., 2003) evaluating the evidence for ONS.

Other authors who have published repeated meta-analyses on this topic include Milne and colleagues (2002, 2005, 2006, 2009). The review of studies carried out by NICE (2006) in order to inform clinical guidelines also requires consideration when reviewing the evidence for the use of ONS.

The systematic review on the use of ONS by Stratton and colleagues (2003) was the only review to separate the evidence for ONS into hospital and community healthcare settings. One important observation highlighted by the authors of this review was that the beneficial effects of ONS are significantly greater in undernourished individuals (mean BMI < 20 kg/m²) than in those who are normally nourished (mean BMI > 20kg/m²). The authors also highlighted that improvements in functional outcomes associated with ONS use were more likely to occur when patients gained more than 2 kg of body weight (Stratton et al., 2003).

In their most recent review, Stratton & Elia (2010) reported that pooled analysis of the systematic reviews and meta-analysis has shown that ONS use is associated with reduced mortality especially in older patients, acutely ill patients and malnourished patients. They also reported that the risk of complications including infections, poor wound healing, development of pressure ulcers and total complications are significantly
reduced with ONS use. Other benefits of ONS use reported by the authors include functional improvements such as increased muscle strength, better quality of life, improved immune response and greater ability to participate in activities of daily life, particularly in older persons, those undergoing surgery and patients with liver disease.

The NICE Guidance on ‘Nutrition Support in Adults’ (2006) stated that too few randomised controlled trials (RCTs) on the efficacy of oral nutritional supplementation in the community were available to make separate recommendations for the use of ONS within this setting. The authors (NICE, 2006) reported that in three RCTs, there was a benefit from oral nutritional supplementation in terms of increased weight, but these three studies did not confirm the benefit in terms of reduced mortality in the community setting observed when both hospital and community trials were grouped together. The authors (NICE, 2006) concluded that “overall the paucity of evidence from community studies makes it very difficult to be confident in any real differences related to setting and/or patient population, and more detailed larger studies are required”.

In the most recent review of protein and energy supplementation (including 62 trials involving 10,187 patients) by Milne and colleagues (2009), the authors did not distinguish between hospital and community settings in their analyses and also grouped all forms of protein and energy supplementation together i.e. trials of protein and energy supplementation both from the provision of food (i.e. fortified food) and the provision of ONS. The authors reported that there was no overall significant effect on mortality seen in supplemented patient groups versus control patient groups (Milne et al., 2009). However, when analysis was limited to trials with only ‘undernourished’ patients, a significant benefit for mortality was seen. The authors reported that supplementation resulted in a beneficial mean percentage weight change of 2.2%. Although the risk of complications was reduced in 24 out of 26 studies, when changes in risk of
complications were analysed by individual diagnoses, „post hip fracture’ was the only diagnostic category where a significant decrease in complications was seen. No significant benefits in functional outcome were reported by these authors in contrast to the conclusions of other authors (Stratton et al., 2003; Stratton & Elia, 2010). They concluded that the evidence suggesting that the use of protein and energy supplementation leads to improvements in clinical outcome, physical function or length of hospital stay is limited and that most trials included in their review were of poor quality (Milne et al., 2009).

3.2.2.2 Compliance with oral nutritional supplements

The issue of compliance with ONS has been repeatedly discussed in the literature. In their review of the evidence for ONS, Stratton and colleagues (2003) commented that many studies of ONS supplementation in the community setting have shown increased energy and protein intake as a result of supplementation; however, the documented weight gain in these studies was often less than expected given the reported increases in energy intake. It has been suggested that part of the explanation for this discrepancy may be patient non-compliance with ONS as well as difficulties with accurately recording dietary intake (Stratton et al., 2003).

Similarly, Volkert and colleagues (2006) reviewed the evidence for compliance with ONS and commented that the success of ONS as a treatment to improve protein and energy intakes can be limited by poor compliance by patients in studies involving ONS and „intolerance’ of patients to ONS (Volkert et al., 2006).

The meta-analysis of protein and energy supplementation carried out by Milne and colleagues (2009) also investigated the issue of compliance with ONS. The authors stated that in 27% of studies (17/63), compliance was „good’ according to a variety of
criteria. The authors noted that it is not possible to determine the overall rate of compliance as in some studies compliance data were not provided or discussed (Milne et al., 2009).

Among individual, randomised, control studies of ONS supplementation in the community setting, reported rates of ONS compliance vary greatly and it is difficult to draw conclusions from these studies due to the different volumes of nutritional supplements with varied nutritional content prescribed and different periods of follow-up.

A number of studies in the community have reported similar rates of compliance during studies ranging from three to six months duration. Volkert and colleagues (1996) studied compliance with ONS in a group of older females (> 75 years of age) living in their own homes, recently discharged from hospital. Patients in the study were asked to consume one 200 ml container (providing 250 kcal) of a milk based supplement per day and compliance was reported as 55% after 6 months. In another study where patients were asked to consume two 235 ml containers of ONS per day for three months, a 68% compliance rate was reported (Gray-Donald et al., 1995). The subjects included in the study by Gray-Donald and colleagues (1995) were older people (> 60 years) living in their own homes who were receiving home help services. In a later study involving a mixed gender group of older persons (> 65 years) with a range of diagnoses living in their own homes, compliance was reported as 55%. During the study older persons were asked to take two 235 ml cans of a milk based ONS per day (Payette et al., 2002).

There is some evidence in more recent studies to suggest that studies where patients have been asked to consume smaller container sizes of ONS (i.e. less than 200 ml) may have higher compliance rates. A study by Wouters and colleagues (2003)
reported a rate of 85% compliance at six months in a group of male and female older persons (> 60 years) living in sheltered accommodation who were asked to take two 125 ml containers of a nutritional supplement daily. Similarly, in a study by Steiner and colleagues (2003), there were high rates of compliance (97.5%) with ONS seen in a group of patients with chronic obstructive airways disease (mean age of 66 years). Patients were asked to take three 125 ml containers of a nutritional supplement providing 570 kcal daily for seven weeks (Steiner et al., 2003).

Hubbard and colleagues (2010) presented preliminary findings of a systematic review of compliance with ONS. The mean compliance rate reported was 78% over an approximate follow-up period of 6 weeks. The authors reported that there was better compliance with ONS by patients in community based studies than in hospital based studies.

Reasons for non-compliance which have been suggested in the literature include patients’ taste perceptions, loss of appetite, taste fatigue, effects of ageing and lack of recognition of ONS as a food product (Dunstan et al., 2005). Personal preferences of patients and lifestyle factors are also thought to have an important role (Lad et al., 2005). Problems with adverse events such as nausea and GI discomfort were reported in 18/24 (75%) of the studies reviewed by Milne and colleagues (2009).

Few studies which attempt to improve compliance with ONS are available. One long-term residential hospital based intervention in the Irish setting used an ONS administration round separate from the medicines administration round and signs placed above the beds of patients who required assistance with taking ONS. An improvement in compliance (measured over 10 days) from 74% to 93% was documented six months after the intervention (McCormick et al., 2007).
Ensuring compliance with ONS in the community setting is arguably more difficult than within the hospital or nursing home setting as there are likely to be fewer opportunities for healthcare professionals, care assistants or carers to prompt patients although this will depend on the level of support provided to patients at home. Neither the level of support nor the effectiveness of provision of such support has been evaluated scientifically. The compliance rates for patients who have been prescribed ONS for long periods of time are also unknown.

The relative benefits of ONS versus dietary advice (dietary counselling and/or dietary fortification) have not yet been proven in different settings over longer time periods. The current situation in 2011 is that, while there are many studies completed to date, high quality evidence for both dietary advice and ONS for the treatment of malnutrition (Milne et al., 2009) remains lacking.

This raises the question as to the reasons for this deficit which some authors have sought to explore. Arnaud-Battandier and colleagues (2004) argued that one of the unique difficulties of designing RCTs for nutrition support is that it is unethical to ask healthcare professionals to omit providing nutritional support to patients who have been identified as malnourished. Weekes and colleagues (2009) argued that although RCTs are accepted as the gold standard in the medical literature, they may not be the most pragmatic type of study to provide the answers which are needed in this area. They suggest that well conducted observational and before- and after- type studies could alternatively be used to provide good evidence.

Despite the fact that evidence is still equivocal for the benefits of ONS on clinical and functional outcomes for patients, they are widely prescribed in the community setting in Ireland and the UK and a review of the different aspects of ONS prescribing is now described.
3.3 Optimising the prescribing of oral nutritional supplements

In order to better understand why ONS are prescribed and how they are used in the community setting, it is useful to consider what prescribing guidance is available for these products in both the Irish and UK settings.

3.3.1 Indications for the use of oral nutritional supplements and prescribing guidelines for general practitioners in the Republic of Ireland

In 2005, General Practitioners (GPs) were the only healthcare professionals in the community setting in Ireland who could prescribe ONS for patients in the community setting i.e. free-living patients outside acute and community hospitals. Prior to January 2009, the Irish Health Service Executive (HSE) did not have specific prescribing guidelines for GPs about ONS although guidance on eligibility, administration and payment for these products under various schemes was provided to GPs by the HSE Shared Care Primary Care Reimbursement Scheme (PCRS). The HSE PCRS also produced guidelines on ONS for manufacturers (General Medical Services Payments Board, 1999) but did not provide this information directly to prescribers.

There was some additional guidance for GPs published by the Irish National Medicines Information Centre (NMIC), which is the state body established to answer queries about medicines from doctors, pharmacists and other healthcare professionals. A NMIC newsletter dedicated to the topic of ONS prescribing in Primary Care was published in 2004. While this newsletter did not give specific indications for the prescribing of ONS, it did state „Before ONS are prescribed a full nutritional assessment should be carried out to determine the adequacy of the existing diet. ONS should not be the first line of nutritional treatment for patients at risk of malnutrition‟.
The National Pharmacoeconomic Centre (NPEC) chaired by Dr. Michael Barry (during the period 2005-2011) is the Irish state body with responsibility for the economic evaluation of pharmaceutical products and the development of cost-effective prescribing protocols. A report on the use of all Clinical Nutritional Products (including enteral tube feeds, gluten free products, specialist metabolic products, low-protein products, and infant formulas and oral nutritional supplements) was published in 2004 by the NPEC. No specific prescribing guidelines for ONS were issued in the report other than the statement: „There is little evidence to support the cost effectiveness of these preparations in the Irish healthcare setting and, therefore, their use in primary care should be critically assessed on an individual basis and closely monitored throughout their use” (National Centre for Pharmacoeconomics).

Additional guidance was available in the „Monthly Index of Medical Specialities“ (MIMS) in the ROI which followed the UK Advisory Committee on Borderline Substances (ACBS) recommendations available at that time and included the following indications for prescribing of ONS „preoperative and post-operative undernourished patients, after total-gastrectomy, inflammatory bowel disease, bowel fistulae, disease related malnutrition, dysphagia and anorexia nervosa“ (Letoha, 2002).

The legislation of medicines in Ireland is overseen by the Irish Medicines Board (IMB), a government funded body whose aim is to ensure the safety and efficacy of medicines available in Ireland, and that the prescription and use of medication is consistent with current medical and scientific knowledge. However, as ONS and other clinical nutritional products are not considered drugs or medicines, they are not regulated by the IMB.

In order to address this gap in guidance about ONS for GPs, the HSE, in 2009, developed and issued a two page document stating clear prescribing guidelines for the
use of ONS in the community setting in Ireland produced by a multidisciplinary group of healthcare professionals (Health Service Executive, 2009). This document was disseminated to all GPs in Ireland who were enrolled with the HSE PCRS as well as to pharmacists and public health nurse management.

3.3.2 Indications for the use of oral nutritional supplements and prescribing guidelines for general practitioners in the United Kingdom

In contrast to the Irish setting in 2005, there were several organisations that provided advice on ONS prescribing to healthcare professionals in the UK, the most significant being the Advisory Committee on Borderline Substances (ACBS), the National Prescribing Centre (NPC) and the National Institute for Health and Clinical Excellence (NICE).

The ACBS is the advisory public body responsible for directing approved prescribers about the prescribing of certain foodstuffs, including ONS, and has carried out this role since 1971. The ACBS provides advice in the form of its ‘recommended list’ which is published as part of the Drug Tariff (Advisory Committee on Borderline Substances, 2011). This information is also available in the British National Formulary (BNF) (Joint Formulary Committee, 2005). The ACBS prescribing indications for the majority of ONS include short bowel syndrome, intractable malabsorption, pre-operative preparation of patients who are undernourished, proven inflammatory bowel disease, following total gastrectomy, bowel fistulae, disease-related malnutrition and dysphagia (National Health Service Prescription Services, 2011). In 2005, additional guidance was provided in the BNF as follows:

"ACBS recommends products on the basis that they may be regarded as drugs for the management of specified conditions; doctors should satisfy themselves that the products
can be safely prescribed, the patients are adequately monitored and where necessary, expert (hospital) supervision is available’ (Joint Formulary Committee, 2005).

In 1998, the UK National Health Service (NHS) National Prescribing Centre (NPC), which is the national government body in the UK with responsibility to „promote and support high quality, cost-effective prescribing and medicines management”, issued a comprehensive two part review with guidelines on ONS prescribing (National Health Service National Prescribing Centre, 1998a; National Health Service National Prescribing Centre, 1998b). These guidelines gave specific advice on the indications for prescribing ONS consistent with those provided by the ACBS. In addition, specific recommendations on the energy content of ONS that should be prescribed (i.e. 500-600 kcals per day per patient) were provided. The NPC review recommended that local policies for the prescribing and monitoring of ONS by the primary care team in conjunction with dietetic services should be developed.

In 2006, the National Institute for Health and Clinical Excellence (NICE) commissioned a landmark document called „Oral Nutrition Support, Enteral Tube Feeding and Parenteral Nutrition Clinical Guidelines for Nutrition Support in Adults”. This document provided both a review of the evidence for different types of nutrition support in hospital and community settings as well as guidelines for all forms of nutrition support for adults. The three key clinical recommendations about oral nutritional support (including both dietary strategies and oral nutritional supplements) made in this document were firstly, that healthcare professionals should consider the use of oral nutrition support for patients that can safely swallow and are either malnourished or at risk of malnutrition. Secondly, healthcare professionals should ensure that the nutrition support contained a balance of macro- and micro-nutrients and, thirdly, that
oral nutritional support should be stopped when no longer required by the patient (NICE, 2006).

In the immediate years that followed the publication of the both the NPC guidelines and the NICE guidelines, a number of studies and audits investigating ONS prescribing were published. These studies are discussed in detail later in this review and are summarised in Table 3.1. In addition to audits and studies of ONS prescribing, a number of primary care trusts (PCTs) in the UK issued local prescribing guidelines and policies on both the use of ONS and the management of malnutrition. These policies are seen to be produced by different multidisciplinary groups within the PCTs but most commonly are produced by local „Prescribing Support Units’ e.g. Bolton NHS Trust (Morton & Gambier, 2000) and Grampian Primary Care Trust (2007). These guidelines reference the expert guidelines already discussed (NPC, 1998a; NPC, 1998b; NICE, 2006) and ACBS recommendations.

On review of the guidance available on the use of ONS for prescribers in Ireland and the UK circa 2005, in Ireland, there appeared to be limited guidance available to prescribers about ONS which this suggests the need for investigation into ONS prescribing and use in the Irish setting. However in the UK there was a growing consensus to be found among evidence based guidelines developed by different expert groups that ONS should be prescribed only by trained healthcare professionals primarily for patients who were malnourished or at risk of malnutrition, and patients with specific medical conditions. In general ONS should not be prescribed to well-nourished patients and patient compliance should be monitored regularly by a trained healthcare professional.
The next sections of this review will describe the cost of ONS and both published and unpublished studies and audits which have investigated ONS prescribing in Ireland and the UK.

3.3.3 Oral nutritional supplement prescribing costs

In the ROI, spending by the Health Service Executive (HSE) on ONS under the General Medical Payments Scheme (GMS) increased by a total of 42% over a four year period (from €18 million in the year September 2003-August 2004 to €25.5 million in the year September 2006-August 2007). During this period, the average yearly rate of increase on expenditure on ONS was 11% (minimum 9%, maximum 15%) (HSE, PCRS, 2008; personal communication).

During this time, there were minimal changes in either patient or doctor eligibility for the GMS scheme. There was a ten percent approximate increase in the number of eligible patients (n = 1.14 million in 2004 compared to n = 1.27 million in 2007) and a seven percent approximate increase in the number of doctors registered under the scheme (n = 2210 in 2004 compared to n = 2374 in 2007) (General Medical Services Payments Board, 2004; National Shared Services Primary Care Reimbursement Service, 2007).

To contextualise the increase in expenditure on ONS, expenditure on ONS can be compared to a 40% increase in expenditure on cardiovascular related medicines (for example lipid modifying agents, renin-angiotensin system medications and beta-blockers) during the period January to December 2004 and January to December 2007.

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4. „Persons who are unable without undue hardship to arrange general practitioner medical and surgical services for themselves and their dependants and all persons aged 70 years and over receive a free general medical service. Drugs, medicines and appliances supplied under the Scheme are provided through Community Pharmacies. In most cases the Doctor gives a completed prescription form to a person, who takes it to any pharmacy that has an agreement with the Health Service Executive to dispense GMS prescription forms“ (National Shared Services Primary Care Reimbursement Service, 2007).
(€179 million versus €250 million) (General Medical Services Payments Board, 2004; National Shared Services Primary Care Reimbursement Service, 2007).

Prior to this study (2004), it is estimated that ONS accounted for approximately 56% (€18 million\(^5\)) of the total expenditure on „Clinical Nutritional Products’ (€28 million) under the GMS scheme. Viewed overall, expenditure on ONS accounted for approximately two percent of total expenditure by the HSE (€831 million) on medicine and non-medicine items under the GMS scheme in 2004 (General Medical Services Payments Board, 2004).

In the UK, the national expenditure on ONS under the FP10 system in the community setting (similar to the GMS system in Ireland) was estimated as £89 million (€111 million)\(^6\) in 2008/2009. Specifically in the London area, it was approximately £14 million (€17.5 million)\(^7\) in 2008/2009 (London Procurement Programme, 2009).

While no European cost comparison on ONS prescribing is available, it may be possible that GPs in Ireland and the UK are higher prescribers of ONS than their European counterparts. For example, in 1998, only 10% of GPs in France were reported to prescribe ONS on a regular basis (Arnaud-Battandier et al., 2004).

Further investigation as to whether these products were being used in the ROI in an evidence based manner, ensuring value for money, was clearly warranted.

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\(^5\) €18 million represents HSE expenditure on ONS for the period September 2003 to August 2004 under the GMS scheme as figures for January to December were not available to the researcher.

\(^6\) Sterling (£) to Euro (€) conversion based on average exchange rate values 2008 (European Central Bank, 2011)

\(^7\) Sterling (£) to Euro (€) conversion based on average exchange rate values 2008 (European Central Bank, 2011)
3.3.4 Investigations of oral nutritional supplement prescribing practices

A review of the literature, including both peer- and non-peer reviewed publications, was carried out up to March 2011. This yielded 24 completed studies or audits which investigated the prescribing of ONS for adults specifically in the community setting. Table 3.1 below provides a summary of all 24 studies identified including a description of subjects and participants, methods and key results and economic outcomes.

Studies based solely in nursing homes (public or private) or acute hospitals were not included except for one (Steigh et al., 1998) carried out in an hospital out-patient setting. This was included as it involved only community dwelling patients.

As many of the studies identified were published or presented only as reports or as abstracts at conferences, it is possible that other studies exist which have been unintentionally omitted from this review. It is also clear that despite considerable research activity on this topic, published, peer-reviewed data are scarce.

Table 3.1: Summary of studies and audits related to oral nutritional supplement (ONS) prescribing practices.

<table>
<thead>
<tr>
<th>(a) Author/s &amp; (b) Location of study</th>
<th>Subjects/Participants</th>
<th>Brief description of study methods</th>
<th>Key Results</th>
<th>Economic Impact/Outcomes</th>
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<tr>
<td>Cooper, 1997. Wirral National Health Service Trust, England, United Kingdom.</td>
<td>n = 3 GP practices. n = 51 patients.</td>
<td>Patients were identified from GP practice medical records and liaison with local pharmaceutical advisor. ONS prescriptions were considered inappropriate if there was no medical indication for ONS prescribing condition recorded in the patient medical record.</td>
<td>30% of ONS prescriptions were considered inappropriate. No intervention described.</td>
<td>Estimated cost savings of approximately £100,200 per year. (Based on a 30% reduction of expenditure on ONS)</td>
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<tr>
<td>Author/s &amp; Location of study</td>
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<td>(a) Steigh et al., 1998. (b) Los Angeles, USA.</td>
<td>n = 55-61 hospital outpatients. n = 90.</td>
<td>Patient medical record review. Criteria for discontinuation of ONS prescriptions included: 1) Patients have a normal nutritional status. 2) Patient might suffer an adverse effect from a high calorie electrolyte containing solution e.g. diabetes mellitus, renal insufficiency (not on dialysis), chronically elevated potassium levels.</td>
<td>44% of ONS prescriptions were considered inappropriate. No intervention described.</td>
<td>Not stated.</td>
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<tr>
<td>(a) McCombie, 1999. (b) Glasgow, Scotland, UK</td>
<td>n = 25 GP practices. n = 90 patients.</td>
<td>Patients were identified from medical records review at GP practices. Patients underwent full nutritional assessment by a dietitian using a standard questionnaire.</td>
<td>50% patients prescribed ONS were normally nourished. 10% were overweight. Percentage of ‘inappropriate’ prescribing not stated.</td>
<td>Not stated.</td>
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<td>(a) Hood and Welch, 2000. (b) Lanarkshire Primary Care Trust, Scotland, UK</td>
<td>n = 101 GP practices. n = 554 patients.</td>
<td>Patients identified by GP referral. Patients assessed by community dietitians. Assessment included: dietary, clinical, and social histories. Schofield equation used to estimate energy requirements. Intervention described was the introduction of a community dietetic referral service.</td>
<td>55% (169/307) of patients living in the community discontinued from ONS. (67%) 61/91 of patients in nursing homes discontinued from ONS. Stockpiling of unused ONS observed. Social issues key contributor to ONS prescribing.</td>
<td>A reduction in total number of prescriptions written, and ONS expenditure ranging from 5-25% per month.</td>
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<td>(a) Author/s &amp; (b) Location of study</td>
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<td>(a) Gall et al., 2001</td>
<td>n = 212 GPs. n = 290 patients.</td>
<td>Patients were identified through general practice computer systems. Criteria for appropriate prescribing of ONS included: 1) Patient is mildly/moderately malnourished and/or had increased nutritional requirements. 2) Patient had received energy dense dietary advice and/or had a combination of the following: a) ability to eat was affected e.g. dysphagia. b) Social circumstances did not allow for the ease of dietary modification. (c) Ability to absorb food is affected e.g. cystic fibrosis. Intervention described as nutrition education intervention for GPs and community dietetic referral service.</td>
<td>73% (211/290) received ONS inappropriately according to set criteria.</td>
<td>15% reduction in total numbers of patients prescribed ONS.</td>
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<td>(b) Dartford &amp; Gravesham NHS Trust, Thames Gateway NHS Trust, Surrey &amp; Sussex Healthcare and Royal Surrey Guilford, UK</td>
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<td>(a) Gale et al., 2001. (b) National UK data including Northern Ireland</td>
<td>n = 27 GP practices. n = 413 patients.</td>
<td>Review of ONS prescriptions on national centrally held computer records. Body Mass Index (BMI) &lt; 20 kg/m² considered appropriate ONS prescribing.</td>
<td>68% ONS inappropriately prescribed. 20% patients prescribed ONS were overweight (BMI &gt; 25kg/m²)</td>
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<td>(a) Forth valley PCT NHS trust, 2001 (b) Forth Valley Primary Care Trust, Scotland, UK</td>
<td>n = 18 GPs. n = 46 patients (random sample).</td>
<td>Patients identified by general practice computer system. Patients deemed to require ONS after a dietitian assessment (details of assessment not described). Intervention described as the introduction of a community dietetic referral service.</td>
<td>50% (23/46) patients discontinued from ONS post-dietitian assessment. 86% patients referred post dietetic referral service required dietary advice but not ONS.</td>
<td>Final savings of approx £36,500 in a six month period.</td>
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<td>(a) Murray, 2001. b) Lothian, Scotland, UK.</td>
<td>Numbers of patients or GPs not provided.</td>
<td>Patients prescribed ONS underwent a dietitian assessment. Criteria for inappropriate ONS prescribing included one or all of the following: 1) BMI ≥ 20 kg/m². 2) No treatment goals recorded in medical notes. 3) No body weight recorded in medical notes.</td>
<td>30% of patients had ONS prescriptions discontinued by a dietitian.</td>
<td>Not provided.</td>
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<td>a) Kyle, 2002 (b) Mendip Primary Care Trust, Somerset, UK</td>
<td>n = 20 GP practices. Number of patients assessed not provided.</td>
<td>717/164,500 patients in 20 GP practices had ONS prescriptions. A small number of these patients were assessed by a community dietitian.</td>
<td>The majority of patients prescribed ONS were older than 75 years and had a BMI &lt; 20kg/m².</td>
<td>Not provided.</td>
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<td>(a) Panico, 2002 (b) Eastbourne Downs Primary Care Group, East Sussex. UK</td>
<td>n = 6 GP practices. n = 47 patients.</td>
<td>Mini-Nutritional Assessment screening tool carried out by a community dietitian on patients prescribed ONS. Non-specified „full assessment’ of patients by a dietitian to assess need for ONS.</td>
<td>12% of patients were normally nourished. 34% of ONS prescriptions were discontinued by a dietitian. 28% ONS prescriptions were reduced.</td>
<td>Not provided.</td>
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<td>(a) Murdock et al., 2002 (b) Causeway H&amp;SS Trust, Northern Ireland.UK</td>
<td>n = 1 GP practice. n = 36 patients.</td>
<td>Patients at risk of malnutrition identified using a local nutrition screening tool. Patients received a full nutritional assessment by a community dietitian.</td>
<td>89% (32/36) patients discontinued from ONS.</td>
<td>Not provided.</td>
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<tr>
<td>(a) Loane et al., 2004 (b) Midland health Board, ROI.</td>
<td>n = 50 GPs.</td>
<td>Telephone interview with (GPs) about their knowledge and practices in relation to ONS.</td>
<td>No health professionals conducted a full health assessment prior to prescribing ONS. Few health professionals knew the energy content of ONS. The majority of healthcare professionals did not give dietary advice to patients at risk of malnutrition.</td>
<td>Not provided.</td>
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</tbody>
</table>
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<td>(a) Arnaud-Battandier <em>et al.</em>, 2004 (b) France</td>
<td>n = 90 GPs, n = 378 malnourished patients older than 70 years of age.</td>
<td>GPs selected on the basis of being located in geographical areas of high or low expenditure on ONS. Observational study with follow-up for 12 months. Nutritional status was measured by GPs using the Mini Nutritional Assessment (MNA) tool (MNA score &lt; 17 = malnourished). Centrally held computer databases were used to determine ONS prescribing rates</td>
<td>GPs in the 'low spender' group identified less patients (57% of total) who were malnourished, compared to GPs in the high spender group (75% of total). GPs in the 'low spender' group prescribed ONS to less than 5% of patients and GP is the 'high spender' group prescribed ONS to 25% of patients.</td>
<td>Healthcare costs at baseline were not provided. Post intervention healthcare costs related to patients in the GP 'high spender group' were significantly less than patients of GPs in the 'low spender group' (+ €195; 90% confidence interval, SD - 478 to + 929).</td>
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<td>(a) Oladipo, 2006 (b) Greenwich. Primary Care Trust, UK.</td>
<td>n = 13 GP practices, n = 215 patients.</td>
<td>Patients who were already prescribed ONS were identified from GP practice records. Patient notes were examined as part of an audit compared to set criteria. No intervention described.</td>
<td>Only 43% patient notes audited had an ACBS indication for ONS.</td>
<td>Not provided.</td>
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<td>(a) Forrest, 2008. (b) Westminster Primary Care Trust, UK.</td>
<td>n = 5 GP practices, n = 24 patients.</td>
<td>Patients identified by computer records. 117 patients identified at 5 GP practices. Only 24/117 attended appointments to which they were invited. Patients received full nutritional assessment by a community dietitian.</td>
<td>75% patients assessed were receiving ONS inappropriately (equated to 13% inappropriate use across the GP practices).</td>
<td>Predicted total saving of approx £47,398 across 5 GP practices in 1 year.</td>
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<td>(a) Skinner &amp; Smith, 2008 (B) Newcastle upon Tyne Hospitals NHS Foundation Trust.</td>
<td>n = 28 GP practices. n = 180 patients.</td>
<td>Patients identified from GP practices records, were invited for a dietitian assessment.</td>
<td>56% patients were discontinued from ONS, as they were taking a normal diet and had a healthy weight.</td>
<td>Potential cost saving £80 286 over a 12 month period</td>
</tr>
<tr>
<td>(a) Fitzgibbon ,2008 (b) South Leeds Primary Care Trust, UK</td>
<td>n = 5 GP practices. n = 128 patients.</td>
<td>Patient’s medical records audited by a community dietitian. Feedback on audit results and prescribing guidelines provided to GPs. Intervention described as introduction of written guidelines and the introduction of a community dietitian referral service.</td>
<td>15% of patients prescribed ONS had their weight monitored before the intervention.</td>
<td>£104,000 actual savings on ONS expenditure over a 2 year period.</td>
</tr>
<tr>
<td>(a) Wigley et al., 2009. (b) Wirral Primary Care Trust, UK.</td>
<td>n = 44 GP practices. n = 497 patients.</td>
<td>All patients with ONS prescriptions referred to a community dietitian for a full nutritional assessment. Patient discontinued from ONS if deemed not necessary to meet nutritional requirements by a dietitian.</td>
<td>50% of patients were discontinued from ONS. 14% of ONS prescriptions were reduced in volume.</td>
<td>Not provided.</td>
</tr>
<tr>
<td>(a) London Procurement Programme, 2009 (b) Locations 1) Greenwich Primary Care trust 2)Hunslow Primary Care Trust 3) Kensington &amp; Chelsea Primary Care Trust 4) Wandsworth</td>
<td>1) n = 13 GP practices. n = 215 patients (Study carried out in 2004) 2) Numbers of patients or GPs not provided</td>
<td>1) Patients notes audited by a community dietitian. 2) Patients prescribed ONS were assessed by a community dietitian</td>
<td>1) 57% of ONS prescriptions did not agree with ACBS indications. 2) 22% of patients on ONS deemed not to require them</td>
<td>Not provided.</td>
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<table>
<thead>
<tr>
<th>(a)Author/s &amp; (b) Location of study</th>
<th>Subjects/ Participants</th>
<th>Brief description of study methods</th>
<th>Key Results</th>
<th>Economic Impact/ Outcomes</th>
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<tr>
<td>PCT</td>
<td>3) n = 18 GP practices. Study carried out (2007/2008)</td>
<td>3) Patients given full nutritional assessment by a community dietitian</td>
<td>3) 70% of ONS prescriptions discontinued.</td>
<td>No details provided</td>
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<td></td>
<td>4) n = 4 GP practices. n = 113 patients. Study carried out in 2003</td>
<td>4) 40/113 patients given a full nutritional assessment by a community dietitian</td>
<td>4) Data not provided</td>
<td>4) Estimated savings of £220,553 in one year</td>
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<td>(a) Ashman &amp; Kominek, 2011 (b) Swindon Primary Care Trust &amp; GWH NHS Foundation Trust, UK</td>
<td>Number of patients not provided. n = 4 GP practices.</td>
<td>Baseline retrospective criterion based audit to assess current ONS prescribing practices. 11 standards based on NICE guidance (NICE, 2006) used. Exclusion criteria: patients on ONS in addition to enteral feeds and patients under 18. Patient details obtained from GP computer systems, Post-audit intervention described involving provision of nutrition education sessions to GP practice staff on „MUST” (Malnutrition Universal Screening Tool) and implementation of management guidelines for patients at risk of malnutrition. Re-audit to determine changes in ONS prescribing practices and expenditure 6 months post-education intervention.</td>
<td>At baseline audit criteria not met across the majority of practices. For example: No evidence of use of nutrition screening tools, no aims documented for ONS use, little nutritional advice being given to patients, patients not given trial of ONS, and patients use of ONS not monitored.</td>
<td>Re-audits at 2/4 GP practices completed as of February 2011. Re-audit six months post education showed ONS prescribing expenditure reduced by 39% and 38% compared to the baseline. Estimated expenditure saving of £95,186 for Swindon area over 1 year period if implemented throughout.</td>
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(a) Noble, 2011  
(b) NHS Grampian Primary Care Trust, Scotland  

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<tr>
<td>Number of GP practices not provided. n = 358 patients at baseline. n = 285 patients post-intervention</td>
<td>Baseline audit of ONS prescribing practices by GPs (method not provided). Intervention described involving nutrition education for GPs and dietetic referral service for patients at risk of malnutrition. Policy introduced that all patients prescribed ONS should be referred to the community dietitian. Re-audit 1 year post-intervention.</td>
<td>Baseline audit results included: 45% of ONS prescribed without dietetic intervention were not necessary. Only 37% of patients prescribed ONS were known to the community dietetic service. Author commented that written guidelines alone did not improve GP prescribing practices related to ONS.</td>
<td>Post intervention. Rate of ONS prescribing increased by 4% compared to 20-30% increases in previous years. Post-intervention rate of referral of patients prescribed ONS to community dietitian increased from 37% to 77%.</td>
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All studies in Table 3.1 were carried out in the UK and Northern Ireland except two, one of which was carried out in the United States of America (Steigh et al., 1998) and one of which was carried out in France (Arnaud-Battandier et al., 2004). The majority of studies were carried out by either one or two dietitians over a 1-2 year period. Thirteen of the 24 studies reviewed were published before 2005 (i.e. before the baseline study described in Chapter 5 of this thesis was carried out).

The size of the studies varied greatly with between one and 212 GPs participating. Patient numbers also varied considerably in these studies, ranging from 554 patients in a study involving 101 GP practices (Hood & Welch, 2000) to 36 patients in a study involving one GP practice (Murdock et al., 2002). The aim of all 24 studies was similar, that being, to investigate the current prescribing of ONS by a GP or group of GPs.
Apart from two studies (Arnaud-Battandier et al., 2004; Loane et al., 2004) which had distinct methodologies and will be discussed separately, two methods were predominantly used in these studies. The first method was a review or audit of written records including one or all of the following: patient medical records, GP practice computer records or centrally held GP prescribing data and a comparison of patient information contained within these records against various audit standards or criteria proposed by the authors for ‘appropriate’ ONS prescribing. Seven studies of this type were found (Cooper et al., 1997; Steigh et al., 1998; Gale et al., 2001; Oladipo, 2006; Fitzgibbon, 2008; London Procurement Programme, 2009; Ashman & Kominek, 2011). There were a variety of criteria or standards used to define ‘inappropriate’ or ‘unnecessary’ prescribing in the studies (shown in Table 3.1). Some examples of criteria for inappropriate ONS prescribing include: no medical condition for which the ONS was warranted listed in the patient’s medical notes (Cooper, 1997), ONS being prescribed to patients with a recorded BMI greater than 20 kg/m² (Gale et al., 2001) and ‘no ACBS indication of ONS recorded in patient notes’ (Oladipo, 2006). Inappropriate prescribing of ONS reported as percentage of total ONS prescribing (where stated) ranged from 44% (Steigh et al., 1998) to 68% (Gale et al., 2001) in these studies.

The second group of studies involved a nutritional assessment of patients already prescribed ONS by a community dietitian, in combination with a review of patient medical records, to determine if ONS prescriptions were considered clinically ‘appropriate’ or ‘necessary’. In some studies, rates of ‘inappropriate’ prescribing were stated whereas in others, rates of discontinuation of ONS were stated. It should be noted that these terms may not necessarily be interchangeable. Fifteen studies of this type were included (McCombie, 1999; Hood & Welch, 2000; Forth Valley Primary

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3 London Procurement Programme (2009) includes a report of four separate studies. See Table 3.1.

Rates of discontinuation of ONS as recommended by a community dietitian, ranged from 30% in the study by Murray (2001) to 89% in the study by Murdock and colleagues (2001). These findings are similar to those observed in the studies which involved review of written records only. There were common themes seen among the recommendations from these studies, for example, that primary care staff need a simple but robust screening tool for prioritising patients and written guidance for prioritising patients for referral to the dietitian.

Gall and colleagues (2001) were the authors of the largest study investigating ONS prescribing practices. Their study entailed the assessment of 290 individual patients by a dietitian and the classification of ONS prescriptions as either „necessary” or „unnecessary” according to set criteria which were clearly defined (see Table 3.1). According to these criteria, 73% of ONS prescriptions were considered „inappropriate”. The criteria included not only the patient’s clinical condition but also healthcare professionals’ practices around the prescribing of ONS such as the provision of dietary advice. The presence of social factors which did not allow for dietary modification was also considered. The range of factors included as criteria may have accounted for the high rate of „inappropriate” prescribing reported in this study.

The French study of Arnaud-Battandier and colleagues (2004) employed different methods from those seen in the other studies described. GPs were selected for inclusion into the study on the basis of being either low or high spenders on ONS at the beginning of the study. Patients were recruited to the study by GPs (who had received

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9 London Procurement Programme (2009) includes a report of four separate studies. See Table 3.1.
an education session on the use of the MNA) on the basis that they were malnourished or at risk of malnutrition (defined by the MNA as a score of < 17 and < 23.5 respectively). At baseline, GPs who were in the low spending group prescribed ONS to < 5% of patients recruited compared to approximately 25% of patients being prescribed ONS in the high spending group. At baseline, 57% of patients in the low spending group could be classified as malnourished (MNA score < 17) compared to 75% of patients recruited in the high spending GP group. The other main difference between the two groups was that GPs in the high spending group had significantly more patients living in residential care institutions compared to living in their own or a family home (71% vs. 51%). Rates of inappropriate or unnecessary prescribing were not discussed in this study (Arnaud-Battandier et al., 2004).

The only published study on ONS prescribing practices in the ROI was carried out by the community nutrition and dietetic service in the HSE Dublin Mid Leinster (Midlands area) in 2002 (Loane et al., 2004). This study used a telephone survey of GPs and community nurses to assess the decision making processes and monitoring procedures for the prescribing of ONS to elderly patients. It also investigated whether these elderly patients underwent appropriate nutritional assessment prior to the prescription of ONS. The study results suggested lack of knowledge of the evidence for ONS use among the healthcare professionals surveyed, that patients did not undergo complete nutritional assessment and that little, or no, monitoring of patients who were prescribed these products occurred. The majority of healthcare professionals surveyed stated that they wanted further education and resources to support them in this area.

The studies presented in Table 3.1 summarise the information available on the prescribing of ONS in the community setting. As the majority (14/24) of these studies were not published in peer-reviewed journals, many suffer from methodological issues.
A variety of criteria are used to define inappropriate/unnecessary prescribing which also complicates their interpretation and many lack detail on the type of assessment carried out on the study patients. These limitations make the studies difficult to compare directly. Furthermore, as noted by one author, individual GP practices are of different size, are comprised of different patient populations and have different rates of prescribing of ONS which also makes comparison difficult (Noble, 2011); these factors may need to be controlled for in future studies.

The results of some of these studies suggest that there are reasons outside the ACBS indications why patients may need an ONS prescription, for example, social reasons (Gall et al., 2001) and suggest that wider prescribing criteria for ONS which include social criteria need to be developed.

Economic evaluations were carried out in some studies but most only estimate savings based on a reduction in total expenditure on ONS which was taken to equal the percentage of inappropriate prescribing. Estimates such as these do not allow for concurrent increases in ONS prescribing which may result from the identification of new patients requiring nutrition support due to implementation of nutrition screening. Actual prescribing costs need to be evaluated to determine the overall effect of interventions on this variable.

3.3.5 Interventions to change oral nutritional supplement prescribing practices

Several of the studies (n = 6) described in Table 3.1 which investigated ONS prescribing also described interventions which were implemented to change or improve ONS prescribing practices and one study which was observational in design was also seen to result in some change of prescribing practices although it had not been designed as an intervention study (Arnaud-Battandier, 2004).
Gall and colleagues (2001) described an intervention entailing an education programme with GPs and community nurses, along with the provision of guidelines on the use of ONS. Participants were followed up three months after the intervention, and a re-audit of patients’ ONS prescriptions was carried out. Inappropriate prescribing, as defined by the authors (described in Table 3.1), was seen to decrease by 15% after the intervention; however, the main limitation to reducing inappropriate prescribing was the lack of provision of dietary advice by GPs and community nurses which was a key criterion for appropriate prescribing in the study. No dietetic referral service was available for the provision of dietary advice to patients.

A number of non-peer reviewed studies published or available as reports did involve the introduction of a community dietetic referral service as the main intervention including those by Forth Valley Primary Care Trust, 2000, Hood & Welch, 2000 and Fitzgibbon, 2008. None of these studies reported the inclusion of education sessions for health care professionals i.e. GPs or nurses but they did include the introduction of written guidelines. The community dietitians involved were part of medicine management teams in the primary care trusts (PCTs) working with these teams. Reduced expenditure on ONS was seen in all three studies post-intervention but there was also evidence of improved patient care such as high patient satisfaction with the dietetic service (Forth Valley PCT, 2001).

The two most recent studies which attempted to change ONS prescribing practices included educational sessions incorporating the Malnutrition Universal Screening Tool (MUST) (Elia, 2003) and the introduction of a community dietetic service as the main intervention (Ashman & Kominek, 2011; Noble, 2011).

Ashman and Kominek (2011) reported some preliminary results of a study through the NICE Guidelines Shared Learning Database. The aims of the study were to
meet the criteria specified in the NICE guidelines (2006) and to produce cost savings. Selective targeting of the GP practices (n = 4) with the highest expenditure on ONS was carried out. The intervention involved on-site education sessions for GPs on the identification and management of malnutrition including „MUST’ (Elia, 2003). GP prescribing practices were re-audited six months after the intervention. Reductions of between 28-29% in ONS expenditure was seen post-intervention.

A similar study by Noble (2011) reported the experience of over ten years of implementation of an intervention to improve ONS prescribing practices in the NHS Grampian (UK) geographical area by the medicines management team. Evaluation of an initial intervention carried out in the Grampian area had indicated that written guidelines on ONS prescribing distributed to GPs together with the provision of a community dietetic referral service were ineffective. The results of an audit carried out after this intervention showed that only 27% of patients prescribed ONS were referred to the community dietitian whereas the guidelines had stated that 100% of patients should be referred. In addition, the authors stated that ONS prescribing continued to increase by 20-30% per annum after the intervention.

After this initial audit, the authors stated that a second, more intensive intervention was implemented by a community dietitian, known as a „dietetic prescribing advisor’, in the Grampian area, which involved nutrition education sessions on-site with individual GPs. Topics covered in the nutrition education sessions included dietary advice for patients at risk of malnutrition, how to advise patients about food fortification, guidelines for appropriate use of ONS, information about the costs associated with ONS prescribing, details of the individual general practice ONS prescribing levels in comparison to other practices in the same geographical area, and information on the role of the community dietitians and the appropriate referral process.
The intervention also involved training for healthcare professionals on how to use the "MUST" (Elia, 2003). After this second wave intervention, a second audit was carried out by the "dietetic prescribing advisor". Although the time frame of the re-audit post-intervention was not stated by the authors (Noble, 2011), a high uptake of the education sessions by general practices was reported with only 3% of those approached declining to take part. In addition, after the intervention, the proportion of patients prescribed ONS who were subsequently referred to the community dietitian was reported to improve from 37% to 77%. Forty percent of patients referred to the community dietitian service were reported as treated by dietary management strategies alone without the use of ONS. The total number of ONS items dispensed by GPs involved in the study was reported to decrease by 6% and while ONS expenditure continued to increase, it was a much lower rate (4%) compared to previous years (20-30%). The authors concluded that the combined intervention of education and guidelines in conjunction with access to a community dietetic referral service for GPs was more effective than the introduction of guidelines about ONS prescribing alone without a supporting nutrition education programme (Noble, 2011).

Finally, in the only observational study which was found related to ONS prescribing practices (Arnaud-Battandier, et al., 2004), the authors provided an education session for GPs prior to the start of the study on how to diagnose malnutrition and how to use the MNA nutrition screening tool. The authors stated that during this education session, no information was given to the GPs about the management of malnutrition as there was no intention to change prescribing practices, and that, therefore, the study should be treated as an observational study.

The study involved a 12 month prospective follow-up of patients who had been identified either as at risk of malnutrition or malnourished using the MNA with GPs.
divided into low or high spending ONS groups based on centrally held data. Over the period of the study, the ONS prescribing practices of GPs who were in the low spending ONS group at baseline changed very little. While there was a slight increase to over 10% of patients being prescribed ONS three months post-baseline, this figure had returned to below 5% at 12 months post-baseline. In contrast, in the high spending group of GPs, the percentage of patients who were prescribed ONS increased markedly from approximately 25% at baseline to approximately 60% at the 12 month follow-up. The nutritional status of patients in both groups (high and low spending) was reported to improve over the 12 month period with the patients of GPs in the high spending ONS group having significantly fewer patients classified as at risk of malnutrition compared to patients in the low spending GP group. The authors suggested that the improvement in the nutritional status of patients who were recruited by GPs in the low ONS spending group could have been due to the placebo effect of being enrolled in the study or perhaps due to better identification of patients requiring ONS by GPs due to their use of the MNA. The main outcome of this study was the economic changes (reported as the difference in healthcare costs) reported by the authors. While the high spending GPs were seen to spend significantly more on ONS (€551 per patient), the authors argued that the reduced healthcare costs in this group offset the cost of ONS, leading to an overall cost saving of €195 per patient. However, a wide range in this cost saving value was observed (90% confidence interval: -478 to +929). A limitation of this study is that the economic data on some patients in the low spending group of GPs were not included in the analysis (n = 125/185 (67.5%) compared to 186/193 (96.1%) in the high spending group). The reason provided by the authors for exclusion of these data is that expenditure data from one district had to be eliminated as it deviated significantly from
other districts. However, it was not stated by the authors whether this deviation was related to an increase or a decrease in prescribing costs (Arnaud Battandier et al., 2004).

As this review has highlighted, there are few published studies which have intervened to change ONS prescribing practices. It is necessary to review the methods used in studies which have investigating the efficacy of other educational interventions for healthcare professionals in the community setting.

3.4 Interventions to Change the Practice of Healthcare Professionals in the Community

Healthcare professionals in the primary care setting require continuous post-graduate education to update their knowledge and skills as a result of ongoing role expansion and new medical and technological developments. Many intervention methods to change and improve the practice of healthcare professionals have been evaluated. (Foy et al., 2005). The evidence for three main types of intervention for healthcare professionals are now reviewed. These are interventions to change the prescribing practice for medicines, interventions to change nutritional care practices and interventions to change nutrition screening practices.

3.4.1 Interventions to change the prescribing practice of medicines

The rationale for interventions to improve the prescribing practices for medicines by healthcare professionals include a desire to improve patient care (Foy et al., 2005) and ensuring that expenditure on medicines provides value for money for health service providers (Barry, 2009).

Before discussing individual interventions to change the prescribing practices for medicines, it is necessary to consider factors which influence prescribers. Studies
have shown that not all prescribing is uniform. Watkins and colleagues (2004) investigated the variation in prescribing of medicines by primary care practitioners (general practitioners or GPs). They reported that those who had high medicine prescribing costs displayed a number of similar behaviours. Higher spenders were found to engage more regularly with pharmaceutical company representatives, report reluctance to end a consultation without issuing a medicine prescription and were more likely to try out medicines on an ad-hoc basis. Other characteristics associated with higher spenders included having inadequate mechanisms for reviewing repeat prescriptions, not being open to criticism of their own prescribing and failing to seek independent evidence of the effectiveness of a drug before prescribing (Watkins et al., 2004). These findings suggest that there are a number of different challenges to be addressed by those wishing to implement interventions which aim to change medicine prescribing practices.

Other authors have investigated the pre-requisites that need to be in place prior to the implementation of interventions to change the prescribing practice of medicines and other practices by doctors successfully. These pre-requisites include awareness on the behalf of the prescriber that a problem may exist in their practice and having an understanding of the causes of the problem. The person creating this awareness must be credible to the prescriber. In order to change their practice, prescribers need information regarding new ways of managing their problem practices. It is important that those providing this information acknowledge the prescriber’s doubts concerning new ways of managing the problem and that recognition of barriers to implementing changes in practice occur together with identification and implementation of ways to overcome these barriers (Veninga et al., 2000, Watkins et al., 2004). These factors are important considerations for those wishing to provide education interventions to GPs.
Early stakeholder consultation to ensure such issues are addressed prior to implementing interventions is likely to be required.

The most successful methods for changing medical doctors’ prescribing behaviours is now considered and several reviews on this topic exist (Ostini et al., 2009; Gray, 2006). Before discussing the methods which have been documented as most successful, it is useful to consider the approaches which did not produce significant changes in the prescribing behaviour of doctors and other healthcare professionals.

The evidence from the reviews carried out suggests that didactic approaches (lecture style), printed materials and practice guidelines are not effective ways of changing doctors’ prescribing of medicines (Gray, 2006). There is evidence from the Irish setting to suggest that financial incentives alone are unsuccessful in changing GP medicine prescribing practices, e.g. the indicative drug target scheme. The indicative drug target scheme was a strategy introduced by the HSE, by which GPs who made savings on their medicine prescribing costs received a proportion of this money back as an educational grant for their practice. Evaluation of this scheme found that it did not bring about significant changes in the prescribing practice of GPs (Walley et al., 2000). The focus of the indicative drug target scheme was to decrease medicine prescribing costs so any effect this scheme may have had on the quality of prescribing is unknown.

On the positive side, approaches that have been shown to change medicine prescribing practice include: teaching aimed at identified learning needs, interactive educational activities, sequenced and multifaceted interventions, enabling tools such as patient education programmes, flowcharts and reminders, the method of „educational outreach” (also known as academic detailing, university based-educational detailing, and educational visiting), and audit and feedback mechanisms (Gray, 2006; Ostini et al., 2009). Of these approaches, the two most consistently used, and for which there is the
highest quality evidence, are audit and feedback and educational outreach (Ostini et al., 2009).

Audit and feedback is another term for clinical audit which has been defined as “any summary of clinical performance of healthcare over a specified time period” (Jamtvedt et al., 2006). The information provided might include information on clinical practice, clinical outcomes or the proportion of patients managed in line with specific clinical recommendations. The information may be provided, for example, by a peer healthcare professional or a healthcare professional from another discipline (Foy et al., 2005). The audit and feedback method has been shown to have the greatest effect on changing practice when there is evidence of poor quality practice prior to the intervention (Foy et al., 2005). However, a limitation of the audit and feedback method to changing healthcare professionals’ practice is that the effect of this type of intervention is normally modest (Jamtvedt et al., 2006). It has also been shown that if healthcare professionals are not compelled to implement changes after this type of intervention, for example, by policy development the effect may be minimal over time (Foy et al., 2005).

Educational outreach visits have been shown to be one of the most consistent methods in producing changes in prescribing behaviour (O'Brien et al., 2007). Educational outreach is the process by which trained persons visit clinicians in the place where they practice (on-site) and provide them with information on how to change their practice. The information given may include feedback on the healthcare professionals’ performance or may be based on overcoming obstacles to change (O'Brien et al., 2007). A systematic review carried out by Madigan (2007) of education outreach in small groups of healthcare professionals in the primary care setting concluded that this type of
education intervention does improve professional knowledge, practice and attitudes compared to no education.

Review of the evidence for changing medicine prescribing practice suggests that both educational outreach and audit and feedback may be useful approaches to consider in designing interventions for healthcare professionals to change their prescribing practices for ONS. The literature in relation to nutritional care practices and healthcare professionals will now be discussed.

3.4.2 Interventions to change dietary advice practices

Nutritional care practices such as the provision of dietary advice (nutrition counselling) can provide improved outcomes for patients (Baldwin & Weekes, 2008).

While dietitians are the healthcare professionals who are formally trained to provide dietary advice to patients, there is evidence that other healthcare professionals in the community (primary care) setting also provide dietary advice for patients including those who require dietary advice for weight management (Heintze et al., 2010), have risk factors for coronary heart disease (CHD) (Moore et al., 2003) and patients at risk of malnutrition (Loane et al., 2004).

Some studies have reported that non-dietitian healthcare professionals have reported difficulties with provision of dietary advice to patients. Commonly cited barriers perceived by GPs to providing nutritional counselling include: lack of time (Nicholas et al., 2003; Kolasa et al., 2010), uncertainty of the effectiveness of nutrition counselling, inadequate skills in providing nutrition counselling, lack of financial incentives and a lack of a systematic organised approach within the practice (Eaton et al., 2003). GPs have also expressed dissatisfaction with the level and quality of nutrition education they received at pre- and post-graduate level (Moore et al., 2003).
Studies have evaluated the benefits of education interventions to improve GPs’ (Moore et al., 2003; Ockene et al., 1995) and practice nurses’ (Cadman and Findlay, 1998) skills to provide dietary advice. Moore and colleagues (2003) carried out a nutrition education intervention with GPs and practice nurses with the aim of improving dietary advice to patients with coronary heart disease. Although each participant was offered a total of five nutrition education sessions, each 90 minutes in length, totalling a maximum of 7.5 hours (3 sessions at a central venue and 2 sessions on-site at their workplace (educational outreach), the majority attended less than 50% of sessions (73% GPs and 100% practice nurses attended three hours of nutrition education sessions). The authors reported that, while the intervention was well accepted by participants and there was evidence of increased knowledge, it did not result in improved dietary advice during patient consultations. The authors concluded that training existing primary care staff was not an effective way to ensure that national guidelines relating to dietary advice and CHD were delivered to patients (Moore et al., 2003). In contrast, Okene and colleagues (1995) reported increased dietary advice provision to patients by physicians after participation in a nutrition education programme (3 hour duration) in order to improve dietary advice related to abnormal blood lipid profiles.

Cadman and Findlay (1998) report increased knowledge and confidence among practice nurses who received nutrition education sessions from a dietitian on the provision of dietary advice. However, they did not report if the intervention led to improved dietary advice being given during patient consultations.

General recommendations from authors who have carried out nutrition education interventions with healthcare professionals in the primary care setting are that nutrition education interventions should be multidisciplinary i.e. include both doctors and nurses who work together at a practice to ensure that consistent advice is provided to patients.
Also, it has been recommended that facilitators of education interventions should be flexible in the times and locations that these education sessions are offered to ensure that all staff can attend (Cadman & Findlay, 1998).

3.4.3 Interventions to change nutrition screening practices

A 2005 review of the argument on whether nutritional screening should be implemented in adults concluded that a large proportion of malnutrition goes undetected in both hospital and community settings (Elia, 2005a). Expert guidelines in the UK have emphasised the importance of routine nutritional screening (NICE, 2006). Implementation of nutritional screening has been shown to result in increased detection of malnutrition, decreased incidence of infection, increased referral to dietitians, increased use of oral nutritional support and enteral feeding and increased patient satisfaction (Elia, 2005a).

The outcomes of nutrition education interventions to change nutrition screening practices of healthcare professionals have been reported by several authors. Gall and colleagues (2001) reported that the there was increased frequency in the use of a local nutritional screening tool after a nutrition education session with healthcare professionals as part of an overall intervention to improve nutrition screening practices.

Since the „MUST’ was launched in 2003 by the Malnutrition Advisory Group of BAPEN (Elia, 2003), there have been several studies which have evaluated nutrition education interventions to teach healthcare professionals to use the „MUST’. Stratton and colleagues (2004) carried out a hospital based study to evaluate healthcare professionals’ ratings of the „ease of use’ of the „MUST’. It was reported as quick and easy to use by the small group of healthcare professionals involved in the study.
In an effort to address the problem of training large numbers of nursing staff to use the „MUST’ (Elia, 2003) where dietitian resources are limited, Lee and Scott (2009) investigated the use a „train the trainer method’ to educate nurses working in residential care homes to train their nursing colleagues to use „MUST’. A one day nutrition education intervention was provided to 67 nurses (in maximum groups of ten) by two dietitians. Eighty-four percent of the nurses who participated in the intervention were observed by a dietitian while facilitating at least one „MUST’ training session within five weeks of attending the nutrition education intervention. Nurse trainers were evaluated by dietitian observers using a standard checklist and all but one nurse was deemed to be competent to provide a „MUST’ training session to colleagues. Care plans completed by nurse colleagues (n=178) were assessed by dietitian observers and the majority of these were completed correctly (Mean score 9.2/10). The authors reported increases in knowledge of nurse trainers and improvement in reported nutrition care practices three months post-intervention compared to the baseline. Forty-four percent of the nurse trainers submitted care plans in which the „MUST’ had been completed 3 months post-intervention (it was not reported by the authors whether the care plans which were submitted by the nurse trainers or nurse colleagues). The authors reported that the majority of „MUST’ screening tools completed in the care plans were correct. The authors concluded that the „train the trainer’ method is an effective way of training large numbers of nursing staff in residential care homes to use „MUST’ (Lee & Scott, 2009).

Several authors have reported low use of nutrition screening tools after nutrition education interventions intended to improve the use of nutrition screening tools (Porter et al., 2009; Fikree, 2010). In a hospital based study, Porter and colleagues (2009) found that the „MUST’ was not being implemented routinely after nursing staff had
received education sessions from dietitians. The authors (Porter et al., 2009) used group interviews to explore the barriers to the implementation of the „MUST’ and they found that lack of time due to busy workloads, particularly paper work, lack of confidence in their skill to use the tool and lack of understanding of the importance of nutrition screening were contributing factors to the „MUST’ not being completed. The authors concluded that in order to ensure that the „MUST’ was implemented routinely, continuous consultation with nursing staff, ongoing nutrition education and policy development were needed. The authors also commented that due to the increasing demands being placed on nursing staff, the role of nutrition screening might be better completed by a dietetic assistant (Porter et al., 2009).

Other research has investigated a nutrition education program for non-healthcare professionals to enable them to complete nutrition screening. A study by Laforest and colleagues (2007) in a Canadian community setting investigated the effectiveness of a nutrition education intervention which entailed the training of non-healthcare professionals by dietitians to screen for malnutrition using the „elderly nutrition screening tool’ for home-bound older persons. The authors concluded that this was an effective method of screening older persons in their own homes as agreement between dietitian and non-healthcare professional assessments was high (≥ 80%). No long-term follow up evaluation of the effectiveness of this intervention was reported.
Conclusion

This review has indicated that in order to identify malnutrition we need a clear definition and a means to recognise it in different settings. The „MUST’ appears to be a useful tool for the appropriate selection of patients who are at risk of malnutrition and may be useful as an onward referral tool to a community dietetic service. Malnutrition may be treated using dietary advice alone or in conjunction with ONS although at the moment the evidence is not strong enough to recommend either treatment alone. A number of other nutritional care interventions have also been shown to be useful. Co-ordination of the management of malnutrition in the community setting requires a multidisciplinary approach. However, a barrier to this is lack of knowledge among healthcare professionals in the community setting about the identification and treatment of malnutrition which can lead to two separate problems. Firstly, under-identification of patients at risk of malnutrition which, in turn, can lead to increased healthcare costs if patients are not treated and deteriorate nutritionally and, secondly, the possible wastage of resources through expenditure caused by inappropriate prescribing of ONS.

It is possible that if adequate education and support services were available to healthcare professionals in the community, this could bring about improvements in nutrition care practices and better targeting of ONS to patients who most need them.
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# CHAPTER 4
## PLANNING THE INTERVENTION

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4. PLANNING THE INTERVENTION

4.1 Defining the Problem

The clinical use of oral nutritional supplements (ONS) had increased greatly prior to 2004 in both the Republic of Ireland (ROI) (National Medicines Information Centre (NMIC), 2004) and the United Kingdom (UK) (Gale et al., 2001) which has a similar health service payment and reimbursement system for ONS prescriptions written by General Practitioners (GPs). Increased use had, in turn, led to a steady increase in expenditure on ONS by the Irish Health Service Executive (HSE). This had focused attention on the use of ONS in the ROI, prompting debate between clinicians and health economists (NMIC, 2004; Barry, 2009; Barron, 2010).

In 2005, when this research project began, ONS accounted for an annual expenditure of approximately €19 million by the Irish Health Service Executive (HSE) (National Shared Services Primary Care Reimbursement Service (PCRS), 2005, Personal Communication). In 2008, this figure had risen to €28 million (Barry, 2009) which represents a 47% increase over a four year period.

Planning for this research was informed by a study carried out in 2002 in the same geographical region by the same community dietetics department i.e. HSE Dublin Mid-Leinster (Midlands area) under the direction of Grainne Flanagan-Rughoobur (GFR) Clinical Specialist Dietitian for Older Persons and Corina Glennon-Slattery (CGS) Community Nutrition and Dietetics Service Manager (Loane et al., 2004).

Loane and colleagues used a telephone survey of general practitioners (GPs) (also known as primary care practitioners) and community nurses to assess the decision making processes and monitoring procedures for the prescribing of ONS to elderly patients, and whether these elderly patients underwent appropriate nutritional
assessment prior to the prescription of ONS (Loane et al., 2004). While the authors reported some negative findings which indicated that both knowledge and nutritional care practices of healthcare professionals around ONS prescribing were poor compared to best practice, on a positive note, the majority of healthcare professionals surveyed reported that they would welcome further education and resources in the area of ONS. These findings helped create the objectives of the research described in this thesis which were to develop, implement and evaluate a community dietetics intervention to improve oral nutritional supplement prescribing practices.

At the time of this research, a number of additional issues required consideration. Firstly, in the ROI, GPs had sole responsibility for the prescription of ONS and monitoring of patients receiving ONS (i.e. there were no prescribing nurses or dietitians). Secondly, prior to this research, the community dietetics service did not provide a service for patients at risk of malnutrition living in the community or in private nursing homes; however, there was a well established community dietetics service in nursing homes which were run by the HSE and so the latter institutions were excluded from this research. Thirdly, at that time, there were no validated protocols or guidelines in existence locally in the HSE Midlands area (counties Laois, Offaly, Longford, and Westmeath) or nationally in the ROI, on which GPs could base their decision to prescribe or recommend ONS. It was anticipated that this research would provide information which could then inform the development of such policies.

At the time of funding the research, it was agreed that the data and recommendations developed from the study findings would be regularly disseminated to HSE senior management. If the community dietetics intervention proved successful, it was envisaged that the model developed and used in this study would be shared with
other community dietetics services within the HSE and would also be disseminated to hospital dietetics services.

4.2 Development of ONS Prescribing Criteria

At the outset of this research, the criteria for ONS prescribing were defined as clearly as possible. The rationale for defining the criteria clearly was that it became apparent when reviewing the literature prior to undertaking the research, that several unpublished studies had investigated the use of ONS in a community setting. These studies were based on a dietitian’s assessment of patients prescribed ONS (Hood & Welch, 2000; Forth Valley Primary Care Trust, 2001; Murdock et al., 2002). The primary outcome in these studies was the rate of discontinuation of ONS by the dietitian; however, details of the criteria used in the dietetics assessment were not always provided by the authors. When designing the current study, the criteria used were made as clear as possible to allow for comparison with other studies.

The criteria used in this study were informed by studies mainly set in the UK which investigated ONS prescribing (Steigh et al., 1998; McCombie, 1999; Gale et al., 2001; Gall et al., 2001) and by existing best practice guidelines (National Health Service National Prescribing Centre, 1998a; National Health Service National Prescribing Centre 1998b; Joint Formulary Committee, 2005).

During completion of the pre-intervention study (between 2005 and 2006), two expert groups published both draft and finalised guidelines which helped to inform the criteria for prescribing ONS used in this research. These were, firstly, the National Institute of Clinical Excellence (NICE) (2006) guidance on „Nutrition Support in Adults‘ and, secondly, the European Society For Enteral and Parenteral Nutrition
(ESPEN) guidelines on enteral nutrition for geriatrics (Anker et al., 2006; Arrends et al., 2006; Lochs et al., 2006; Volkert et al., 2006; Weimann et al., 2006).

4.3 Consultation with Stakeholders

At the beginning of this research project, it was envisaged that a nutrition education programme would be a component of a community dietetics intervention to change ONS prescribing practices as this had previously been documented as a successful strategy in improving nutrition knowledge and nutrition care practices of healthcare professionals (Gall et al., 2001). However, the format and content most acceptable to healthcare professionals in the local community setting where the study was being undertaken was unknown.

In order to design a community dietetics intervention that fitted local needs, local stakeholder representatives from the target healthcare professional groups were contacted and, subsequently, individual meetings were held with two local GPs, one director of community nursing, two assistant directors of community nursing, one private nursing home manager and one practice nurse facilitator. The objectives of these meetings were to discuss the aims and content of the education intervention and evaluation tools and offer choice in the format of delivery. Options discussed for the education intervention were evening meetings versus „study day’ format, use of existing continuous medical education (CME) learning groups for GPs and education sessions delivered on-site at the workplace. The preference expressed by all healthcare professional representatives (n=8) consulted was for the education intervention to take place on-site at the workplace. Delivery of education sessions in this way is known as „education outreach’ or as an „academic detailing model’ and has been shown to be highly acceptable to healthcare professionals and successful at improving knowledge,
professional practice and attitudes (Welschen et al., 2004; Madigan, 2005; Midlov et al., 2006). As a result of this consultation with healthcare professionals, the nutrition education programme sessions were tailored in length to suit the needs of each healthcare professional group. Community nurses indicated that a three hour session would be acceptable, private nursing home staff nurses indicated 1.5 hours and GPs and practice nurses indicated a one hour session would be preferable. Copies of the nutrition education programme resources developed for the intervention are included in the Appendices of this thesis (Appendix II: Nutrition Education Programme Session Plans, Presentation and speaker notes, Malnutrition Universal Screening Tool, Case Studies, Patient Advice Leaflets Sheets and Community Nutrition and Dietetics Service Patient Referral Form). A copy of the resource folder developed for healthcare professionals is also provided (See attached CD).

Self-administered questionnaires and multiple choice questionnaires were agreed by all stakeholders as acceptable evaluation tools for healthcare professionals.

When planning this research, effort was made to contact community dietitians in the UK who were involved in similar research by writing to the authors of studies identified by the literature review. Responses were received from two community dietitians; L. Mincher, Sutton & Merton Primary Care Trust and N. Panico, Eastbourne & County Health Care, Nutrition & Dietetics Department, Suffolk East Primary Care Trusts provided detailed information about the initiatives in which they had been involved (Panico, 2002).

Contact was also made with an established network of dietitians in the UK who were involved in projects related to the prescribing of ONS called the „Prescribing Support Dietitians Group”. Members were contacted and asked to share any
information from their experience; however, no information was gathered from this source.

S.K met with S. Madigan who had previously carried out an educational outreach style intervention in the primary care setting in Northern Ireland to improve the management of patients prescribed enteral feeds in the community. She had also reviewed the evidence in relation to outreach style education interventions (Madigan et al., 2005) and her knowledge of the topic and experience in planning a nutrition education programme informed the design of the intervention used in this study.
4.4 Piloting of Nutrition Education Programme Evaluation Tools

Prior to the baseline study, an initial pilot project was carried out with 15 patients to test the interview-assisted questionnaire used in the study. After this pilot project, there were no changes required to the questionnaire.

The evaluation tools used to evaluate the nutrition education programme i.e. the multiple choice knowledge questionnaire and the questionnaire used to measure healthcare professionals’ satisfaction with the education intervention programme were piloted with the staff of one GP practice (including three GPs and two practice nurses). These healthcare professionals completed a questionnaire after they had completed the evaluation tools; all comments received were positive and no changes were made to the evaluation tools.

4.5 Oral Nutritional Supplement Governance and Control, and Data Selection

During the planning stage of this research, it was necessary to gain an understanding of the structures for ONS governance and control in the ROI in order to decide which data should be collected.

In the ROI, the government body responsible for the administration and payment of claims relating to costs and services associated with prescribed medications is the Health Service Executive National Shared Services Primary Care Reimbursement Service (HSE PCRS), formerly known as the General Medical Services Payments Board (prior to 2005). Claims for payment from doctors and pharmacists for medicines prescribed and dispensed are processed by the HSE PCRS under a number of different schemes and payment arrangements. The three main schemes which provide payment
to doctors and pharmacists for services and products at the time of this research were the General Medical Payments Scheme (GMS), the Drugs Payment Scheme (DPS) and the Long Term Illness (LTI) Scheme, with the GMS having by far the greatest expenditure on medicines and appliances each year (General Medical Services Payments Board, 2004).

Under the GMS, during the period 2005-2008 when this research was carried out, patients who were entitled to avail of the scheme included all adults aged over 70 years and anyone deemed to be unable to provide GP and other medical services for themselves without undue hardship (this is also known as ‘having a medical card’). These persons are entitled to receive certain free medical services from the HSE including medicines and appliances prescribed by a GP which are then provided through retail pharmacies (National Shared Services Primary Care Reimbursement Service, 2005). It was thought that the study population was likely to be mainly older persons (> 70 years) based on previous studies (McCombie, 1999; Gall et al., 2001) and, for this reason, it was decided to evaluate the effects of the intervention on GMS expenditure only. Under the GMS there was no limit to the costs of medications and appliances that retail pharmacies could claim for services and products provided to patients with a medical card at the time of this research. The total expenditure on medicines and appliances e.g. dressings under the GMS was €831.4 million in 2005, of which €30.64 million was spent on a group of products classified as Clinical Nutritional Products.

At the time of this research, under the PCRS schemes, Clinical Nutritional Products were further divided into four sub-groups of products. These were ‘products for inborn errors of metabolism’, ‘low protein products’, ‘gluten-free products’ and ‘other products’. The ‘other products’ group included ONS for adults and children, tube
feeds for adults and children, special products for metabolic diseases, infant milk substitute products and thickening agents (General Medical Services Payments Board, 1999). However, ONS were not officially categorised as one group of products by the PCRS and, therefore, statistical analysis of data held by the PCRS relating to ONS specifically was not routinely carried out. In order to determine the effect of the intervention on ONS for adults at the beginning of this research, SK reviewed the full list of Clinical Nutritional Products provided by the PCRS, identified and listed each ONS for adult use and provided this list to the PCRS to facilitate the extraction of data from the centrally held database.

### 4.6 Thesis format

In the course of the literature review, it became apparent that there was a poor volume of published literature available relative to the large number of unpublished studies and audits investigating ONS prescribing practices. Non-publication of research can be an impediment to improving clinical practice and appears to have lead to considerable repetition of work by community dietetics departments across the UK; therefore, the submission of papers for peer-reviewed publication was a priority of this research project. The content of the papers accepted for publication form the following three chapters of this thesis.
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5. THE USE OF ORAL NUTRITIONAL SUPPLEMENTS IN AN IRISH COMMUNITY SETTING

5.1 Abstract

**Background:** The frequency of oral nutritional supplement (ONS) prescribing has been increasing steadily in the Republic of Ireland (ROI). Available evidence indicates that health professionals in the community setting in the ROI have a poor level of knowledge about ONS. The objectives of the present study were to investigate ONS prescribing practices and to identify the types of patient who were prescribed these products.

**Methods:** Ten of 17 eligible general practitioners were recruited and asked to refer all patients (aged > 16 years) who were prescribed ONS during a 3-month period. Patients were interviewed by a community dietitian, using a questionnaire incorporating the Malnutrition Universal Screening Tool (MUST). ONS prescriptions were judged either to fulfil or not to fulfil a set of criteria developed for ONS prescribing in the community.

**Results:** The majority of patients were female (62/78). Their mean (SD) age was 79 (10.5) years. According to MUST criteria, 31 of 78 patients were at „low risk”, 18 of 78 were at „medium risk” and 29 of 78 were at „high risk” of malnutrition. Less than half of the patients (36/78) had a body mass index of < 20 kg m\(^2\). Only 21 of 78 patients reported having received dietary advice in addition to their ONS prescription. Almost one-third (31%) of ONS prescriptions did not fulfil the criteria. Social factors, such as living alone, and difficulties with cooking and shopping, influenced the need for ONS in almost 70% of cases.
Conclusions: ONS were prescribed in accordance with the prescribing criteria in the majority of cases; however, some patients who were prescribed ONS were not „at risk” of malnutrition. Social circumstances played an important part in determining the need for ONS prescriptions.

5.2 Introduction

The increasing cost of oral nutritional supplements (ONS) to the health services has focused attention on their use in the Republic of Ireland (ROI) and in the UK (McCombie, 1999; Gale et al., 2001; Gall et al., 2001; Loane et al., 2004). Spending by the Health Service Executive (HSE) under the General Medical Services (GMS) Payments Scheme in the ROI on ONS products increased by an estimated by 42% over the 4-year period from August 2003 to August 2007 (August 2003 to August 2004, approximately €18 million; August 2006 to August 2007, approximately €25.5 million), despite no significant change in eligibility for the scheme or in product prices (Primary Care Reimbursement Service, unpublished data).

Expert guidelines (NICE, 2006) recommend the initiation of ONS if patients are undernourished or „at risk” of malnutrition. A meta-analysis has shown that, in the community setting, the beneficial effects of ONS are significantly greater in undernourished patients [i.e. body mass index (BMI) < 20 kg m\(^{-2}\); Stratton et al., 2003] and in patients > 75 years old (Milne et al., 2006). Routine supplementation for older people at home or for well nourished older patients in any setting is not considered to be justified (Milne et al., 2006).

Several UK studies and audits, both published and unpublished, have investigated ONS prescribing in the community. The methods used in these studies have comprised audits of patient records or general practice databases (Cooper, 1996;
Munroe et al., 1998; Norwood & Short, 1999; Gale et al., 2001) or audits of patients records or databases combined with nutritional assessment of patients by a dietitian (McCombie, 1999; Hood & Welch, 2000; Gall et al., 2001; Kyle, 2002; Murdock et al., 2002; Murray, 2002; Panico, 2002; Jones, 2003; Fitzgibbon, 2006; Oladipo, 2006). The use of ONS was considered ‘inappropriate’ or unwarranted in 30–70% of cases according to various criteria differing between studies.

In the ROI, little is known about the types of patients prescribed ONS in the community or about the interaction between patient and health professional in relation to ONS. A survey of general practitioners (GPs; primary care physicians) and community nurses, suggested that there is lack of knowledge about nutritional supplementation, incomplete nutritional assessment of patients prior to prescription of ONS, and poor monitoring of patients using these products (Loane et al., 2004). The present study aimed to determine the extent to which ONS prescriptions fulfilled a set of criteria for ONS prescribing in the community setting, to determine who initiated ONS prescriptions in the community, to record self-reported compliance with ONS, to examine the current roles of healthcare professionals when monitoring the use of ONS, and to describe the demographic profile of patients who were prescribed ONS in the community setting.

5.3 Materials and methods

5.3.1 Recruitment of GP sample

This study was carried out in a midlands county in the ROI with a population of approximately 79 000 people (11% > 65 years of age) (CSO, 2006). There was no specific primary care or community-based dietetic referral service in the geographical
area for patients requiring oral nutritional support at the time of the study. GPs were eligible to be recruited if they had more than 500 patients under the GMS scheme (i.e. patients entitled to free medicines and GP visits) and had facilities for a dietetics clinic at their practice. Seventeen of forty-eight (35.4%) GPs in that county met these criteria. All 17 GPs were contacted by phone by the dietitian (SK) to arrange a face-to-face meeting about the study. Data collection took place between June and November 2005. Ethical approval was received from Dublin Institute of Technology (DIT) ethics committee and HSE–DM (HSE–Dublin Mid-Leinster: former Midland Health Board Area) ethics committee.

5.3.2 Recruitment of patient sample

For the purposes of this study, ONS were defined as commercially manufactured high energy and/or high protein oral supplements in liquid, pudding or powdered form to be taken under medical or dietetic supervision only (Letoha, 2002). The ONS products included in the study did not include infant formulas, paediatric specific products, specialist metabolic products, gluten free foods, low protein foods, or enteral tube feeds. Figure 5.1 provides information on the total population size and sample size recruited to the study.
Retrospective information about ONS prescriptions is only available 3 months after ONS prescriptions are issued locally from the national database held by the HSE Primary Care Reimbursement Service (PCRS). Therefore patients were recruited prospectively in an attempt to capture data as closely as possible to the time when ONS prescriptions were issued. Anonymous data on total number, gender and age category of patients prescribed ONS by the subject GPs during the study period were provided subsequently by the HSE PCRS statistics unit.

Participating GPs were asked to refer all adult patients (> 16 years) to whom they provided either a „new” or „repeat” prescription for ONS for the duration of the 3-month study period. When referred to the study, patients were contacted by the research community dietitian (by phone or letter) to arrange an appointment or domiciliary visit as required. All patients were seen and assessed by the community dietitian within 2 weeks of receiving a referral from the GP. Patients were asked to provide their written or verbal consent, and were given verbal and written information about the study. Medical records were reviewed at the GP practice or private nursing home.
5.3.3 Patient assessment

A structured interviewer-assisted questionnaire was completed by each patient, which included seven sections: (i) patient demographics, including sex, age, current residence, cohabitants, mobility level, diagnosis and previous medical history; (ii) The Malnutrition Universal Screening Tool (MUST) (Elia, 2000), requiring the determination of BMI, the percentage of recent unplanned weight loss and consideration of acute clinical conditions affecting the patient described in detail elsewhere (Elia, 2000); (iii) current difficulties with eating & drinking, gastrointestinal and other symptoms self-reported by the patient; (iv) the patients’ interaction with health professionals prior to receiving an ONS prescription, including what advice they received about diet (written and oral) and whether or not they were given any choice of ONS or allowed to taste ONS; (v) current use of ONS, including type and quantity currently prescribed, length of prescription, use of ONS as a meal replacement, compliance with ONS prescription and factors affecting compliance; (vi) social variables, including current uptake of community services and financial difficulties; and (vii) a 24-h recall of food and drinks (Thomas & Bishop, 2007) using a photographic atlas of food portion sizes to increase the accuracy of portion size estimates (Nelson et al., 2002). The questionnaire is provided in the Supporting Information. Energy and nutrient intakes were calculated using a nutritional analysis package wisp, version 2.0 (Tinuviel software, 2007).

5.3.4 Criteria for ONS prescribing in the community setting

A set of criteria (Table 5.1) was devised based on the results of well designed studies for clinical effectiveness of ONS, studies of ONS usage and the opinion of respected expert groups, most notably the NICE guidelines on nutrition support in adults (NICE,
and the ESPEN guidelines on enteral nutrition (Arends et al., 2006; Lochs et al., 2006; Volkert et al., 2006; Weimann et al., 2006).

<table>
<thead>
<tr>
<th>Criteria for ONS prescribing</th>
<th>Health Reasons</th>
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<tr>
<td>(One or more of the criteria were fulfilled)</td>
<td>a) Presence of disease related malnutrition or nutritional risk e.g. (NICE, 2006)</td>
</tr>
<tr>
<td></td>
<td>b) Patient not consuming adequate food to meet energy and protein requirements as per nutritional assessment by a dietitian or trained health professional (NICE, 2006; NPC 1998a)</td>
</tr>
<tr>
<td></td>
<td>c) Patient has an active disease state e.g. renal disease, liver disease, respiratory disease or is pre- or post-operative with increased nutritional requirements (NICE, 2006; Weimann et al. 2006, )</td>
</tr>
<tr>
<td></td>
<td>d) Patient’s ability to absorb food is affected by disease e.g. inflammatory bowel disease, bowel fistulae, cystic fibrosis pre- or post-operative state (e.g. total gastrectomy) (Lochs et al., 2006; NPC1998a).</td>
</tr>
<tr>
<td></td>
<td>e) Pre- and post-operative undernourished patients (e.g. hip fracture or orthopaedic surgery) (Volkert et al 2006).</td>
</tr>
<tr>
<td></td>
<td>f) Anorexia and or cachexia due to chronic disease or treatment (Anker et al, 2006; Arends et al, 2006)</td>
</tr>
<tr>
<td></td>
<td>g) Patient has problems with eating, drinking, swallowing including dysphagia, dental problems, sore mouth, dry mouth (Volkert et al., 2006 ; Gall et al, 2001)).</td>
</tr>
<tr>
<td></td>
<td>h) Clinically diagnosed depression where there is anorexia &amp; poor motivation to eat.(Volkert et al, 2006)</td>
</tr>
<tr>
<td></td>
<td>i) Patient has mobility problems affecting ability to obtain, prepare or consume foods.(See social reasons)</td>
</tr>
<tr>
<td></td>
<td>j) To prevent, or improve the healing of, pressure ulcers.(Volkert et al, 2006).</td>
</tr>
<tr>
<td></td>
<td>k) Early and moderate dementia to ensure adequate energy and nutrients .(Volkert et al, 2006)</td>
</tr>
<tr>
<td>Social Reasons (Gall et al., 2001)</td>
<td>l) Financial difficulties affecting ability to buy food.</td>
</tr>
<tr>
<td></td>
<td>m) Difficulties cooking /shopping/preparing food.</td>
</tr>
<tr>
<td></td>
<td>n) Living alone, or eating majority of meals alone &amp; poor motivation to eat.</td>
</tr>
</tbody>
</table>

The criteria are not intended to be considered as exhaustive, but to reflect the majority of possible prescribing indications seen for ONS in the community setting. Other
resources considered when setting the criteria included existing guidelines on ONS for prescribers (British medical association & royal pharmaceutical society, 2008, MIMS, 2008), meta-analyses for the beneficial use of ONS in the community (Stratton et al., 2003; Milne et al., 2006) and a variety of published opinions (NPC, 1998a,b; Hood & Welch, 2000, Gall et al., 2001; Murdock et al., 2002; Murray, 2002). ONS prescriptions reviewed in the present study were classified as fulfilling or not fulfilling the set criteria.

When a prescription did not fulfil the set criteria, a recommendation was made by the community dietitian (i.e. by letter or phone) to the GP to discontinue or adapt the ONS prescription.

5.3.5 Statistical analysis

Analysis was carried out using the Statistical Package for Social Sciences for Windows, version 13 (SSPS Inc., Chicago, IL, USA). Chi-square analysis was used to test for differences between groups and to identify relationships between the level of risk of malnutrition and demographic variables and differences between GPs’ prescribing practices. Fisher’s exact test was used in cases where low cell frequencies were expected. Student’s t-test was used to test for differences in nutrient intakes between nursing home and free-living patients. Spearman’s rank order correlation was used to use to investigate the relationship between continuous variables (i.e. BMI, energy and protein intakes, number of community services assessed and number of ONS products prescribed).
5.4 Results

5.4.1 Characteristics of GPs participating in the study
Fifty-nine percent (10/17) of the eligible GPs (eight men and two women) were recruited. Reasons for nonparticipation included being too busy or not having enough time (n = 2), not agreeing with the referral criteria for patients (n = 1), concerns about time demands on other staff at the practice (n = 2) and nutrition support not being an important issue for their current patient population (n = 2).

5.4.2 Recruitment rate and characteristics of patients participating in the study
Figure 5.1 shows the total number and gender of patients prescribed ONS by the 10 subject GPs during the 3-month study period as identified from data supplied by the HSE PCRS. It also shows the number of patients referred and subsequently recruited to the study as well as the reasons for non-recruitment. Forty-seven percent (78/167) of the total number of patients prescribed ONS by subject GPs were recruited to the study. A higher percentage of females (57%; 62/109) than males (28%; 16/58) were recruited. A higher percentage of patients in the „greater than 65 years” age category (50%; 73/145) compared to the „15–65’ years age category (23%; 5/22) was recruited.

Eighty percent (63/78) of patients were interviewed directly by the community dietitian; in the remainder, a proxy interviewee was involved, such as a staff nurse in a private nursing home (8/78) or a fulltime carer (7/78). Most patients (34/78) were interviewed in their own home or a carer’s home; the remainder were either interviewed in a nursing home (28/78) or at a GP’s surgery (16/78). Characteristics of patients are shown in Table 5.2. The mean (SD) age of the patients interviewed was 79 (10.5) years.
Table 5.2: Characteristics of patients studied

<table>
<thead>
<tr>
<th></th>
<th>Number of patients, n (% total)</th>
<th>Mean (Sd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>16 (20.5)</td>
<td>n/a</td>
</tr>
<tr>
<td>Females</td>
<td>62 (79.4)</td>
<td>n/a</td>
</tr>
<tr>
<td>Living in nursing homes/state residential homes</td>
<td>28 (35.8)</td>
<td>n/a</td>
</tr>
<tr>
<td>Living in own home/relatives home</td>
<td>50 (64.0)</td>
<td>n/a</td>
</tr>
</tbody>
</table>

**Anthropometric Measures**

<table>
<thead>
<tr>
<th>Measure</th>
<th>n</th>
<th>Mean (Sd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean body weight (kg)</td>
<td>63</td>
<td>57.4 (16.1)</td>
</tr>
<tr>
<td>Mean height (m)</td>
<td>53</td>
<td>1.59 (0.11)</td>
</tr>
<tr>
<td>Mean height estimated from ulnar length (m)*</td>
<td>25</td>
<td>1.59 (0.08)</td>
</tr>
<tr>
<td>Mean BMI (kg/m²) measured directly</td>
<td>53</td>
<td>22.5 (5.08)</td>
</tr>
<tr>
<td>Mean BMI (kg/m²) using estimated height from ulnar length</td>
<td>10</td>
<td>21.9 (5.13)</td>
</tr>
<tr>
<td>BMI &lt;20 kg/m²</td>
<td>36 (46.1)</td>
<td>n/a</td>
</tr>
<tr>
<td>BMI 20-24.9 kg/m²</td>
<td>28 (35.8)</td>
<td>n/a</td>
</tr>
<tr>
<td>BMI 25-29.9 kg/m²</td>
<td>9 (11.5)</td>
<td>n/a</td>
</tr>
<tr>
<td>BMI &gt;30 kg/m²</td>
<td>5 (6.4)</td>
<td>n/a</td>
</tr>
</tbody>
</table>

**Medical details**

<table>
<thead>
<tr>
<th>Feature</th>
<th>n</th>
<th>Mean (Sd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discharged from acute hospital setting in previous 2 years</td>
<td>46 (58.9)</td>
<td>n/a</td>
</tr>
<tr>
<td>One or more chronic disease states</td>
<td>64 (82.0)</td>
<td>n/a</td>
</tr>
</tbody>
</table>

**Activity level**

<table>
<thead>
<tr>
<th>Activity level</th>
<th>n</th>
<th>Mean (Sd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bed-bound</td>
<td>5 (6.4)</td>
<td>n/a</td>
</tr>
<tr>
<td>Sitting out of bed</td>
<td>10 (12.8)</td>
<td>n/a</td>
</tr>
<tr>
<td>Walking with aid</td>
<td>23 (29.4)</td>
<td>n/a</td>
</tr>
<tr>
<td>Fully ambulant</td>
<td>40 (51.2)</td>
<td>n/a</td>
</tr>
</tbody>
</table>

**Social characteristics**

<table>
<thead>
<tr>
<th>Social characteristic</th>
<th>n</th>
<th>Mean (Sd)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients eating main meals alone „on most days“</td>
<td>36 (46%)</td>
<td>n/a</td>
</tr>
<tr>
<td>Number of patients reporting difficulties managing shopping for food</td>
<td>37 (47%)</td>
<td>n/a</td>
</tr>
<tr>
<td>Number of patients reporting difficulties preparing and cooking meals.</td>
<td>36 (46%)</td>
<td>n/a</td>
</tr>
<tr>
<td>Number of patients reporting financial problems limit ability to buy food</td>
<td>14 (18%)</td>
<td>n/a</td>
</tr>
<tr>
<td>Patients living alone</td>
<td>27 (34.6)</td>
<td>n/a</td>
</tr>
</tbody>
</table>

† Body Mass Index was estimated using mid upper arm circumference (cm) (MUAC) for n=15 patients therefore mean BMI data is not available for this group.

*The methodology for the estimation of height using ulnar length and estimation of BMI (kg/m²) using Mid Upper arm circumference(cm) are described elsewhere (Elia, 2003)
The disease profile of the sample included: ischaemic heart disease (n = 31), dementia (all causes) (n = 20), heart failure (n = 17), respiratory disease (n = 15), cerebrovascular accident/stroke (n = 10), diabetes (n = 8), cancer (n = 7), wound/chronic ulcer (n = 5), liver disease (n = 4), renal disease (n = 4) and other conditions (n = 12).

5.4.3 Necessity for ONS prescriptions
Sixty-nine percent (54/78) of ONS prescriptions fulfilled the set criteria, and 31% (24/78) did not. Almost half (47%) of ONS prescriptions (25/54) fulfilled the criteria as a result of a combination of both health and social reasons. Thirty-one percent (17/54) of prescriptions fulfilled the criteria based on health reasons alone. Social reasons alone accounted for 22% (12/54) of cases where ONS prescriptions fulfilled the criteria. There was no significant difference between GPs (P = 0.49) in the proportion of ONS prescriptions that did not meet the criteria for ONS prescribing.

5.4.4 Nutritional intake and anthropometric measures
There was a wide range in mean (SD) estimated energy 6.6 (2.0) MJ day\(^{-1}\) and protein 68.3 (25) g day\(^{-1}\) intakes per 24 h. There was a positive relationship between BMI (kg m\(^{-2}\)) and estimated energy intake (MJ day\(^{-1}\)) (r = 0.356, n = 62, P £ 0.05). There was no significant difference between the energy (MJ) (P = 0.62), protein (P = 0.20), carbohydrate (P = 0.57) or fat (P = 0.96) intakes between free-living and nursing home patients. Anthropometric data for the study population are presented in Table 5.2. Results of MUST and its component scores for all patients (n = 78) are shown in Fig. 5.2. Sixty percent (47/78) of patients prescribed ONS were either at „high risk’’ or „moderate risk’’ of malnutrition according to MUST.
Figure 5.2: Malnutrition Universal Screening Tool (MUST) and component scores of patients (n=78) prescribed ONS.

* BMI score criteria: BMI > 20kg/m² = score 0, BMI 18.5-20 kg/m² = score 1, BMI < 18.5 kg/m² = score 2.

** Recent unplanned weight loss score (in the past 3-6 months) criteria: <5% = score 0, 5-10% = score 1, >10% = score 2.

Note: No patients were given the ‘acute disease effect score’ i.e. a score of 2 if the patient is ill and there has been or there is likely to be little or no intake for 5 days.

† The total MUST score is calculated by adding the BMI, weight Loss and acute disease effect score. Score 0 = low risk, score 1 = medium risk, score 2 or more = high risk.
5.4.5 Gastrointestinal and other symptoms self-reported by patients

Current symptoms which commonly affect appetite that were currently experienced by patients at the time of interview are shown in Table 5.3. The mean (SD) number of symptoms experienced by patients was 3 (2.4).

Table 5.3: Current gastrointestinal and other symptoms currently experienced by patients (n=78)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constipation</td>
<td>46 (59)</td>
</tr>
<tr>
<td>Chewing Difficulties (Including poor dentition, ill fitting and broken dentures)</td>
<td>34 (44)</td>
</tr>
<tr>
<td>Bloating</td>
<td>20 (26)</td>
</tr>
<tr>
<td>Diarrhoea</td>
<td>19 (24)</td>
</tr>
<tr>
<td>Swallowing Difficulties</td>
<td>18 (23)</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>17 (22)</td>
</tr>
<tr>
<td>Nausea/Vomiting</td>
<td>17 (22)</td>
</tr>
<tr>
<td>Dry Mouth</td>
<td>17 (22)</td>
</tr>
<tr>
<td>Acid Reflux</td>
<td>16 (21)</td>
</tr>
<tr>
<td>Unpleasant tastes/Metallic taste in mouth/Taste changes</td>
<td>8 (10)</td>
</tr>
<tr>
<td>Sore Mouth/Mouth Ulcers</td>
<td>4 (5)</td>
</tr>
<tr>
<td>Other</td>
<td>13 (17)</td>
</tr>
</tbody>
</table>

5.4.6 Uptake of community services

Fifty-four percent (42/78) of patients had support from one or more community services. The mean (SD) number of community services used was 1.35 (1.5). Thirty-eight percent of patients (30/78) were currently accessing more than one community service concurrently. The community services used by patients prescribed ONS included public health nurse visits 49% (38/78), home help assistance 29% (23/78), occupational therapy 19% (15/78), speech therapy 8% (6/78), physiotherapy 6% (5/78), meals-on-wheels 1% (2/78), social worker (1/78) and other services 15% (12/78).
There was no relationship found between the number of community services accessed and the number of concurrent ONS products prescribed \( (r = 1.36, P = 0.236) \), or total MUST score \( (r = 0.119, P = 0.28) \).

### 5.4.7 Prescription of ONS

Twenty-four percent \( (19/78) \) of patients reported that their GP had recommended ONS, and 27% \( (21/78) \) could not remember. Other people reported to recommend ONS included hospital dietitians \( (n = 12) \), community nurses \( (n = 7) \), staff nurses in a private nursing home \( (n = 7) \), relatives \( (n = 4) \), community dietitians \( (n = 3) \), home help assistants \( (n = 2) \) and others \( (n = 3) \). Nine percent of patients \( (7/78) \) reported that they had asked their GP for a prescription for ONS (i.e. self-recommended).

The top five most commonly prescribed types of ONS were high calorie 6.27 kJ mL\(^{-1}\) sip feeds \( (61%; 47/78) \), liquid fat source supplements \( (12%; 9/78) \), pudding style products \( (10%; 8/78) \), high protein sip feeds \( (8%; 6/78) \) and juice style sip feeds \( (5%; 4/78) \). Eighty-three percent \( (65/78) \) of patients had only one type of ONS product prescribed, 13% \( (10/78) \) had two types of products prescribed concurrently, and 4% \( (3/78) \) had three different types of products prescribed concurrently.

In eighty-seven percent \( (68/78) \) of cases, the current ONS prescription held by patients was a repeat prescription, and 13% \( (10/78) \) were „first’ prescriptions’. Sixty-eight percent of current ONS prescriptions held by patients \( (53/78) \) were for 1 month and the remaining 25/78 were for a duration of 3 months.
Figure 5.3 shows the estimated length of ONS prescriptions prior to the study, as reported by patients. There was no relationship found between fulfilment (or not) of ONS prescribing criteria and whether the ONS prescription was a „first’ or „repeat’ script (P = 0.75).

**Figure 5.3: Patient self-reported duration of ONS consumption.**

<table>
<thead>
<tr>
<th>Length of ONS prescription prior to the study as self-reported by patients</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 24 months</td>
<td>5</td>
</tr>
<tr>
<td>18-24 months</td>
<td>10</td>
</tr>
<tr>
<td>12-18 months</td>
<td>15</td>
</tr>
<tr>
<td>6-12 months</td>
<td>20</td>
</tr>
<tr>
<td>3-6 months</td>
<td>15</td>
</tr>
<tr>
<td>1-2 months</td>
<td>10</td>
</tr>
<tr>
<td>Less than one month</td>
<td>5</td>
</tr>
</tbody>
</table>

**5.4.8 Compliance with ONS prescriptions and length of ONS prescriptions**

Twenty-eight percent (22/78) of patients reported not consuming any ONS in the previous 24 h. Forty-nine percent (38/78) of patients interviewed reported not consuming the amount of ONS prescribed for them „on most days of the week”.

Patients who were significantly more likely to report having taken ONS in the previous 24 h included those prescribed ONS for less than 6 months (P = 0.015), those who had difficulties cooking their food (P = 0.008) and those who had difficulty shopping for food (P = 0.011). Patients who reported not to have consumed ONS in the previous 24 h were significantly more likely to have ONS prescriptions that did not fulfil the prescribing criteria (P = 0.001).
Specific problems reported by patients with ONS prescriptions that may have affected compliance are reported in Table 5.4. Almost one-quarter (24%; 19/78) of the patients reported using ONS regularly as a meal replacement (15 free-living and four nursing home residents were included in this group).

**Table 5.4: Compliance problems with ONS prescriptions (self reported)**

<table>
<thead>
<tr>
<th>Problem</th>
<th>n/ (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume of ONS prescribed 'too large'</td>
<td>23 (29.4)</td>
</tr>
<tr>
<td>Tired/bored of taking ONS prescribed</td>
<td>19 (24.3)</td>
</tr>
<tr>
<td>Flavour of ONS prescribed not liked</td>
<td>8 (10.2)</td>
</tr>
<tr>
<td>Difficulty collecting/transporting ONS products from the pharmacy</td>
<td>8 (10.2)</td>
</tr>
<tr>
<td>Desired ONS product not available from the pharmacy</td>
<td>5 (6.40)</td>
</tr>
</tbody>
</table>

‡Only includes data from patients who were interviewed directly (n=63).

### 5.4.8 Evidence-based use of ONS

Table 5.5 shows the advice given by health professionals, as reported by patients.

**Table 5.5: Advice given to patients prior to ONS prescription, as reported by patients**

<table>
<thead>
<tr>
<th>Advice patients received prior to receiving ONS</th>
<th>n=78</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient’s weight measured by health professional (reported)</td>
<td>20</td>
<td>25.6</td>
</tr>
<tr>
<td>Patients who received oral food-related dietary advice</td>
<td>20</td>
<td>25.6</td>
</tr>
<tr>
<td>Patients who received written food-related dietary advice</td>
<td>17</td>
<td>21.8</td>
</tr>
<tr>
<td>Patients who were advised on volume of ONS to per day</td>
<td>51</td>
<td>65.3</td>
</tr>
<tr>
<td>Patients who were given choice of ONS type/flavour</td>
<td>16</td>
<td>20.5</td>
</tr>
<tr>
<td>Patients who were allowed to taste ONS prior to prescription</td>
<td>16</td>
<td>20.5</td>
</tr>
</tbody>
</table>

Thirty-seven out of 78 (47%) patients reported seeing their GP in person before receiving their current prescription for ONS. A previous body weight was recorded in the medical records of 17/78 (21.8%) of the patients. Twenty-one patients reported having received dietary advice, of whom 11 said they were advised by a dietitian in
hospital, whereas others received dietary advice from a community dietitian (3/20), community nurse (2/20), GP (2/20), nursing home staff nurse (2/20) or private dietitian (1/20).

5.4.9 Changes to the nutritional care plans of patients after assessment by the community dietitian

The community dietitian recommended discontinuing the patient’s ONS prescription in 31% of cases that were assessed, if the ONS prescription did not fulfil the criteria (Table 5.1). Other changes to ONS prescriptions that were recommended included a reduced volume (14%; 11/78), an increased volume with or without increased energy content (19.2%; 15/78) or a change in product in almost half of the patients (44%), usually to address the problems of taste fatigue or poor compliance.

5.5 Discussion

Two-thirds of ONS prescriptions reviewed in this study fulfilled the prescribing criteria for ONS use in the community. The use of ONS without good evidence of benefit has been reported to account for between 30–70% of ONS prescriptions in studies from the UK (McCombie, 1999; Gale et al., 2001; Gall et al., 2001), and a similar pattern was expected in the present study given the poor provision of resources and training for health professionals in relation to ONS in the community setting in the ROI (Loane et al., 2004) and the lack of national or local prescribing guidelines. The main unforeseen finding was the extent to which “social factors”, such as difficulties with cooking and shopping, affected patients who were prescribed ONS. Similarly, it has been reported that primary healthcare professionals sometimes prescribe ONS for patients who are mildly or moderately malnourished when social circumstances did not
allow modification of food intake in the community setting in the UK (Gall et al., 2001).

Patients’ self-reported compliance in the present study suggests that general adherence with ONS prescriptions was poor, in keeping with the findings obtained elsewhere (Milne et al., 2006). Patients were significantly more likely to report „regular use” of ONS if they lived alone or had difficulties with cooking and shopping, as observed previously by Payette et al. (2002). Perhaps if adequate state and voluntary support services were available to these patients, such as home help assistants or „meals on wheels” or access to day care services, ONS would not need to be prescribed. It is hard to justify the use of ONS in the long-term as an acceptable alternative for patients who could eat normal food if it were available to them, and further work should be carried out to investigate the cost-effectiveness of ONS being used in this manner.

The present study identifies the relative roles of various healthcare professionals in determining the use of ONS in the community. Patients reported that GPs were the most common healthcare professionals to recommend ONS, whereas Practice Nurses appeared to have a lesser role. Community nurses sometimes recommended ONS, although their influence in the present study was less than expected, given that they were reported by GPs to be an important influence in a previous Irish study (Loane et al., 2004). Community nurses were the most accessed healthcare professional group by free-living patients participating in the present study, which was also found in a nationally representative Irish study (Mcgee et al., 2005). The influence of any one of the health professions may be underestimated in the present study because many patients could not remember who recommended their use of ONS.

Although the sample size in the present study was relatively small, the study population characteristics are similar to those found in larger studies in the UK (Munroe
et al., 1998; Gale et al., 2001; Murdock et al., 2002). The majority of patients prescribed ONS in the community were elderly women with multiple chronic diseases, most commonly ischaemic heart disease. Patients needing ‘palliative care’, or those with ‘chronic ulcers or wounds’, were not in the majority, in contrast to that reported by health professionals in a previous Irish study (Loane et al., 2004). It is possible that these conditions may have been underrepresented in our study sample. The dominance of one type of ONS being prescribed (high-energy milk-based sip feeds [6.27 kJ m L\(^{-1}\) (1.5 kcal m L\(^{-1}\)]) reflects Irish national prescribing trends (NMIC, 2004) and has been observed in studies in the UK (Gale et al., 2001).

Evidence from meta-analysis suggests that there is a greater indication for prescribing ONS to patients with a BMI < 20 kg m\(^{-2}\) because this achieves more significant clinical and functional benefits (Stratton et al., 2003). However, BMI alone is insufficient as a clinical indicator for prescription of ONS, and should be considered in the context of a more detailed nutritional assessment by a trained healthcare professional. Available clinical guidelines (NICE, 2006) and results of meta-analysis (Milne et al., 2006) suggest that ONS should be prescribed to patients who are ‘malnourished’ or ‘at risk’ of malnutrition. In the present study, the majority of patients prescribed ONS did not satisfy these indications because less than half (n = 36, 46%) had a BMI < 20 kg m\(^{-2}\), and even fewer (n = 31, 39.7%) were found to be ‘at risk of malnutrition’ according to the MUST criteria (Elia, 2000). These observations are comparable with studies of patients prescribed ONS in the community in the UK, in which 34–59% patients had a BMI< 20 kg m\(^{-2}\) (Gale et al., 2001; Gall et al., 2001). Also in keeping with previous UK studies (McCombie, 1999; Gale et al., 2001; Gall et al., 2001), ONS were prescribed to some weight-stable, overweight (BMI > 25 kg m\(^{-2}\)) and clinically obese patients (BMI > 30 kg m\(^{-2}\)) in the present study. As reported
previously (Munroe et al., 1998; McCombie, 1999; Gale et al., 2001; Jones, 2003), the
recommended nutritional assessment methods (e.g. anthropometric measurements,
assessment of current and usual dietary intake and nutrition screening tools) were rarely
used by medical and nursing practitioners in the community setting in the present study.

Gastrointestinal and other symptoms were recorded in the present study as part
of the dietitian’s nutritional assessment of the underlying causes of malnutrition and
poor appetite (NPC, 1998a; Ritchie et al., 2000; Suominen et al., 2005), with the most
common being ‘constipation’. Some studies have reported gastrointestinal symptoms
during trials of ONS (Milne et al., 2006), although it was not possible to distinguish
whether any of the symptoms reported by patients in the present study were the result of
underlying clinical problems or the use of ONS.

In addition, many patients had ONS prescribed for more than 6 months without
review and so they were not monitored in a structured manner. At the time of the
present study, there were no published local or national criteria in the ROI for
discontinuation of ONS when they are no longer needed, as has been recommended in
expert guidelines (NICE, 2006).

Only a small proportion of patients reported that they had received dietary
advice from health professionals prior to or at the time of ONS prescriptions, which is
in keeping with other community-based studies (McCombie, 1999; Gall et al., 2001).
Meta-analyses have noted that there is insufficient evidence for the relative benefits of
dietary advice either alone or in combination with ONS (Stratton et al., 2003; Baldwin
& Weekes, 2008), with the conclusion that there are insufficient randomised control
trials in the community setting to make specific recommendations. However, NICE
guidance (2006) recommends that, until further evidence is available, food-related
dietary advice should be included in the treatment of malnourished patients.
Although the majority of patients who were referred by GPs to the community dietetic service were recruited to the present study, when compared with central prescription records, the study sample only represented 47% of patients who were prescribed ONS by the GP sample during the study period. This was lower compared to similar studies in the UK where recruitment rates of 52% (McCombie, 1999) and 66% (Gall et al., 2001) were achieved. In both of these studies, computerised general practice databases were used to identify patients prescribed ONS. Only three of the 10 GPs in the present study had computerised data management systems for patient’s prescriptions; therefore, our rates depended solely on the consistency of referral by individual GPs. In particular, there was a notable shortage of patients recruited from the younger adult age group (16–65 years of age) and males of all ages. There may be issues related to the younger adult age group and ONS use, which have not been revealed by the present study. In theory, one such issue might be the use ONS in association with drug and alcohol addiction, as previously reported by McCombie (1999) in a UK-based study; however, there was no evidence of such usage in the present study.

The findings obtained in the present study support the currently available evidence suggesting there is a need for targeted educational interventions for community-based health professionals to promote ‘evidence-based’ use of ONS. Irish GPs and community nurses have indicated that they would like to receive further education about ONS (Loane et al., 2004). Gall et al. (2001) conducted an educational intervention for GPs and practice nurses in the UK and found that more suitable and cost effective use of ONS resulted from the intervention.

A co-ordinated education intervention should be conducted, incorporating clinical guidelines and the use of a validated nutritional screening tool, such as MUST
(Elia, 2000), and involving all groups of health professionals known to influence the prescribing of ONS, particularly community nurses and staff nurses in private nursing homes. The benefits of introducing a dietetic referral service for GPs in tandem with such an intervention should also be investigated because this would address the current lack of dietary advice available for patients at risk of malnutrition. The potential for monetary savings through reducing ‘unnecessary’ prescribing of ONS needs to be evaluated in the context of the increased resources required to implement educational interventions for healthcare personnel and to improve the provision of more suitable food-based nutritional supports in the community setting. Future studies of prescribing practice should encompass social indications for the use of ONS, in addition to the more widely-used clinical indicators, such as diagnostic category or nutrition screening results. The issue of ‘social’ ONS prescribing should also be addressed in future education interventions for health professionals in the community to determine whether increased awareness and provision of social services to patients would have any effect on ONS prescribing.

5.6 References


5.7 Supporting information

Interview Assisted Questionnaire
<table>
<thead>
<tr>
<th><strong>Interviewer Assisted Questionnaire</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient information sheet provided: yes/no</td>
</tr>
<tr>
<td>Consent received: yes/no</td>
</tr>
<tr>
<td>Date:</td>
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</table>

### Section A: Patient Details

<table>
<thead>
<tr>
<th>Name /Patient ID number</th>
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</thead>
<tbody>
<tr>
<td>Date of Birth</td>
</tr>
<tr>
<td>Sex</td>
</tr>
<tr>
<td>Place of Residence</td>
</tr>
<tr>
<td>Diagnoses</td>
</tr>
<tr>
<td>Current Medications</td>
</tr>
<tr>
<td>Have you/the patient recently been discharged from hospital?</td>
</tr>
<tr>
<td>Approx discharge date………………………………</td>
</tr>
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### Section B: Carer Details

<table>
<thead>
<tr>
<th>Is the patient competent/able to answer the questionnaire?</th>
<th>Yes</th>
<th>No</th>
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</thead>
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<tr>
<td>If no why?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Details of person interviewed if not the patient.</td>
<td>Name:</td>
<td>Address:</td>
</tr>
<tr>
<td>Relationship to patient</td>
<td></td>
<td></td>
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### Section C: Results of MUST and nutritional assessment details

<table>
<thead>
<tr>
<th>Measured body weight (kg)</th>
<th>..........kg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Usual weight (kg)</td>
<td>..........kg</td>
</tr>
<tr>
<td>Reported ............</td>
<td>Reported in medical chart yes........kg/no</td>
</tr>
<tr>
<td>Height directly measured(m)</td>
<td>..........m</td>
</tr>
<tr>
<td>Or Estimated from Ulna length (m)</td>
<td>..........m</td>
</tr>
<tr>
<td>BMI (weight (kg)/height (m)^2) score from direct measurements.</td>
<td>..........m^2</td>
</tr>
<tr>
<td>OR Estimated from MUAC</td>
<td>..........m^2</td>
</tr>
<tr>
<td>Unplanned weight loss in the past 3-6 months score (kg) and Score</td>
<td></td>
</tr>
<tr>
<td>Acute disease effect score</td>
<td></td>
</tr>
<tr>
<td>Overall risk of malnutrition</td>
<td>Low/Medium/ High Risk</td>
</tr>
<tr>
<td>Relevant Blood Results Available :</td>
<td></td>
</tr>
<tr>
<td>Do you take any exercise?</td>
<td>Yes</td>
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<tr>
<td>Details</td>
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<tr>
<td>Patients Activity Level</td>
<td>Bed bound</td>
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<tr>
<td>Ambulant</td>
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<tr>
<td>Estimated Energy Requirements</td>
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<td>Disease specific Requirements</td>
<td>Details</td>
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<td></td>
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</table>


### Section D: 24 Hour Recall Food and Oral Nutritional Supplements

<table>
<thead>
<tr>
<th>Est. Time</th>
<th>Food description</th>
<th>Volume (mls)</th>
<th>Quantity (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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</tr>
<tr>
<td>Totals</td>
<td></td>
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</tr>
</tbody>
</table>

Is the day that you have described the same as what you have been eating and drinking over the last number of days?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
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<tbody>
<tr>
<td>Comments</td>
<td></td>
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</tbody>
</table>

Do you take a drink /alcohol?
If yes how many per day /week

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
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</thead>
<tbody>
<tr>
<td>Estimated units per week</td>
<td></td>
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</table>

### Section E: Factors Influencing Nutritional Intake

Have you/the patient experienced any of the following symptoms in the past number of weeks?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea /Feeling queasy or as if you are going to get sick.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vomiting /Getting sick</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unusual tastes in your mouth when eating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sore mouth /Mouth ulcers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry mouth</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diarrhoea</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constipation (Less than 3 bowel movements per week)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart burn/Acid reflux</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty in swallowing food (coughing after eating, food sticking, change in speech after eating.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Difficulty in chewing food</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problems with dentures</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Feeling of fullness/bloating after eating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stomach cramps/pain during or after eating</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any other problems you feel may be affecting you’re the amount of food you are able to eat?</td>
<td>Details</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If yes was answered to any of the above?

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you /the patient avoiding any particular foods due to these problems?</td>
<td>Details</td>
<td></td>
</tr>
</tbody>
</table>

132
Section F: Details of Oral Nutritional Supplement Prescription

<table>
<thead>
<tr>
<th>ONS name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Company/manufacturer</td>
<td></td>
</tr>
<tr>
<td>Length of current prescription</td>
<td>Weeks</td>
</tr>
<tr>
<td>Total amount prescribed (total volume/prescription?)</td>
<td></td>
</tr>
<tr>
<td>Amount prescribed per day?</td>
<td>Specified …………/Not specified Details</td>
</tr>
<tr>
<td>Initial or repeat prescription: Is this your/the patient’s first prescription for a nutritional supplement?</td>
<td>Initial Repeat Unsure</td>
</tr>
<tr>
<td>Who recommended that you/that the patient should take the supplement you are prescribed at the moment?</td>
<td></td>
</tr>
<tr>
<td>What was the reason that this person advised you to start to take the supplement?</td>
<td>To gain weight Other</td>
</tr>
<tr>
<td>Have you been reviewed by a dietitian since receiving your prescription</td>
<td>Details</td>
</tr>
<tr>
<td>Did you speak to your GP in person before receiving this prescription?</td>
<td>Yes No Details …………</td>
</tr>
<tr>
<td>Were you/the patient given any advice (written, oral or both) on the foods you should eat along with taking your supplement? If so by whom</td>
<td></td>
</tr>
<tr>
<td>Were you/the patient given a leaflet or booklet about the supplement?</td>
<td>Yes /No Unsure……………………………..</td>
</tr>
<tr>
<td>Were you given any other advice about your supplement?</td>
<td></td>
</tr>
<tr>
<td>Were you/ the patient given a choice of the type of supplement?</td>
<td>Type : Yes Pudding/ Milk / juice /other ………… No Flavour Yes/No Any other …………………………………..</td>
</tr>
<tr>
<td>Were you asked what flavours you like or if you preferred a milky or juice type drink?</td>
<td></td>
</tr>
<tr>
<td>Were you/the patient allowed to taste the supplement before you were given your prescription?</td>
<td>Yes / No Can’t remember</td>
</tr>
<tr>
<td>Can you remember if you were weighed by anyone before you got your prescription? If yes do you remember what your weight was?</td>
<td>Yes No Unsure Reported Weight ………………………………..</td>
</tr>
<tr>
<td>Body weight available in the medical chart</td>
<td>Yes No Details:</td>
</tr>
</tbody>
</table>
### Section G: Compliance ONS prescription

<table>
<thead>
<tr>
<th>Question</th>
<th>YES</th>
<th>No</th>
<th>Unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much of the supplement are you/the patient managing to take per day?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are you having any problems with taking your supplement?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What time of day do you usually take your supplement?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you ever take your supplement instead of meals?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If yes to above. How often do you use your supplement instead of meals?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Section H: Lifestyle factors

<table>
<thead>
<tr>
<th>Question</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you smoke?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Occupation</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Section 1: For Patients Living In the Community

<table>
<thead>
<tr>
<th>Details of Co-Habitants</th>
<th>Lives alone</th>
<th>Lives with others (specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you receive any of the following services?</td>
<td>Speech Therapy</td>
<td>Social Work</td>
</tr>
<tr>
<td></td>
<td>Home Help</td>
<td>PHN visits</td>
</tr>
<tr>
<td></td>
<td>Day Care Centre</td>
<td>MOW</td>
</tr>
<tr>
<td></td>
<td>Physiotherapy</td>
<td>Dietitian</td>
</tr>
<tr>
<td></td>
<td>Dentist</td>
<td>Occupational Therapist</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td></td>
</tr>
<tr>
<td>To your knowledge are you currently on a awaiting referral to any of these services/or have been refused any of these services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you shop for your own food?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>If yes do you have any difficulties shopping for yourself?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Do you cook most of your own meals?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>If yes do you have any difficulties cooking for yourself?</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>How often do you eat alone? Do you usually eat with the rest of the family /in the dining room?</td>
<td></td>
<td>no of days per week</td>
</tr>
<tr>
<td>Do you always have enough money for the food you need?</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
CHAPTER 6

EVALUATION 6-MONTHS AFTER INTERVENTION

AN EVALUATION OF A COMMUNITY DIETETICS INTERVENTION ON THE MANAGEMENT OF MALNUTRITION FOR HEALTHCARE PROFESSIONALS.


6.1 Abstract 136
6.2 Introduction 137
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6.5 Discussion 150
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6.7 Supporting Information 158
6. An evaluation of a community dietetics intervention on the management of malnutrition for healthcare professionals

6.1 Abstract

Background: Healthcare professionals working in the community setting have limited knowledge of the evidence-based management of malnutrition. The present study aimed to evaluate a community dietetics intervention, which included an education programme for healthcare professionals in conjunction with the introduction of a community dietetics service for patients „at risk’ of malnutrition. Changes in nutritional knowledge and the reported management of malnourished patients were investigated and the acceptability of the intervention was explored.

Methods: An education programme, incorporating „Malnutrition Universal Screening Tool (MUST)” training, was implemented in eight of 10 eligible primary care practices (14 general practitioners and nine practice nurses attended), in seven private nursing homes (20 staff nurses attended) and two health centres (53 community nurses attended) in conjunction with a community dietetics service for patients at risk of malnutrition. Nutritional knowledge was assessed before, immediately after and 6 months after the intervention using self-administered, multiple-choice questionnaires. Reported changes in practice and the acceptability of the education programme were considered using self-administered questionnaires 6 months after the intervention.

Results: A significant increase in nutritional knowledge 6 months after the intervention was observed (P < 0.001). The management of malnutrition was reported to be improved, with 69% (38/55) of healthcare professionals reporting to weigh patients „more frequently”, whereas 80% (43/54) reported giving dietary advice to prevent or
treat malnutrition. Eighty-percent (44/55) of healthcare professionals stated that „MUST” was an acceptable nutrition screening tool.

**Conclusion:** An education programme supported by a community dietetics service for patients „at risk” of malnutrition increased the nutritional knowledge and improved the reported management of malnourished patients in the community by healthcare professionals.

### 6.2 Introduction

Malnutrition is frequently under-recognised in the community setting (Elia *et al*., 2005). The importance of screening for malnutrition has been highlighted by expert groups [Malnutrition Advisory Group (MAG), 2003; National Institute for Health and Clinical Excellence (NICE), 2006; Volkert *et al*., 2006]. Malnutrition has many negative consequences that affect both the individual and the health service, such as delayed recovery from illness, poorer treatment outcomes, increased need for healthcare provision in the home, more frequent general practitioner (GP) visits, more hospital admissions, and longer hospital stays (MAG, 2003). It is recommended that nutrition screening should have multidisciplinary responsibility and that a consistent tool or criteria should be used by all healthcare professionals to identify malnutrition or risk of malnutrition (MAG, 2003).

Expenditure on oral nutritional supplements (ONS), a commonly used treatment for malnutrition, has been growing steadily over the past number of years and was estimated to cost the Irish Health Service Executive (HSE) approximately €28 million in 2008 (Barry, 2009). In a recent study of ONS prescribing practices in the Irish community setting (Kennelly *et al*., 2009), approximately one-third of patients were „unnecessarily” prescribed ONS. As a result of these findings, a community dietetics
intervention that included a nutritional education programme for healthcare professionals and the instigation of a community dietetics service for patients ‘at risk’ of malnutrition was developed. Evidence from Irish and UK settings has shown that the management of malnutrition and the prescribing of ONS by healthcare professionals are largely not ‘evidence-based’ or in accordance with expert guidelines. Healthcare professionals receive little training on the management of malnutrition and access to literature on its management predominantly comes from sales representatives from companies selling clinical nutrition products (McCombie, 1999; Gale et al., 2001; Gall et al., 2001; Loane et al., 2004). Healthcare professionals working in the community setting have previously expressed an interest in improving their knowledge about the management of malnutrition and the appropriate prescribing of ONS (Loane et al., 2004), although the effectiveness and acceptability of methods to do so have not been established. However, the delivery of education programmes to healthcare professionals at their place of work, also known as ‘education outreach’ or ‘academic detailing’, has been shown to be effective in increasing the knowledge and improving the practice of healthcare professionals in other settings (Welschen et al., 2004; Madigan, 2005; Midlov et al., 2006).

The present study aimed to evaluate a dietetics intervention designed for healthcare professionals working in the community setting (i.e. GPs, practice nurses, community nurses and private nursing home staff nurses). Changes in knowledge resulting from the intervention, reported changes in practice related to the management of malnutrition and the acceptability of the education programme and resources used, including the ‘Malnutrition Universal Screening Tool (MUST)’ tool (MAG, 2003), were established.
6.3 Materials and methods

6.3.1 Study setting
The present study was carried out in 2006 and 2007, in one county in the midlands of the Republic of Ireland with a population of approximately 79 000 people (11% >65 years of age) (Central Statistics Office, 2006) and 42 individual GPs registered with the HSE primary care unit. Ethical approval was received from the Dublin Institute of Technology and the HSE Dublin Mid-Leinster research ethics committees. Before commencement of the study, no GP practice, community nurse or private nursing home had access to an HSE-funded community dietetics service for patients ‘at risk’ of malnutrition.

6.3.2 Participants in community dietetics intervention
Healthcare professionals were eligible to participate in the community dietetics education intervention if the primary care practice or private nursing home where they worked was involved in the earlier study that had investigated ONS prescribing practices (Kennelly et al., 2009). Participants included staff (GPs and practice nurses) from 10 primary care practices, staff nurses from seven private nursing homes and all community nurses (n = 53) working in the county where the study took place.

6.3.3 Community dietetics intervention

6.3.3.1 Content and format of the nutrition education programme
An outline of the format and content of the education programme delivered to each health professional group is shown in Table 6.1.
Table 6.1: Outline of the education programme delivered to each healthcare professional group and number of participating healthcare professionals

<table>
<thead>
<tr>
<th>Description of type and size of healthcare professional group</th>
<th>Length &amp; Timing Of Programme</th>
<th>Location</th>
<th>Format</th>
<th>Summary of Content</th>
<th>Number of Healthcare Professionals (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Practitioners &amp; Practice Nurses</td>
<td>1 hour Lunchtime</td>
<td>GP practice</td>
<td>PowerPoint Presentation, Case studies</td>
<td>Underlying causes of malnutrition, Patients ‘at risk’ of malnutrition, Indications for use of ONS, Simple ‘high protein high energy’ dietary advice, Use of ‘MUST’ Case studies</td>
<td>n=15/17 GPs, n=9/10 Practice Nurses from 10 GP practices</td>
</tr>
<tr>
<td>(1-5 per group)</td>
<td>Content: 45min theory 15min practical</td>
<td></td>
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</tr>
<tr>
<td>Community Nurses</td>
<td>3 hours Afternoon</td>
<td>Health centre</td>
<td>Power-point presentation, Group work, Case studies</td>
<td>Theory as for GPs and practice nurses, Discussion of dietary advice, Practical content based on healthcare professionals working in groups of 5-6/ community dietitian facilitator, Use of ‘MUST’*, Surrogate measurements for BMI and height Case studies</td>
<td>n=53/53 Community Nurses</td>
</tr>
<tr>
<td>(10-15 per group)</td>
<td>Content: 75min theory 90min practical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nursing Home Staff Nurses</td>
<td>1.5 hours Afternoon</td>
<td>Nursing home</td>
<td>Power point presentation, Group work, Case studies</td>
<td>Theory as for GPs and practice nurses, Practical content as for community nurses</td>
<td>n=20 Staff Nurses from 7 nursing homes</td>
</tr>
<tr>
<td>(1-6 per group)</td>
<td>Content: 60min theory 30min practical</td>
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</tr>
</tbody>
</table>

BMI, body mass index; GP, general practitioner
* ‘MUST’ Malnutrition Universal Screening Tool (MAG, 2003)
The format and content were developed after consultation with the health professional groups for whom the programme was designed and was based on previous Irish and UK studies on the nutritional knowledge and malnutrition management practices of community-based healthcare professionals (McCombie, 1999; Gall et al., 2001; Loane et al., 2004), clinical guidelines from expert bodies (NICE, 2006; Volkert et al., 2006) and current evidence for ONS use in the community setting (Stratton & Elia, 2000; Milne et al., 2005). The format and resources for the education programme were developed and tailored to each healthcare professional group (Table 6.1). One community dietitian (SK) facilitated each educational programme with support for practical group work from other community dietitians. The resources developed included a folder containing the theoretical content of the education programme (Table 6.1), case studies, and copies of two advice booklets for patients, „Eating when you have a small appetite”, which contained simple advice on how to achieve higher energy and protein intakes and „A guide to using oral nutritional supplements”, which contained advice on how to incorporate ONS into the diet. Both booklets were written specifically for this intervention. Each healthcare professional was also provided with a copy of „MUST” (MAG, 2003).

6.3.3.2 Community dietetics service for patients „at risk” of malnutrition.

Each primary care practice and private nursing home participating in the education programme was offered access to a new community dietetic referral service for patients „at risk” of malnutrition. Healthcare professionals who attended the education intervention were encouraged to nutritionally screen patients using „MUST” (MAG, 2003) and refer patients „at risk” of malnutrition to the community dietetics service. It
was also recommended that all patients with current ONS prescriptions, regardless of „MUST” risk category, should be referred to the community dietitian for review.

6.3.4 Evaluation of community dietetics intervention

Evaluation of the nutrition education programme was carried out using the three self-administered questionnaires described below; the timing of the administration of these questionnaires is shown in Figure 6.1. A knowledge multiple choice questionnaire (MCQ) was used to evaluate changes in knowledge. MCQs have been recommended to assess changes in the knowledge of health professionals after educational programmes (Ghosh, 2008) and were administered at three time points (Figure 6.1).
Figure 6.1: Overview of the study design and evaluation including participation rates

<table>
<thead>
<tr>
<th>Pre-Intervention</th>
<th>Self-administered knowledge questionnaire (MCQ*) (n=87/96, 91%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education Programme (n=96 participants)</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td>Immediately Following Education Programme</td>
<td>Self-administered questionnaires to assess knowledge (MCQ*) and acceptability of programme (n=91/96 for both, 95%)</td>
</tr>
<tr>
<td>Introduction of Community Dietetics Service for Patients ‘at risk’ of Malnutrition</td>
<td><img src="image" alt="Diagram" /></td>
</tr>
<tr>
<td>6-Months Following the Intervention</td>
<td>Self-administered questionnaires to assess knowledge (MCQ*) (n=57/96, 59%) and evaluate malnutrition management practice (n=55/96, 57%)</td>
</tr>
</tbody>
</table>

MCQ=multiple choice questionnaire  
n=number of health professionals

The MCQ consisted of eight questions and evaluated the effectiveness of the education programme in delivering key learning points. Possible answers were modelled on the responses of healthcare professionals in previous studies (McCombie, 1999; Gall *et al.*, 2001; Loane *et al.*, 2004).

Participants were required to add their initials to the MCQ to make them identifiable for statistical analysis. A question that determined any previous education or training healthcare professionals had received about ONS was also included when the
questionnaire was first administered (i.e. before the intervention). The MCQ (Supporting Information, Appendix S1) was pilot-tested with a mixed group of healthcare professionals prior to its use in the present study. Reported practices relating to the management of malnutrition were investigated 6 months after the education programme using a self-administered questionnaire containing both open and closed questions (Supporting Information, Appendix S2).

This evaluation included questions about the provision of simple dietary advice to patients “at risk of malnutrition” and how ONS should be used. Healthcare professionals were also asked to report any difficulties they experienced in giving dietary advice to patients.

The acceptability of the education programme itself was assessed using a self-administered questionnaire immediately after the delivery of the programme (Supporting Information, Appendix S3). This questionnaire included questions on the format, content, and method of delivery of the education programme. This questionnaire was completed anonymously. The acceptability of the resources provided during the education programme to healthcare professionals including „MUST” (MAG, 2003) was determined as part of the self-administered questionnaire 6 months after the intervention (Supporting Information, Appendix S2).

Six months after the introduction of the community dietetics service for patients „at risk” of malnutrition, referral forms received via the new referral pathway based on „MUST” (MAG, 2003) were reviewed (by SK) to determine the number and source of referrals and to establish the location where patients were reviewed by the community nutrition and dietetics service.
6.3.5 Statistical analysis

Data were entered into SPSS for Windows, version 15 (SPSS Inc., Chicago, IL, USA) database and then analysed. The Friedman test was used to determine if nutritional knowledge was significantly different across the three time periods (before, immediately after and 6 months after the intervention programme). Wilcoxon signed rank tests were used to identify differences in nutritional knowledge from before the education programme to immediately after it was delivered, and from before the programme to 6 months after it’s delivery.

6.4 Results

6.4.1 Participation in nutrition education programme and evaluation of intervention

A total of 96 (10 male and 86 female) healthcare professionals participated in the education programme (Table 6.1). These healthcare professionals reported working in the community setting for a mean (SD) of 11.9 (8.87) years. The percentage completing the evaluation questionnaires at each time point is shown in Fig. 6.1. Reasons for non-completion of questionnaires immediately before or after the education programme were late arrival (9/96) or early departure (5/96) as a result of clinical workload. Reasons for non-completion of questionnaires 6 months after the education programme included not wishing to complete (5/96), no longer working in the position (20/96), on annual leave during the study period (5/96) and uncontactable (11/96).
6.4.2 Participants’ previous education on ONS

Forty-one of 96 (43%) healthcare professionals reported receiving previous education or training on ONS. Thirty seven healthcare professionals from this group gave further detail about the type of education or training they had received: ‘Visits from sales representatives’ was the most frequently reported response (33/37, 89%), with ‘Attending study days’ reported by a small number (4/37).

6.4.5 Evaluation of changes in nutritional knowledge

Nutritional knowledge at all three time points (i.e. before, immediately after, and 6 months after the intervention) was assessed in 54% (52/96) of healthcare professionals who participated in the education programme. Table 6.2 shows the differences in mean knowledge scores during the three time periods for GPs, nurses and the full group (n = 52).

Table 6.2: Mean knowledge scores for health professionals for whom matched data were available at all three time points

<table>
<thead>
<tr>
<th>Health Professional Group (n=52)</th>
<th>Pre-Education Programme</th>
<th>Post-Education Programme</th>
<th>Six Months Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean Rank</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td>General Practitioners (n=10)</td>
<td>3.3 (2.21)</td>
<td>1.10</td>
<td>7.6 (0.51)</td>
</tr>
<tr>
<td>Nurses (n=42)</td>
<td>4.1 (1.6)</td>
<td>1.18</td>
<td>6.8 (1.2)</td>
</tr>
<tr>
<td>Total Group (n=52)</td>
<td>3.9 (1.73)</td>
<td>1.16</td>
<td>6.9 (1.15)</td>
</tr>
</tbody>
</table>

*Friedman Test (p<0.05)
‘Nurses’ includes community nurses, practice nurses and staff nurses in private nursing homes
There was a significant improvement in the mean knowledge score across the three time periods ($\chi^2 = 68.7, P < 0.05$) for the full group. When nutritional knowledge at specific time points was tested, a significant increase occurred from baseline (pre-intervention) to immediately after the education programme ($z = -7.625, P < 0.001$) and from baseline to 6 months after the dietetics intervention ($z = -5.535, P < 0.001$).

6.4.5 Reported malnutrition management practices 6 months after the community dietetics intervention

Reported practices related to the management of malnutrition by healthcare professionals 6 months after the dietetics intervention are shown in Table 6.3.
Table 6.3: Management of malnutrition practices reported by healthcare professionals six months after the intervention

<table>
<thead>
<tr>
<th>Management practice</th>
<th>Always (n=43)</th>
<th>Sometimes (n=19)</th>
<th>Never (n=4)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Do you give dietary advice to patients who are at risk of malnutrition?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Practitioners (n=10)</td>
<td>7 (70)</td>
<td>1 (10)</td>
<td>2 (20)</td>
</tr>
<tr>
<td>Nurses (n=44)</td>
<td>36 (82)</td>
<td>7 (16)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Total Group (n=54)</td>
<td>43 (80)</td>
<td>8 (15)</td>
<td>3 (5)</td>
</tr>
<tr>
<td><strong>Do you give advice to patients on how ONS should be used?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Practitioners (n=10)</td>
<td>7 (70)</td>
<td>1 (10)</td>
<td>2 (20)</td>
</tr>
<tr>
<td>Nurses (n=43)</td>
<td>18 (42)</td>
<td>10 (23)</td>
<td>15 (35)</td>
</tr>
<tr>
<td>Total Group (n=53)</td>
<td>25 (47)</td>
<td>11 (21)</td>
<td>17 (32)</td>
</tr>
<tr>
<td><strong>Do you review the progress of patients to whom you have prescribed ONS?</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Practitioners (n=10)</td>
<td>6 (60)</td>
<td>2 (20)</td>
<td>2 (20)</td>
</tr>
<tr>
<td>Nurses (n=44)</td>
<td>24 (55)</td>
<td>9 (20)</td>
<td>11 (25)</td>
</tr>
<tr>
<td>Total Group (n=54)</td>
<td>30 (56)</td>
<td>11 (20)</td>
<td>13 (24)</td>
</tr>
<tr>
<td>Reported to have used the ‘MUST’* since the education programme?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Practitioners (n=10)</td>
<td>5 (50)</td>
<td>5 (50)</td>
<td>0</td>
</tr>
<tr>
<td>Nurses (n=45)</td>
<td>30 (66)</td>
<td>14 (31)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Total Group (n=55)</td>
<td>35 (64)</td>
<td>19 (35)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Have you referred patients ‘at risk’ of malnutrition to the community dietitian using the ‘MUST’ referral pathway?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Practitioners (n=10)</td>
<td>8 (80)</td>
<td>2 (20)</td>
<td>0</td>
</tr>
<tr>
<td>Nurses (n=43)</td>
<td>23 (53)</td>
<td>19 (44)</td>
<td>1 (3)</td>
</tr>
<tr>
<td>Total Group (n=53)</td>
<td>31 (58)</td>
<td>21 (38)</td>
<td>1 (2)</td>
</tr>
<tr>
<td><strong>Do you weigh patients ‘more frequently since you received the training?’</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Practitioners (n=10)</td>
<td>7 (70)</td>
<td>1 (10)</td>
<td>2 (20)</td>
</tr>
<tr>
<td>Nurses (n=45)</td>
<td>31 (71)</td>
<td>12 (27)</td>
<td>2 (2)</td>
</tr>
<tr>
<td>Total Group (n=55)</td>
<td>38 (69)</td>
<td>13 (24)</td>
<td>4 (7)</td>
</tr>
</tbody>
</table>

* „MUST,” Malnutrition Universal Screening Tool (MAG, 2003)
„Nurses” includes community nurses, practice nurses and staff nurses in private nursing homes

The majority of healthcare professionals (80%; n = 43) reported always providing dietary advice to patients. The type of dietary advice most frequently stated as provided
included the provision of dietary advice to patients using the information contained in
the „small appetite patient advice booklet’ (n = 20). Other dietary advice offered
included eating small, frequent meals (n = 11) and fortification of food (n = 9).
Difficulties reported by healthcare professionals in providing patients with dietary
advice included „lack of co-operation from patients’ (n = 12), „social factors’ (n = 12),
and „lack of time’ (n = 8). „Patients living alone with poor support’ (n = 7), „dementia/cognitive decline’ (n = 6) and „clínical depression’ (n = 6) also presented
difficulty for healthcare professionals when providing dietary advice. After the
community dietetics intervention, consultation with the dietitian was the most common
factor reported to influence the prescribing of ONS (n = 14). Low body mass index
(BMI) or a BMI below 20 kg m–2 (n = 13), unintentional weight loss (n = 10), the use
of „MUST’ (n = 9) and poor appetite/dietary intake (n = 8) also influenced the decision
to prescribe or recommend ONS. Advice provided specifically about ONS included „not
using ONS as a meal replacement’ (n = 7). Recommendations on the volume (n = 5)
and timing of ONS (n = 5) were also provided after the dietetics intervention.
Measurement of body weight (n = 12) was the most commonly reported practice for
monitoring patients prescribed ONS. Six months after the dietetics service for patients
„at risk’ of malnutrition had been initiated at the eight primary care practices who
participated in the intervention, 90 patients had been reviewed by the community
dietitian. The majority of referrals (42%; 38/90) were made by a GP, 22% (20/90) by
community nurses, 14% (12/90) by staff nurses in nursing homes, 12% (11/90) by
practice nurses, and 10% (9/90) by dietitians in acute hospitals in the geographical area.
The largest number of patients referred were seen in the GP practice (n = 36; 40%)
although one-third (n = 31; 34%) were seen on a domiciliary visit and one-quarter (n =
23; 26%) were seen in the private nursing home in which they resided.
6.4.6 Acceptability of the nutrition education programme

All (73/73) healthcare professionals who answered the question reported that the format and content of the nutrition education programme was useful. Eighty-nine percent (81/91) gave comments on the „most useful” aspects of the education intervention, which included: „case studies” (n = 16), „underlying causes of malnutrition” (n = 12) and „appropriate use of ONS”. The majority (70/91, 77%) were „satisfied” with the duration of the education intervention, although five would have liked it to be longer, including three community nurses and two nursing home staff nurses. Six healthcare professionals suggested that the intervention could be improved by the inclusion of more case studies. Six months after the intervention, 80% of healthcare professionals (44/55) agreed that „MUST” is an „acceptable” nutrition screening tool to use in their workplace, with 62% (34/55) rating it as „easy” or „very easy” to use. This included 10/10 GPs, 27/34 community nurses, three of five practice nurses and four of six nursing home staff nurses. The reported use of „MUST” by healthcare professionals since the education programme is shown in Table 6.3. A mean rating in the range 4.1–4.6 out of 5 was given to the resources developed for the intervention by the participating healthcare professionals.

6.5 Discussion

Improving the management of malnutrition in the community presents a challenge for the health services and community dietitians. The evaluation of this community dietetics intervention suggests that this type of intervention has beneficial effects on nutritional knowledge results in an improvement in the management of malnutrition, prescription of ONS and monitoring of patients prescribed ONS in the community setting and is acceptable to healthcare professionals. Nutritional knowledge increased
in both GPs and nurses after the education programme and this increase in knowledge appeared to be retained when healthcare professionals were followed up 6 months later. This is in keeping with the findings of other studies that have also reported improvements in nutritional knowledge and practices using this type of education intervention (Cadman & Findlay, 1998; Gall et al., 2001; Madigan, 2005).

The majority of healthcare professionals (both GPs and nurses) surveyed 6 months after the intervention reported having made positive changes to their practice in managing malnutrition, including weighing patients ‘more frequently’, providing simple dietary advice to patients ‘at risk’ of malnutrition and using clinically justifiable reasons to prescribe or recommend ONS. The results of the present study suggest that the management pathway for patients at risk of malnutrition developed by the MAG of the British Association for Parenteral and Enteral Nutrition (MAG, 2003) works well as an onward referral tool to the community dietetic service for patients who are malnourished or ‘at risk’ of malnutrition in the community setting. After the intervention, the present study contrasts favourably with two previous studies carried out in the same geographical region (Loane et al., 2004; Kennelly et al., 2009), both of which show little evidence of nutritional assessment techniques such as weighing patients or the provision of simple dietary advice to patients prescribed ONS. This suggests that there has been a ‘shift’ towards more ‘evidence-based’ practice by healthcare professionals in the region brought about by the intervention.

The acceptability of the nutritional education programme was found to be good because healthcare professionals reported high satisfaction ratings with the format and content of the education programme. Providing targeted education programmes for healthcare professionals within their workplace has previously been reported to be acceptable in other studies involving healthcare professionals (O’Brien et al., 2007).
The healthcare professionals involved in this intervention highly rated the „MUST“ (MAG, 2003). The majority found the „MUST“ to be „user-friendly“ and an acceptable nutrition screening tool; this is in keeping with the findings of a previous study by Stratton et al. (2004) in which the screening tool was also found to be „easy to use“ by healthcare professionals. Although a small number of healthcare professionals reported not using „MUST“ 6 months after the education programme, a possible explanation may be that these healthcare professionals may not have encountered patients who were „at risk“ of malnutrition on a regular basis; for example, some community and practice nurses commented that the majority of their daily work was in the area of child health. With GPs, it was apparent that, in some cases, the task of nutritional screening was delegated to another healthcare professional.

The most common difficulties in providing dietary advice for „malnourished“ patients or those „at risk“ of malnutrition in this study were reported to be „poor patient co-operation“ and a „lack of time“. These two factors have been identified in other studies investigating low professionals (Kushner, 1995; Hiddink et al., 1999; Moore & Adamson, 2002). It was not possible to determine the reasons for „lack of patient co-operation“ reported by the participants in the present study but it could be speculated that it may be related to factors such as dementia, depression, or poor social circumstances, which have been reported in other studies (Browne et al., 1997; Gall et al., 2001; Kennelly et al., 2009).

Although this evaluation demonstrates that changes in practices in relation to the management of malnutrition in the community are achievable when healthcare professionals receive a specifically designed education programme coupled with access to dietetics services, some limitations of the present study must be noted. The sample of GP practices involved was relatively small (n = 8) and some of the findings observed in
the study may not therefore be observed in evaluations of similar education programmes elsewhere. A further challenge encountered in carrying out the evaluation was that there was a relatively high turnover of nursing staff in all settings, although this was particularly the case in nursing homes, which meant that there was a reduction in the number of nurses who completed the evaluation questionnaires 6 months after the intervention. The high turnover of staff suggests that frequent and repeated education programmes are required to maintain high levels of nutritional knowledge, which has considerable implications for manpower planning for community dietetics services as the providers of such training. Recently, the use of a „train the- trainer’ method for educating nursing home staff in the use of „MUST’ was reported as successful (Lee & Scott, 2009); this may offer a possible solution to training needs in the nursing home setting. The findings of the present study suggest that a community dietetics intervention comprised of an education programme supported by a community dietetics service for patients „at risk’ of malnutrition increased the nutritional knowledge and improved the reported management of malnourished patients in the community by healthcare professionals. Evaluation of the actual changes in ONS prescribing practices by auditing patient medical records and the HSE database of ONS prescriptions is required to further verify the effects of this community dietetics intervention.

5.6 References


6.7 Supporting Information

Multiple choice questionnaire
Post-training evaluation satisfaction form
Management of malnutrition in the community training follow-up questionnaire
POST-TRAINING MULTIPLE CHOICE QUESTIONNAIRE
Please Tick the most suitable answers – Only 1 answer in each case
Note: Malnutrition may be taken to mean under-nutrition or a deficiency in energy and nutrients
YOUR NAME/INITIALS: .................................................................

Q1. Which of the following is not a common contributing factor to malnutrition?

a) Liver Disease  

b) Chronic Obstructive Airways Disease  

c) Poor dentition  

d) Well controlled Type 2 Diabetes  

e) Unsure  

Q2. A person who is malnourished is more likely to experience which of the following?

a) A higher risk of ischaemic heart disease  

b) A higher risk of chest infections  

c) A higher risk of developing Type 2 diabetes  

d) A higher risk of developing gout  

e) Unsure  

Q3. If a patient has a poor appetite what type of foods would you encourage them to include at each meal?

a) Foods which are good energy and protein sources e.g. meat, eggs, dairy products  

b) Foods that are high in monounsaturated fats e.g. rapeseed oil  

c) Foods that are low in sugar  

d) Healthy Eating  

e) Unsure
Q4. Current evidence suggests the beneficial effects of Oral Nutritional Supplements e.g. Ensure Plus, Fortisip have been shown to be greatest in which group of patients?

a) Patients with a BMI of less than 20kg/m²
b) Patients who have lost 5% of their body weight
c) Patients who have low albumin levels
d) Patients with a BMI greater than 20kg/m²
e) Unsure

Q5. When determining a patient’s risk of malnutrition what level of weight loss would you consider clinically significant?

a) Greater than 3% weight loss in the past 3-6 months
b) Greater than 2% weight loss in the past 3-6 months
c) Greater than 5% weight loss in the last 3-6 months
d) Greater than 4% weight loss in the last 3-6 months
e) Unsure

Q6. In order to calculate a patient’s Body Mass Index (BMI) what information do you need to know about an individual?

a) Their current body weight in kilograms (kg), height in metres and age in years
b) Their current body weight in kilograms (kg) and height in metres (m)
c) Their current body weight in kilograms (kg) and any recent weight loss
d) Their weight in (kg) and their sex (male or female)
e) Unsure

Q7. How many 200ml cartons/bottles per day of a high energy sip feed (1.5kcal/ml) e.g. Ensure Plus/Fortisip/Fresubin Energy should be prescribed, to add 600 kilocalories (kcs) to a patient's diet.

a) 6
b) 3
c) 2
d) 1
e) Unsure
Q8. How can you tell that a patient is getting enough energy (kcal) from the food they are eating to meet their nutritional requirements.

   a) Their weight remains stable over time
   b) They report ‘having more energy’
   c) They lose less than 2kg body weight in a month
   d) Their appetite improves
   e) Unsure

Q9. Please rate how you found this questionnaire (tick box below preference)

<table>
<thead>
<tr>
<th>Very Easy</th>
<th>Easy</th>
<th>Difficult</th>
<th>Very Difficult</th>
</tr>
</thead>
</table>

THANK YOU FOR YOUR CO-OPERATION
# POST-TRAINING EVALUATION/ SATISFACTION FORM:

<table>
<thead>
<tr>
<th>Health professional job title:</th>
<th>Date:</th>
</tr>
</thead>
</table>

Please tick/circle your preference, or provide a reason where required

1. Did you feel the training session was a suitable length of time  
   YES  NO  UNSURE  
   Any additional comments  
   ……………………………………………………………………………………………………………………………………………

2. What did if anything did you find **most useful** about the session?  
   ……………………………………………………………………………………………………………………………………………

3. What did if anything you find **least useful** about the session?  
   ……………………………………………………………………………………………………………………………………………

4. Were their other topics that needed to be covered  If yes please list these?  
   YES  NO  UNSURE  
   Any additional topics…………………………………………………………  
   ……………………………………………………………………………………………………………………………………………

5. If appropriate can you make any suggestions to improve this training session?  
   ……………………………………………………………………………………………………………………………………………

6. Are there any other comments you would like to make about this training session  
   ……………………………………………………………………………………………………………………………………………
**SECTION 1: RESOURCES**

Q1: Please rate on a scale of 1-5 below (1 = not useful at all and, 5 = very useful), how useful have you found the resources provided to you at this training.

Please tick box under the relevant score for each resource. If you have no opinion or are unsure please tick „Don’t know”

<table>
<thead>
<tr>
<th>Resource</th>
<th>Not useful at all</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Very Useful</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Guide to First line Management of Malnutrition in the Community (Red Coloured Folder)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUST Screening tool (Coloured 6 page pull-out)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>„Eating Well when you have a small appetite” (6 page Colour A4 diet sheet)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>„Using Oral Nutritional Supplements – A Guide for patients” (6 page Colour A4 diet sheet)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MUST results sheet/dietitian referral form (black and white 1 page A4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Q2: Do you have any comments about how any of the above resources might be improved, if so please give details?

…………………………………………………………………………………………..
…………………………………………………………………………………………..
…………………………………………………………………………………………..
…………………………………………………………………………………………..
SECTION 2: MUST SCREENING TOOL

Q3: How often have you personally, used the MUST screening tool since you received training? Please tick √ your best estimate below?

<table>
<thead>
<tr>
<th>√ Please tick one answer below</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have not used the MUST screening tool at all myself</td>
</tr>
<tr>
<td>Between 1 and 5 times</td>
</tr>
<tr>
<td>Between 5 and 10 times</td>
</tr>
<tr>
<td>Between 10 and 20 times</td>
</tr>
<tr>
<td>Greater than 20 times</td>
</tr>
<tr>
<td>Don’t know</td>
</tr>
</tbody>
</table>

Q4: How would you rate the MUST in terms of ease of use? Please tick the box of the most appropriate answer from your experience

Very Easy ☐ Easy ☐ Difficult ☐ Very Difficult ☐ Don’t Know ☐

Q5: Have you ever asked another health professional /colleague to carry out the MUST screening tool on a patient of yours, that you were concerned about?

Yes ☐ No ☐ Don’t Know ☐

Q5a: If you answered yes to Q5, above, can you please give the job title of these person/s in the space below? E.g. a Practice Nurse, a Staff Nurse at a nursing home, a Public health nurse, a GP.

Job title of person I requested to carry out MUST …………………………………………

Q6: Do you personally think MUST tool is an acceptable tool to use in your work setting?

Yes ☐ No ☐ Don’t Know ☐

Q7: If you have any additional comments to make regarding MUST please do so in the space provided below

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………
SECTION 3: PRESCRIBING PRACTICES

Q8: How do you decide that an Oral Nutritional Supplement (e.g. Ensure Plus, Fortisip, and Calogen) is necessary for a patient?

Q9: What do you do if a staff nurse at a nursing home requests a prescription for ONS for a patient?

Q10: What do you do if a Public Health Nurse requests a prescription for ONS for a patient?

Q11: Do you think the frequency with which you recommend/prescribe ONS to patients has changed since you received this training? Please tick one relevant box below.

- I Prescribe/Recommend ONS more often
- I Prescribe/Recommend ONS less often
- No change in how often I recommend/prescribe ONS
- Don’t Know

Q12: Do you personally, give any dietary advice to patients (including written advice or leaflets) who you feel are at risk of malnutrition e.g. Patient who are unintentionally losing weight

- Yes
- No
- Sometimes
- Don’t know

Q13: If YES to Q9, please give a short description of the kind of dietary advice you give (written or oral)?

Q14: What if any, do you feel are the main barriers/difficulties to you giving dietary advice to patients who have lost weight and are at risk of malnutrition?
Q15: Do you personally, weigh patients „more frequently” since you received this training?
Yes ☐  No ☐  Don’t know ☐

Q16: Do you personally give any advice to patient’s who are prescribed ONS about how to use these products (including written advice)?
Yes ☐  No ☐  Sometimes ☐  Don’t know ☐

Q16a: If yes to Q16, can you briefly describe the advice you give (Including any written advice)?

Q17: Do you personally review the progress of patients who are prescribed ONS?
Yes ☐  No ☐  Sometimes ☐  Don’t know ☐

Q18: If yes to Q14 above, how do you review their progress?

Q19: Have you personally, referred any patients to the community dietetic service since you received the MUST training?
Yes ☐  No ☐  Don’t Know ☐

Q20: If you have any additional comments about the training or any other aspects of this questionnaire please do so in space provided below (or on the back of this page).

…………………………………………………………………………………………
…………………………………………………………………………………………
…………………………………………………………………………………………
…………………………………………………………………………………………
CHAPTER 7

EVALUATION AT 12-MONTHS AFTER INTERVENTION

SUSTAINED BENEFITS OF A COMMUNITY DIETETICS INTERVENTION TO IMPROVE ORAL NUTRITIONAL SUPPLEMENT PRESCRIBING PRACTICES.


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7.3 Materials and methods 171
7.4 Results 186
7.5 Discussion 184
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7. Sustained benefits of a community dietetics intervention designed to improve oral nutritional supplement prescribing practices

7.1 Abstract

**Background:** Healthcare professionals working in the community do not always prescribe oral nutritional supplements (ONS) according to best practice guidelines for the management of malnutrition. The present study aimed to determine the impact of a community dietetics intervention on ONS prescribing practices and expenditure 1 year later.

**Methods:** The intervention involved general practitioners (GPs), practice nurses, nurses in local nursing homes and community nurses. It comprised an education programme together with the provision of a new community dietetics service. Changes in health care professionals’ nutrition care practices were determined by examining community dietetics records. ONS prescribing volume and expenditure on ONS were assessed using data from the Primary Care Reimbursement Service of the Irish Health Service Executive.

**Results:** Seven out of 10 principal GPs participated in the nutrition education programme. One year later, screening for malnutrition risk was better, dietary advice was provided more often, referral to the community dietetics service improved and ONS were prescribed for a greater proportion of patients at „high risk’ of malnutrition than before (88% versus 37%; P < 0.001). There was a trend towards fewer patients being prescribed ONS (18% reduction; P = 0.074) and there was no significant change in expenditure on ONS by participating GPs (3% reduction; P = 0.499), despite a 28% increase nationally by GPs on ONS.
Conclusions: The community dietetics intervention improved ONS prescribing practices by GPs and nurses, in accordance with best practice guidelines, without increasing expenditure on ONS during the year after intervention.

7.2 Introduction
Healthcare professionals working in the community setting (primary care physicians and community nurses) in the Republic of Ireland (Loane et al., 2004; Kennelly et al., 2009) and the UK (McCombie, 1999; Gall et al., 2001) receive little formal education about the recognition and management of malnutrition including oral nutritional supplements (ONS). Although guidelines concerning the use of nutrition support for adults (including oral nutrition support) were published by the National Institute for Health and Clinical Excellence in the UK (NICE, 2006), few educational resources are available to provide practical guidance on the prescription of such supplements in the community setting. There is evidence that patients at risk of malnutrition may not be identified in the community setting by healthcare professionals in the Republic of Ireland (ROI) (Loane et al., 2004) or in the UK (Elia et al., 2005) as a result of the absence of routine nutritional screening and clear nutrition care pathways. It has also been suggested that „unnecessary” prescribing of ONS occurs for some patients when the requirement for ONS has not been determined by a dietitian (McCombie, 1999; Gall et al., 2001; Kennelly et al., 2009). The costs per annum associated with disease related malnutrition, estimated at €1.5 billion in the Republic of Ireland for 2007 (N. Rice, 2010, personal communication) and £13 billion in the UK in 2007 (Elia et al., 2010), place a considerable burden on the health services.

The characteristics of patients prescribed ONS in a community setting in the ROI (in 2005) have been described previously, together with the extent of „unnecessary”
prescribing of ONS (Kennelly et al., 2009). In 2006, a community dietetics intervention was developed and implemented in the same midland county in the ROI (Kennelly et al., 2010). The intervention incorporated a nutrition education programme for healthcare professionals and a referral pathway to a community dietetics service based on the presence or risk of malnutrition or on the use of oral nutritional supplements. The results of an initial evaluation (6 months after the intervention) showed an improvement in the knowledge of healthcare professionals who participated in both elements of the intervention, in addition to a self-reported improvement in management of malnutrition and ONS prescribing practices (Kennelly et al., 2010).

The present follow-up study was carried out in 2007 aiming to determine whether the beneficial effects on nutrition care observed 6 months post-intervention were sustained at 1 year post-intervention. Outcome measures included the use of structured screening for malnutrition risk, referral of patients at risk of malnutrition to the community dietetics services, key nutritional care actions, selection of suitable patients for ONS prescriptions and the cost of ONS prescription.

7.3 Materials and methods

7.3.1 Subjects
All general practitioners (GPs) included in the present study worked in medical practices located in one midland county in the ROI. This county had a total of 48 GPs and a population of approximately 79,000 people (11% > 65 years of age) (Central Statistics Office, 2006).

Seventeen of the 48 GPs met the eligibility criteria set for the study in 2005. These criteria specified that GPs should have more than 500 patients eligible for free
general medical services and they must have a consultation room available for a dietetics clinic at their practice premises. Of the 17 eligible GPs approached, 10 agreed to participate in the pre-intervention study and seven continued to be involved during the 1-year post-intervention follow-up study. Three GPs who participated in the pre-intervention study did not complete the nutrition education programme, citing a lack of time. However, because these three GPs consented for their prescribing practices to be reported, this information has been presented to provide contextual contrast.

The nutrition education programme was offered to other GPs and practice nurses working in the same practices, staff nurses in private nursing homes linked to the GP practices and all community nurses in the county in which the study took place. The rationale for including the full range of healthcare professionals in the programme was that other healthcare professionals are important in influencing ONS prescribing decisions by GPs (Loane et al., 2004). Consequently, 96 healthcare professionals participated in the nutrition education programme, comprising 14 GPs from eight practices (of whom seven were the principals whose prescribing was tracked), nine practice nurses, 53 community nurses and 20 staff nurses in nursing homes.

7.3.2 Study design
The post-intervention study was undertaken in 2007, during the same 3 months of the year (June to August inclusive), 2 years after a pre-intervention study undertaken in 2005 (Kennelly et al., 2009) and 1 year after the implementation of a community dietetics intervention in 2006, as described previously (Kennelly et al., 2010). Figure 7.1 illustrates the study design.
7.3.4 The community dietetics intervention

The community dietetics intervention implemented in the study incorporated a nutrition education programme facilitated by a community dietitian within the workplaces of the participating healthcare professionals (i.e. general practices, health centres and private nursing homes) and a dietetics referral service for patients at risk of malnutrition. All sessions of the nutrition education programme were facilitated by the same community dietitian, using standardised presentations and resources. Interactive learning methods were employed and case studies were included. The programme included information on the underlying causes of malnutrition, the effects of malnutrition on the individual,
use of the „Malnutrition Universal Screening Tool” [„MUST”, British Association for Enteral and Parenteral Nutrition (BAPEN), 2003], practical dietary advice for patients with a poor appetite, and the evidence supporting the use of ONS. Advice about diet and ONS were based on standard written resources, which were provided during the education sessions and designed for health professionals to use in consultations with patients. Advice on the monitoring of patients using ONS was also included in the education session. The development, delivery and initial evaluation (after 6 months) of the community dietetics intervention have been described previously (Kennelly et al., 2010).

NICE guidelines on the use of nutrition support in adults (2006) recommend that individuals with disease-related malnutrition should be managed by referral to a dietitian or by staff following dietitian-led protocols with appropriate referral to the dietitian as necessary. The protocol for dietetics referrals in this intervention study was consistent with these guidelines. Patients were prescribed ONS on the recommendation of a community dietitian after a full nutritional and dietetics assessment. The main indication for prescribing ONS was that the patient was found to be malnourished or at risk of malnutrition according to internationally accepted criteria (NICE, 2006; Volkert et al., 2006). The criteria used to recommend ONS prescriptions in the present study have been described in detail elsewhere (Kennelly et al., 2009). At the time of this study, GPs were the only healthcare professionals working in the community setting who could prescribe ONS (i.e. there were no prescribing community dietitians or prescribing community nurses).
7.3.5 Evaluation outcomes measured

The main purpose of this follow-up study was to investigate the nutrition care practices of the principal GPs who used the community dietetics referral service and had participated in the nutrition education programme (n = 7). All worked in separate general practices. However, it was also possible to examine data relating to three principal GPs who were involved in the pre-intervention study and continued to use the community dietetics referrals service but did not take part in the education intervention. It must be noted that comparison between these two groups is limited by numbers and could be confounded by an „interested’ bias among the majority who participated in the educational intervention.

Selected patient characteristics, including those described in Table 7.1, and healthcare professional nutrition care actions as detailed in Table 7.2, were investigated by reviewing community dietetics patient records. Community dietitians from the HSE Dublin-Mid-Leinster Community Nutrition and Dietetics Service, who provided the service to GPs participating in the study, recorded details of all patients referred to them during the study period (June to August 2007). Information was obtained by the community dietitian from a patient interview and review of medical records. Patients were asked about previous advice on diet (including written advice) and ONS (instructions for use and whether samples were provided) received from healthcare professionals. A nutritional assessment (including measurement of body weight) was performed by the same dietitian and all information was recorded on a specifically designed dietetics patient record card. The community dietitians provided patients with written information about the study and obtained consent for use of this information for the purposes of the study. The community research dietitian (SK) reviewed all dietetics record cards for the period (June to August 2007), noting all patients who had been
prescribed ONS during the study period. Patients were excluded from the study if they did not have an ONS prescription during the study period. Patients were also excluded if they had been part of the pre-intervention study to enable a clearer reflection of changes brought about by the education programme.

Changes in the characteristics of patients prescribed ONS and the ONS prescribing practices of healthcare professionals were determined by comparison of the data collected in this follow-up study with the data collected in the pre-intervention study in 2005 (Kennelly et al., 2009).

The proportion of patients who were prescribed ONS and referred to the community nutrition and dietetics service were determined by comparing the number of patients prescribed ONS during the study period (June to August 2007) using data provided by the Primary Care Reimbursement Service of the Irish Health Service Executive (HSE PCRS) and the number of patients referred via the structured dietetics referral pathway who were prescribed ONS during the same period. Data relating to patients of the seven participating GPs from both pre- and post-intervention were compared to determine whether changes occurred in the number of patients prescribed ONS and in GP expenditure on ONS. All age categories were included. The number of patients and expenditure on ONS prescriptions provided by the statistics unit of the HSE PCRS were also analysed.

Because the methods used in the pre-intervention study may have contributed to a reduction in the number of patients prescribed ONS and expenditure for ONS in the period June to August 2005, as a result of the discontinuation of patients receiving unnecessary ONS prescriptions during this time, the number of patients prescribed ONS for the 3-month period (June to August) for all years between 2004 (before the pre-intervention study) and 2007 (post-intervention) were examined. Differences in
expenditure on ONS for a full 12-month period from August to August for the years 2004, 2005, 2006 and 2007 were also investigated.

7.3.6 Statistical analysis

Information collected was coded and recorded in SPSS software (SPSS Inc., Chicago, IL, USA) database. Chi-squared analysis was used to test for differences between pre- and post-intervention groups for categorical variables, including patient diagnoses and demographics, „MUST‘ risk category, anthropometric category, activity level, social factors, community services and practices of health professionals. Fisher’s exact test was used when small frequencies (n < 5) were observed in a category.

As the data were not normally distributed, nonparametric tests were used to check for differences between pre- and post-intervention measures and for ONS prescribing differences between GPs who participated in the nutrition education programme and those who did not.

7.3.7 Ethical approval

Ethical approval was received from both the HSE Dublin Mid-Leinster (former Midland Health Board) and the Dublin Institute of Technology (DIT) ethics committees.
7.4 Results

7.4.1 Description of patients prescribed oral nutritional supplements

In the period June to August 2007, 150 dietetics patient records were reviewed. Twenty-eight percent (42/150) of patients were eligible for inclusion in the study; of the remainder, 44% (66/150) had not received a prescription for ONS during the study period, 14% (21/150) had been included in the pre-intervention study and 14% (21/150) were patients of GPs who did not complete the education intervention, although data from the latter group have been presented for comparative purposes. The characteristics of patients included in this study (n = 42) are shown in Table 7.1.
Table 7.1: Comparison of patient characteristics pre-and post-intervention

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Patients</td>
<td>Patients of</td>
</tr>
<tr>
<td></td>
<td>(n=78)</td>
<td>Participating GPs</td>
</tr>
<tr>
<td></td>
<td>†</td>
<td>(n=42)</td>
</tr>
<tr>
<td>Male</td>
<td>16 (21)</td>
<td>14 (33)</td>
</tr>
<tr>
<td>Female</td>
<td>62 (79)</td>
<td>28 (67)</td>
</tr>
<tr>
<td>Nursing home</td>
<td>28 (36)</td>
<td>7 (17)</td>
</tr>
<tr>
<td>Own home</td>
<td>50 (64)</td>
<td>35 (83)</td>
</tr>
<tr>
<td>Living alone</td>
<td>27 (35)</td>
<td>17 (40)</td>
</tr>
<tr>
<td>'MUST’ Risk</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category **</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low risk</td>
<td>31 (40)</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Moderate risk</td>
<td>18 (23)</td>
<td>4 (9)</td>
</tr>
<tr>
<td>High risk</td>
<td>29 (37)</td>
<td>37 (88)</td>
</tr>
<tr>
<td>Anthropometry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMI &lt;20 kg/m²</td>
<td>36 (46)</td>
<td>32 (76)</td>
</tr>
<tr>
<td>BMI ≥20 kg/m²</td>
<td>42 (54)</td>
<td>10 (23)</td>
</tr>
</tbody>
</table>

†see Kennelly et al., 2009. n, number of patients; n/s, not statistically significant.
'MUST’, Malnutrition Universal Screening Tool; GP, general practitioner; BMI, body mass index. *Chi-squared analysis. Fisher’s Exact Test was used when <5 were observed in a category. **If not completed on referral, ‘MUST’ scores were calculated by community dietitians from information provided at referral or at first assessment of the patient.
The demographic characteristics of patients were comparable in the pre- and post-intervention groups. Most patients prescribed ONS were >65 years old both pre-intervention (79 ± 10.5 years, n = 78) and post-intervention (72.9 ± 18.4 years, n = 42, for patients of GPs who participated in the education programme; 83.5 ± 6.09 years, n = 21, for patients of GPs who did not participate).

Significantly more patients prescribed ONS in the post-intervention group were underweight (BMI <20 kg m²) or at risk of malnutrition (i.e. at „medium’ or „high’ risk according to „MUST’ scores) (BAPEN, 2003). Pre-intervention, 42/78 (54%) patients prescribed ONS had a BMI ≥20 kg m–2 of whom only eight (19%) were classified as at risk of malnutrition according to the „MUST’ criteria (BAPEN Malnutrition Advisory Group, 2003). Of these, seven patients were at „high risk’ and one at „medium risk’. Post-intervention, 10/42 (24%) patients prescribed ONS had a BMI ≥20 kg m–2; all 10 were at „medium risk’ of malnutrition according to the „MUST’ criteria.

The most frequent primary diagnoses recorded in patients post-intervention were malignancy (11/42; 26.2%), respiratory disease (10/42; 23.8%), cardiovascular disease (7/42; 16.7%) and dementia (5/42; 11.9%). A smaller proportion of patients in the pre-intervention group had malignancies (7/78; 9%; P < 0.05), whereas more had cardiovascular disease (31/78; 40%; P < 0.05). There were no other significant differences in diagnostic categories observed between the pre- and post-intervention groups.

7.4.2 Number, proportion and source of community dietetics service referrals

Data held centrally by the HSE PCRS showed that 42.5% (43/101) of patients prescribed ONS by the principal GPs (n = 7) who participated in the education intervention were referred to the community dietetics service post-intervention
compared to 47% (58/123) for the same GPs pre-intervention (P = 0.722). One patient was excluded from analysis as a result of prior inclusion in the pre-intervention study.

Patient referrals to the community dietitian post-intervention (n = 42) came from community nurses (18/42), GPs (15/42), nursing home staff nurses (5/42) and hospital dietitians (3/42), and one was from an unspecified category of staff. All 42 patients referred were either at „medium” or „high risk” of malnutrition or had a current prescription for ONS, in accordance with referral criteria set by the community dietetics service.

7.4.3 Healthcare professional actions relating to nutrition care

Table 7.2 shows the actions of healthcare professionals relating to nutrition care in both pre- and post-intervention studies. Significant improvements in practice were recorded post-intervention compared to pre-intervention. Although, pre-intervention, there was no evidence of nutritional screening, post-intervention „MUST” scores (BAPEN Malnutrition Advisory Group, 2003) had been calculated for 62% (26/42) of patients before referral to the community dietetics service. Eight patients had „MUST” screening completed by GPs and the remainder (n = 18) were completed by community nurses.

7.4.4 Change in number of patients prescribed oral nutritional supplements

Table 7.3 shows the total number of patients prescribed ONS in the periods June to August 2004, 2005, 2006 and 2007 by the seven principal GPs who participated in the education programme. Although 18% fewer patients were prescribed ONS in the post-intervention study period (2007) than in the pre-intervention study period (2005), this did not reach significance (P = 0.074) (Table 7.3).
Table 7.2: Healthcare professionals’ actions relating to nutrition care, pre-and post-intervention

<table>
<thead>
<tr>
<th></th>
<th>Pre-Intervention†</th>
<th>Post-Intervention</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All Patients (n=78)</td>
<td>Patients of Participating GPs (n=42)</td>
<td>Patients of Non-Participating GPs (n=21)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>p*</td>
<td></td>
</tr>
<tr>
<td>Nutritional screening („MUST”)</td>
<td>0 (0)</td>
<td>26 (62)</td>
<td>0.000</td>
<td></td>
</tr>
<tr>
<td>completed on referral to the</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>community dietitian.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body weight measured *</td>
<td>20 (26)</td>
<td>39 (93)</td>
<td>0.000</td>
<td>14 (67)</td>
</tr>
<tr>
<td>Basic dietary advice provided by</td>
<td>20 (26)</td>
<td>38 (90)</td>
<td>0.000</td>
<td>15 (71)</td>
</tr>
<tr>
<td>any health professional (not</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>including the community dietitian)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dietary advice provided by a GP</td>
<td>2 (3)</td>
<td>12 (29)</td>
<td>0.000</td>
<td>2 (10)</td>
</tr>
<tr>
<td>Written dietary advice provided</td>
<td>17 (22)</td>
<td>30 (71)</td>
<td>0.000</td>
<td>6 (28)</td>
</tr>
<tr>
<td>Choice of ONS type given</td>
<td>16 (21)</td>
<td>31 (74)</td>
<td>0.000</td>
<td>12 (57)</td>
</tr>
<tr>
<td>Samples of ONS given</td>
<td>16 (21)</td>
<td>34 (81)</td>
<td>0.000</td>
<td>13 (62)</td>
</tr>
</tbody>
</table>

† see Kennelly et al., 2009
n, number of patients; n/s, not statistically significant
„MUST“, Malnutrition Universal Screening Tool; GP, general practitioner; ONS, oral nutrition supplements
*Chi-squared analysis; Fisher’s exact test was used when <5 were observed in a c
Table 7.3: Number of patients prescribed ONS from June to August each year from 2004 to 2007

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2005 (Pre-intervention)</th>
<th>2006</th>
<th>2007 (Post-intervention)</th>
<th>2005 vs. 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patients</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>prescribed ONS</td>
<td>n (median, IQR)</td>
<td>n (median, IQR)</td>
<td>n (median, IQR)</td>
<td>n (median, IQR)</td>
<td>$P^*$</td>
</tr>
<tr>
<td>by participating</td>
<td>118 (14, 12)</td>
<td>123 (19,11)</td>
<td>120 (16,8)</td>
<td>101 (14,10)</td>
<td>0.074</td>
</tr>
<tr>
<td>GPs (n=7)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>prescribed ONS</td>
<td>66 (18, 22)</td>
<td>54 (17, 13)</td>
<td>53 (15, 16)</td>
<td>94 (39, 25)</td>
<td>0.109</td>
</tr>
<tr>
<td>by non</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>participating</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPs (n=3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

n, number of patients; IQR, inter-quartile range
GP, general practitioner; ONS, oral nutrition supplements
* Wilcoxon signed-rank test.
7.4.5 Differences in expenditure on oral nutritional supplements

Expenditure on ONS for a 12-month period by the seven principal GPs who participated in the education programme pre- and post-intervention, the three non-participating GPs, and national total expenditure over the same time period are summarised in Table 7.4.

The actual and expected changes in expenditure on ONS by GPs who participated in the education programme are illustrated in Fig. 7.2. Expected expenditure was estimated on the assumption that without the intervention, the ONS prescribing costs of these GPs would have increased at a similar rate to the national average increase in expenditure on ONS. The costs of ONS products did not change during the study period as a result of the implementation of price control measures by the HSE during that time.

Figure 7.2: Actual versus expected* expenditure on oral nutritional supplements (ONS) by general practitioners (GPs) who participated in the education intervention.

* Expected expenditure was estimated using the national rate of increase in expenditure on ONS during the study time period (28%).
### Table 7.4: Expenditure on oral nutritional supplements annually from September 2004 to August 2007

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pre-Intervention</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participating GPs</td>
<td>total (median, IQR)</td>
<td>total (median, IQR)</td>
<td>total (median, IQR)</td>
<td>total (median)</td>
<td></td>
</tr>
<tr>
<td>(n=7)</td>
<td>€93,024 (€10,040, €12,197)</td>
<td>€105,391 (€13,666, 14,664)</td>
<td>€90,397 (€12,131, €10,139)</td>
<td>-3 % (14.14%)</td>
<td>0.612</td>
</tr>
<tr>
<td>Non-participating GPs</td>
<td>total (median, IQR)</td>
<td>total (median, IQR)</td>
<td>total (median, IQR)</td>
<td>total (median, IQR)</td>
<td></td>
</tr>
<tr>
<td>(n=3)</td>
<td>€46,961 (€14,512, €4,495)</td>
<td>€46,213 (€15,793, €4,435)</td>
<td>€75,085 (€26,033, €21,622)</td>
<td>+60% (36.96%)</td>
<td>0.109</td>
</tr>
<tr>
<td>National GP group</td>
<td>total (median, IQR)</td>
<td>total (median, IQR)</td>
<td>total (median, IQR)</td>
<td>total (median, IQR)</td>
<td></td>
</tr>
<tr>
<td>(n=n/a)</td>
<td>€19.9 million (n/a)</td>
<td>€23.2 million (n/a)</td>
<td>€25.5 million (n/a)</td>
<td>+28%</td>
<td>n/a</td>
</tr>
</tbody>
</table>

* Wilcoxon signed-rank test
n/a, not available
IQR, inter-quartile range
7.4.6 Differences in practice between general practitioner participants and non-participants in the nutrition education programme

All GPs studied, regardless of their participation in the nutrition education programme, prescribed ONS for a significantly greater number of patients who were either malnourished BMI <20 kg m\(^{-2}\) or at risk of malnutrition according to „MUST’ criteria (BAPEN Malnutrition Advisory Group, 2003) post-intervention compared to pre-intervention (Table 7.1).

The proportion of patients referred to the community dietetics referral service by GPs who participated in the nutrition education programme (43/101; 42.5%) was also comparable to the referral pattern of the three non-participating GPs (41/94; 43.6%).

One-third (7/21) of the patients with non-participating GPs were screened using „MUST’ before being referred to the community dietetics service. However, the screening had been completed by nursing staff rather than the GPs (one by a community nurse, six by a nursing home staff nurse).

The number of patients prescribed ONS by non-participating GPs was greater (54 versus 94; 57%) in the post-intervention study period (Table 7.3) and their expenditure on ONS also increased (Table 7.4).

Table 7.2 shows other statistically significant improvements in nutritional care practices that were unique to GPs who participated in the nutrition education programme, such as the better provision of dietary advice by GPs and the better provision of written dietary advice.

7.5 Discussion

Implementation of a community dietetics intervention, comprising a nutrition education programme for healthcare professionals and a structured referral pathway to community
dietetics services, resulted in a number of benefits to patients and to the health service. These included more widespread screening for malnutrition risk, good selection of patients for referral to the community dietetics service, better targeting of patients for ONS prescriptions, and no significant increase in the number of patients prescribed ONS or in expenditure on ONS (against national trends) by GPs who participated in the nutrition education component of the intervention.

Improved assessment of patients at risk of malnutrition was evident in the practice of doctors and nurses after the intervention. Patients’ weights were measured more frequently in general practices. This improvement was seen even when the GPs had not participated in the nutrition education programme. This may be because other healthcare professionals in their practice area (e.g. public health nurses, staff nurses in private nursing homes caring for patients of these GPs) did participate in the nutrition education programme and disseminated the information to their colleagues.

Appropriate nutritional screening was also evident, with over half the patients having their „MUST’ score calculated before referral to the community dietitian. Before the intervention, nutrition screening by community healthcare professionals had not been observed in this setting (Loane et al., 2004; Kennelly et al., 2009), despite being recommended in a number of expert guidelines (BAPEN Malnutrition Advisory Group, 2003; NICE, 2006). The results of the present study suggest that community nurses are more likely to complete the „MUST’ (BAPEN Malnutrition Advisory Group, 2003) than GPs 1 year post-intervention. This is in keeping with the results reported 6 months after the intervention (Kennelly et al., 2010), which showed that 68% of community nurses claimed to use „MUST’ compared to 50% of GPs reporting its use.

Improved provision of dietary advice by doctors and nurses also resulted from the educational intervention. GPs are often reluctant to give dietary advice (Truswell,
1999; Moore & Adamson, 2002; Van Weel, 2003), even when training and resources have been provided (Gall et al., 2001). Encouragingly, GPs who participated in the educational intervention in the present study more often provided dietary advice than previously, including written advice. Community nurses in the ROI are known to give dietary advice regularly to patients living in the community (Loane et al., 2004; Kennelly et al., 2009) and the provision of nutritional training should improve the quality of their advice.

Oral nutritional supplement prescribing practices after the educational intervention were more compliant with best practice guidelines (NICE, 2006; Volkert et al., 2006). A significantly higher proportion of patients prescribed ONS were „underweight’ (BMI <20 kg m–2) or at risk of malnutrition („medium’ or „high’ risk category according to „MUST’ score) post-intervention compared to pre-intervention (Kennelly et al., 2009). Furthermore, 34 patients prescribed ONS pre-intervention were not underweight (BMI >20 kg m–2) and could not be classified as at risk of malnutrition, whereas, post-intervention, all 10 patients who were not underweight but were prescribed ONS were at risk of malnutrition according to „MUST’. Dislike of ONS flavours and taste fatigue had been observed pre-intervention (Kennelly et al., 2009). Offering a selection of ONS options can address this issue and may reduce wastage of ONS (Dunstan et al., 2005). After the intervention, significantly more patients were given a choice of ONS products and were encouraged to taste different types and flavours.

Post-intervention, there were trends towards fewer patients (by 18%) being prescribed ONS and a reduction in expenditure on ONS (by 3%). Unfortunately, the present study had insufficient power to confirm that these trends were significant. However, in comparison, the national trend during the same period showed a
significantly increased expenditure on ONS. This suggests that cost savings might be achieved through preventing a continuing rise in expenditure on ONS by implementing a community dietetics intervention more widely.

The community dietetics intervention implemented in the present study appeared to improve patient care. Moreover, the benefits generated by this type of community dietetics intervention are not confined to a potential reduction in expenditure on ONS. With better screening for risk of malnutrition and prevention of malnutrition through evidence-based nutritional support, additional cost savings can be expected from reduced GP visits, fewer prescriptions for other medications and a lower rate of hospital admission (Elia et al., 2005; Stratton & Elia, 2010).

However, the resource implications of such interventions require consideration in planning community dietetics services. Without additional resources to support implementation of the community dietetics intervention, it would be necessary to rationalise existing services to accommodate the workload associated with the intervention. Costs involved in implementing the intervention included a dietitian’s salary, pay-related social insurance and overhead costs such as travel and telephone usage. Additional costs included printing of resource materials (diet sheets, nutrition screening tools, etc.) and catering for lunches at training sessions.

The results obtained in the present study suggest that benefits from an intervention of this nature may be enhanced through the education of GPs (or other prescribers) rather than targeting nurses only because the trend towards reduction on ONS costs and numbers of patients prescribed ONS was seen only for GPs who completed the nutrition education programme in addition to having access to the dietetics referral service, despite their support staff (e.g. community nurses) having attended the educational programme.
One of the limitations of the present study was the incomplete participation of GPs in the intervention (3/10; 30% non-participation). However, examination of the prescribing practices of those who did not participate in the education component of the intervention provided some insight into the prescribing practices of the minority of GPs who are uninterested in or unavailable for continuing education and training. During the period of the study, the three principal GPs who opted not to participate in the education programme prescribed considerably more ONS than those who did participate in the education programme or might be expected from the national trend for reasons that are not clear. Some studies investigating the medication prescribing practices of GPs have shown that GPs who spend more on medications do not accept criticism of their prescribing practices and fail to seek independent evidence of the effectiveness of medications before prescribing these (Watkins et al., 2004).

In the present study, less than half the patients prescribed ONS were referred to the community dietetics service after the intervention, despite this service being available. Similarly low referral rates were observed after a similar intervention in the UK (Gall et al., 2001). Further study is necessary to determine whether patients who are prescribed ONS without being referred to the dietetics service are monitored appropriately including periodic assessment of nutritional status.

No incentives were provided to GPs or other healthcare personnel participating in this intervention study, although refreshments were provided during the lunchtime educational sessions. Motivation to participate in such education and training might be improved by ensuring that the programme is accredited by the appropriate professional bodies, thereby enabling participants to accumulate credits (e.g. continuing medical education) in a cost-effective manner.
Sustained benefits, such as improved ONS prescribing practices and resulting cost efficiencies, can be achieved by providing short targeted nutrition education programmes to those prescribing ONS (i.e. GPs) and to the healthcare professionals who support them in the community setting. Ensuring that best practice guidelines are available, or simply providing a community dietetics referral service to GPs for patients at risk of malnutrition without targeted education, is unlikely to deliver the same benefits.
7.6 References


CHAPTER 8

DISCUSSION CONCLUSIONS AND RECOMMENDATIONS

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8. DISCUSSION

8.1 Overview of Thesis

This research set out to determine whether a community dietetics intervention could improve the nutrition care practices of healthcare professionals related to the prescribing of oral nutritional supplements (ONS). Figure 8.1 shows an overview of the research design which was divided into three studies and illustrates how the results of each study have been described in a peer review publication.

Collectively, the three studies described in this thesis show that it is possible to improve the nutrition knowledge of healthcare professionals and achieve sustained improvements in nutrition care practices, by providing a targeted nutrition education programme and a supporting community dietetic referral service for the prescribers i.e. GPs, and other healthcare professionals who recommend ONS for patients in the community. The results have also suggested that these changes in nutrition care practices can be achieved without increasing health service expenditure associated with ONS.
Figure 8.1 Overview of study design and timeline including participation rates and content of peer review papers

Pre-intervention (Baseline study)
Interviewer-assisted patient interviews
n=78 patients, n=10 General Practitioners (i.e. 10 principal GPs)

Development and design of community dietetics intervention

Nutrition education programme
Participants included: n=98 healthcare professionals
(including n=14 GPs (n=7 principals and 7 GP co-workers))

Immediately following the nutrition education programme
Investigation of acceptability of nutrition education programme and changes in knowledge (MCQ*) of healthcare professionals using self administered questionnaires.

Introduction of community dietetic referral service for patients at high risk of malnutrition

6 months after the community dietetic intervention
Investigation of changes in knowledge (MCQ*) and evaluation of malnutrition management practice

1 year after the community dietetic intervention
Investigation of changes in malnutrition management practice by data collection from patient dietetic records
(n=7 General practitioners (i.e. 7/10 principals, n=42 patients)

1 year after the community dietetic intervention
Investigation of changes in oral nutritional supplement prescribing volume and expenditure using centrally located data

*MCQ= multiple choice questionnaire
‡Principal= Key General Practitioners recruited for follow-up over a two year study period

Study Timeline

Paper I

Paper II

Paper III
Prior to the pre-intervention study, 10 individual GPs (Principals) were recruited from 10 separate general practices which met the study criteria. All 10 principal GPs took part in the pre-intervention study. The main focus of the research was to implement a two pronged community dietetics intervention (involving both a nutrition education programme and a community dietetics referral service) with these 10 GPs. The evaluation measured changes in the nutrition care practices and ONS prescribing practices of these 10 principal GPs and other healthcare professionals one year after the intervention.

Although all 10 principal GPs agreed at the outset to participate in the full intervention, only seven of the 10 principal GPs participated in the nutrition education programme component, together with seven other supporting GP colleagues who worked with them in the 10 primary practices (total group of GPs, n = 14). Three principal GPs did not participate in the nutrition education programme but received the community dietetics referral service throughout the study period. One year after the intervention (in addition to the seven principal GPs who took part in both components of the community dietetics intervention) there was an opportunity to examine data from three of the principal GPs who did not take part in the nutrition education component. Although at the outset of the research it had not been planned to measure the relative benefits of each part of the two-pronged intervention, given the opportunity to examine data from each group, this has been included for comparative purposes. However, it must be acknowledged that this comparison is limited by the small number within each group and could be confounded by „interested” bias among the majority who participated in the nutrition education programme.

The main differences in nutrition care practices observed between the two groups were that a greater proportion of patients of GPs who participated in the
education programme and the dietetics referral service were screened using the Malnutrition Universal Screening Tool (MUST) (Elia, 2003) on referral to the community dietitian service, compared to patients of GPs who participated in the dietetics referral service only. Patients of GPs who participated in both components of the intervention were more likely to receive both dietary advice from their GP and to receive written dietary advice. In addition, GPs who participated in both components of the community dietetics intervention did not increase their expenditure or the volume of ONS prescribed during the study period, compared to increases in both these variables for GPs who did not participate in the nutrition education programme. These findings suggest that the nutrition education programme component of the intervention was important in achieving the aims of the intervention.

The impact of the first study (pre-intervention study) was that it provided evidence that, although the majority (69%) of ONS prescribing was in agreement with evidence-based criteria, 31% of patients were not prescribed ONS in line with these criteria. This suggested that some improvement in the nutrition care practices of healthcare professionals was necessary.

The proportion of ONS prescriptions that did not meet the prescribing criteria in this study was lower than that reported in some other studies which used different criteria (McCombie, 1999; Gale et al., 2001; Gall et al., 2001). Therefore, in order to compare the findings of this research with those of other studies, it is necessary to examine results related to individual criteria used in the studies which can be directly compared.

In the study by Gall and colleagues (2001), the main reason that ONS prescriptions were deemed inappropriate was the lack of provision of dietary advice by healthcare professionals to patients who were prescribed ONS and this criterion alone
accounted for 63% of inappropriate ONS prescriptions at baseline. If the provision of dietary advice is removed as a criterion from this study, the value reported for inappropriate prescribing is reduced to 37%, which was closer to the value observed in the current study. Similarly, in the study by Gale and colleagues (2001), 68% of ONS prescriptions were deemed inappropriate based on only one criterion i.e. that ONS should not be prescribed for patients with a BMI of greater than 20 kg/m². If this criterion alone had been used in the current research, the value reported for ONS prescriptions that did not meet this criterion would have been substantially higher (i.e. 54% and not 30%).

During the pre-intervention study, the main focus was an investigation of the proportion of ONS prescriptions that did not meet the evidence-based criteria; this focus was altered to a small extent following analysis of the results of this stage of the research, as it became apparent that the lack of evidence-based prescribing was not due to intentional poor practice or negligence on the part of healthcare professionals. It became clear that its cause related to more complex problems, including the absence of a structured approach to the prescribing of ONS in the community and a lack of resources available to healthcare professionals working in this setting. These observations highlighted the lack of structure for the identification of patients at risk of malnutrition i.e. nutrition screening did not exist. Even basic anthropometric assessment such as the measurement of patients body weight prior to ONS prescribing by healthcare professionals was not carried out routinely. In addition, there was poor monitoring of patients prescribed ONS. Many patients had been prescribed ONS for periods longer than six months and had received continuous repeated prescriptions during that time. Only half of the total group of patients had a consultation with the GP before receiving their last ONS prescription. The results also suggested that there was a
diffusion of responsibility between medical and nursing staff in the community around
the prescribing of ONS and monitoring of patients prescribed these products.

Compounding these difficulties, evidence from the pre-intervention study showed that healthcare professionals were faced with many patients for whom poor social circumstances and other issues, such as living alone and difficulties cooking and shopping for food influenced their requirements for ONS.

8.2 Benefits and Challenges of the Nutrition Education Programme

The format and content of the nutrition education programme used in this research was found to be well received by healthcare professionals, demonstrated by the high satisfaction ratings given by them immediately after the nutrition education programme was delivered. Other authors have reported that GPs and nurses in the community rate nutrition education programmes highly (Okene et al., 1995; Cadman & Finlay, 1998; Moore et al., 2003).

Nutrition knowledge (as measured by MCQ scores) was shown to be significantly improved immediately after, compared to before the intervention and this improvement was also found to be sustained six months after the intervention. Similarly, Gall and colleagues (2001) have shown that improvements in nutrition knowledge related to patients at risk of malnutrition can be observed three months after a nutrition education programme.

The nutrition education programme used in this research was found to have positive changes in nutrition care practices as reported by healthcare professionals including improved use of nutrition screening, more frequent weighing of patients and provision of dietary advice prior to prescribing ONS. While no evidence of nutrition
screening at baseline was observed, one year after the intervention, 67% of patients prescribed ONS were found to have been screened by healthcare professionals using the „MUST” (Elia, 2003). Similarly, Gall and colleagues (2001) found that healthcare professionals reported to carry out nutrition screening more frequently three months after an intervention involving a nutrition education programme and a nutrition screening tool were introduced; however, the authors did not report actual rates of screening so a direct comparison cannot be made.

The evidence from this study indicated that improved nutrition screening resulting from the intervention led to a better targeting of ONS as after the intervention, ONS were prescribed for a greater proportion of patients who were at „high risk” of malnutrition than before (88% vs. 37%, P < 0.001).

Six months after the intervention, 70% of GPs reported weighing patients more often. The self-reported improvement in nutrition care practices related to the decision to prescribe ONS was further substantiated by the results of the evaluation one year after the intervention when over 90% of patients had their body weight measured prior to their prescription for ONS.

Before the intervention, very few patients (3%) reported having been given dietary advice by their GPs prior to or in conjunction with their ONS prescription. Low rates of dietary advice provision by GPs have also been reported in previous studies in the UK (McCombie, 1999; Gall et al., 2001). Six months after the intervention, there appeared to be some change in this nutrition care practice with 70% of GPs reporting that they always give dietary advice to patients who are at risk of malnutrition. However, one year after the intervention, the review of patient records indicated that only 29% of patients reported having received dietary advice from their GP. This study suggests that the provision of dietary advice is not a role that GPs readily adopt, even
though their understanding of its importance and their knowledge of appropriate dietary advice may have been improved by the intervention. Previous research has reported similar mixed findings in relation to the provision of dietary advice by healthcare professionals in the community (Kolasa, 2010). Gall and colleagues (2001) observed that the levels of reported improvement in dietary advice provision were not corroborated by actual improvements in the provision of dietary advice as measured by patient interviews (Gall et al., 2001).

These findings suggest that if patients are to receive dietary advice prior to, or in conjunction with, a prescription for ONS, a structure needs to be in place for patients to access a healthcare professional for dietary advice, the most suitable healthcare professional being the community dietitian who is formally trained to give such advice.

It did appear that the nutrition education programme had an effect on ONS prescribing practices. Healthcare professionals reported prescribing or recommending ONS less frequently six months after the intervention, suggesting that there might be a reduction in overall ONS prescribing volume and expenditure rates. However, this needs further verification by the analysis of centrally held data held by the primary care reimbursement service (PCRS). One year after the intervention, a trend towards fewer patients being prescribed ONS (18% reduction, P = 0.074) could be observed; this result is similar to the reduction in total numbers of patients prescribed ONS, seen post-intervention by Gall and colleagues (18% reduction) in 2001.

Despite the trend towards a reduction in the number of patients prescribed ONS seen in this study, there was no significant change in expenditure on ONS by GPs who participated in the full intervention (3% reduction, P = 0.499). However, when this finding is compared to a 60% increase in expenditure among the GPs who did not participate in the nutrition education programme, and the 28% increase in expenditure
on ONS by GPs nationally. These results suggest that the intervention may have prevented or limited further increases in ONS expenditure by GPs involved in the study against national trends. Other authors have reported changes to ONS expenditure after community dietetics interventions. An intervention by Noble in 2011, using a similar intervention to that used in this study (an education programme including „MUST’ and a community dietetics referral service) reported a 4% annual increase in ONS expenditure post-intervention compared to a 20-30% increase in previous years for the group of GPs targeted by the intervention.

This research also provides some information about the need for further education after a nutrition education programme. Six months after the nutrition education programme, knowledge levels remained significantly higher than before the programme for all healthcare professionals groups. This suggests that the education session would not have to be repeated more frequently than annually.

The main challenge to implementing the nutrition education programme was the time constraints required. The format chosen for this intervention was a nutrition education programme delivered at the healthcare professional’s workplace. This has time and resource implications for the educator and necessitates expenses associated with travel and subsistence. However, more importantly, time was seen as a scarce resource for healthcare professionals in this study. Lack of time was a barrier to participation for some GPs at the outset of the study. Six months after the intervention, lack of time was cited as a barrier to the implementation of nutrition care practices such as the provision of dietary advice by healthcare professionals.

While the results of this study have shown that it is possible to improve knowledge and nutrition care practices related to the prescribing of ONS using a community dietetics intervention which incorporated a nutrition education programme,
the difficulties associated with providing nutrition care for elderly patients with poor social circumstances and/or lack of social supports cannot be fully addressed by nutrition education programmes alone.

8.3 The Influence of Social Factors

Expert multidisciplinary organisations have highlighted the fact that malnutrition in the community is not caused by medical conditions alone and that the social circumstances of individuals have an important influence on its development (European Nutrition for Health Alliance, 2006; NICE, 2006). Patient populations that have been shown to be particularly at risk of malnutrition include older people, those who are housebound, those who have medical problems, those who receive infrequent home help services, and those who have recently been in hospital (Locher, 2008). These characteristics were observed in the majority of patients in the studies described in this thesis.

The issue of prescribing ONS for social reasons has been raised by other authors (Gall et al., 2001) who reported that for some patients dietary advice could not be provided due to poor social circumstances and as a result, ONS were prescribed to help meet such patients nutrition requirements. However, the authors (Gall et al., 2001) did not provide a description of the individual social circumstances of the patients studied, so it is not possible to determine if they were similar to those encountered in this research.

In this study, the three main social factors which were seen to influence patients requirements for ONS were living alone, financial constraints affecting their ability to buy food and an inability to shop and/or cook for themselves. Many of the patients interviewed in this study were socially isolated. The majority not only lived alone but
lacked social interaction with others outside the home and did not attend any groups, clubs, or day-care††† services. During the community dietitian interviews, some patients mentioned a lack of motivation when cooking for one person. Dean and colleagues (2009) reported that older persons (> 75 years) who eat with a partner eat a more varied diet. Living alone has previously been shown to be an independent risk factor for malnutrition (Pirlich et al., 2005). Other studies have shown that homebound patients who receive daily visits from carers are more likely to have a greater dietary intake (Locher et al., 2008).

This social isolation was also seen in relation to transport. The majority (68%) of patients who lived in their own homes or the home of a carer rather than in a nursing home required a domiciliary visit by the community dietitian. The main reason for a domiciliary visit was to facilitate patients who were physically too unwell to travel due to their clinical condition. However, these visits were also carried out for patients who reported that they had no access to transportation and could not afford to pay for transportation e.g. a taxi to attend a clinic at their local GP practice. Other authors have reported that a lack of access to reliable transportation was significantly related to greater nutrition risk in older persons (Locher et al., 2005) and to decreased dietary variety (Dean et al., 2009) compared to those who had access to a car.

Financial constraints, resulting in a lack of money to buy food, were also reported by some patients in this study. The link between financial deprivation and malnutrition has been reported in international studies in which poor socioeconomic circumstances have been shown to be associated with greater risk of malnutrition, less fruit and vegetable consumption, poorer micronutrient status and poorer dentition in older persons (> 65 years) in the community setting (Elia & Stratton, 2005) and also

††† Day care centres provide meals, hygiene/bathing, laundry services, hairdressing and chiropody services. They also promote social contact among older people and help prevent loneliness. For carers and relatives, they provide respite in caring for people during the day.
poorer dietary variety (Dean et al., 2009). Also, in the hospital setting, social deprivation has been found to be associated with greater risk of malnutrition and poorer clinical outcomes in older persons (Stratton, 2006).

Apart from financial constraints, inability to shop for, prepare and cook food caused by problems such as poor mobility, lack of knowledge about cooking and the recent death of a spouse who had predominantly undertaken meal preparations in the home were also observed in this study. Such observations have been reported elsewhere among older persons living in the community (Payette et al., 2005; Locher et al., 2008; Dean et al., 2009).

The responses of healthcare professionals six months after the community dietetics intervention reinforced these observations. Barriers reported by some healthcare professionals to providing dietary advice included a number of social factors such as patients living alone with poor social support. This suggests that while knowledge was improved and malnutrition was more readily identified by healthcare professionals after the intervention, education for healthcare professionals and access to a community dietetics service alone could not fully address all difficulties associated with the social factors affecting some patients.

Although some social problems are potentially modifiable, when patients were interviewed by a community dietitian, it was apparent that these social problems either had not or could not always be adequately addressed prior to, or together with, the prescribing of ONS. For example, in some cases, where home-help assistants were assigned to patients by the HSE, the role of these assistants was focused on interventions to improve personal care and hygiene, and these duties seemed to be

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+++ Home helps may be employed either by the Health Service Executive (HSE) or by voluntary organisations. They usually help with normal household tasks although they may also help with personal care. If a person is assigned a home help, s/he may have to make a contribution towards the cost but this practice varies greatly from area to area.
prioritised over nutrition care interventions such as cooking and feeding. During the course of this research, it became apparent that community nurses are the key healthcare professional who decides the role of the home-help assistants. It is possible that the lack of focus on meal preparation by home-help assistants was due to the poor knowledge of community nurses regarding the identification of malnutrition and treatment of its underlying causes (Loane et al., 2004). Similar findings have been reported by Brantervik and colleagues (2005). In a study of older patients in a non-acute geriatric rehabilitation hospital setting, it was found that malnutrition was not adequately recognised by doctors and nurses, that it was not considered in the decision whether to discharge patients to home and did not influence whether home aid services (similar to home help assistants) for cooking and personal care were provided for the patient. Instead the patient’s functional status was the main indicator used to make these decisions on discharge. The authors also reported that malnourished patients were more likely to be receiving assistance with personal care e.g. personal hygiene on admission to the hospital (Brantervick et al., 2005).

Another reason why underlying social causes of malnutrition may not have been addressed was that they present a considerable challenge for healthcare professionals such as GPs, community nurses, and practice nurses in situations where adequate social support services are not available. Key interventions to address these social issues such as the initiation of meals-on-wheels, the introduction of home help assistants to help with cooking and shopping and encouraging attendance at day-care services may not always be readily available in a geographical area.

However, even if these social services are available and offered to patients by healthcare professionals, patients may choose not to accept these services. There have been contrasting findings from other studies in relation to this issue. Some studies have
reported that older persons in Ireland may not accept social services such as meals-on-wheels due to the stigma associated with these services (McGee et al., 2005) whereas others have shown that older persons do not associate meals-on-wheels with a feeling of stigma but rather with a loss of autonomy which was difficult for them to accept (O'Dwyer & Timonen, 2008).

There have been a number of studies which have investigated the problem of ‘food insecurity’. Food insecurity occurs ‘whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain’. While food insecurity is not exclusively associated with older persons or those at risk of malnutrition, it can also be associated with younger persons and overweight and obese individuals. Food insecurity has been associated with sub-optimal dietary intake, poorer nutritional status and poorer overall health in older persons compared to those who were not categorised as being food insecure (Lee et al., 2001; Sahyoun, 2002).

A limitation of this research was that the prevalence of food insecurity among patients prescribed ONS was not investigated. It seems reasonable that many of the patients in this study could be described as suffering from food insecurity given the prevalence of poor social conditions such as living and eating alone, lack of money to buy food, difficulties cooking and shopping and a lack of access to transport. Future studies should consider investigation of the prevalence of food insecurity among patients prescribed ONS in the community.
8.4 **The Role of the Multidisciplinary Team**

This research provided some new information about the interplay between the different healthcare professionals in the prescribing of ONS. Viewed from an overall perspective this study provided some evidence that this type of intervention may improve multidisciplinary team working by improving knowledge and promoting inter-referral of patients.

At the beginning of the research, GPs were seen to have the leading role in the initiation of ONS prescriptions for patients, as GPs were the healthcare professional reported by patients to have most frequently recommended that they start taking ONS. However, there was also evidence that GPs decisions to prescribe ONS were influenced by others including hospital dietitians, community nurse recommendations and demands from patients and their families and carers. This finding agrees with previous research where GPs themselves reported the factors listed above to be among the most important influences on increasing expenditure on ONS (Loane *et al.*, 2004). At the beginning of this study, the results suggested that these requests from other healthcare professionals and patients themselves for ONS prescriptions may have had a greater influence on the GPs decision to prescribe ONS, than more evidence-based clinical indicators such as current body weight which, in fact was recorded for less than one in four patients.

After the community dietetics intervention, there was some evidence that the decision making process of GPs around the prescribing of ONS had changed. Six months after the intervention, health care professionals reported that the most important factors to influence the decision to prescribe or recommend ONS was consultation with the community dietitian, low BMI (kg/m²) and a clinical history of unintentional weight loss.
While it was not a planned objective of this research to improve the multidisciplinary management of malnutrition, there was some evidence that there were some changes in this after the intervention. Examples of these changes included the finding that six months after the intervention, GPs reported asking other healthcare professionals to carry out the MUST (Elia, 2003) on patients and GPs provided the biggest source of referral to the community dietetics referral service. These findings suggest willingness among GPs who participated in the intervention to engage in multidisciplinary management of malnutrition.

Despite these improvements, there was some evidence after the intervention that GPs may choose to take an autonomous role in the prescribing of ONS for some patients even when a community dietetics referral service is available. Less than half of patients prescribed ONS were referred to the community dietitian both before and after the intervention. It is not possible to determine the exact reasons for this finding but the study results provide some possible answers. Less than half of all patients prescribed ONS were reviewed individually by the GP before receiving their current ONS prescription; this suggests that data management systems within general practices may be inadequate to allow for active monitoring of patients with ONS prescriptions and therefore, GPs may have been unaware of some patients who were receiving ONS prescriptions.

Another possible explanation is that certain patient types e.g. palliative care patients may have been intentionally not referred to the community dietitian by GPs. GPs have reported that palliative care is one of the most common reasons they prescribe ONS (Loane et al., 2004) yet few of that patient type were referred to the community dietetics referral service in this study. Other authors have expressed concern about possible distress caused by carrying out nutrition assessment measures such as body
weight in palliative care patients (McCombie, 1999) and it is possible that this influenced some GPs decision not to refer patients to the dietetics service.

This continued autonomous practice by GPs suggests the need for greater focus on the benefits of multidisciplinary management of malnutrition during future nutrition education programmes. It may be possible that, as a working relationship is developed over time between the multidisciplinary team in the primary care setting, the referral rate could increase.

A multidisciplinary team approach to the management of patient care in the community in place of the older model of GPs working autonomously, is the model on which the „primary care teams’ are based; such teams are currently under development in the Republic of Ireland (Department of Health and Children, 2001).

The initial focus of the community dietetics intervention was on changing the ONS prescribing practices of GPs; however, as the research progressed it became clear that changing the nutrition care practices of their nursing colleagues, particularly community nurses, was of equal importance to the overall aims of the intervention. Due to the relatively small number of subjects in this research, data for community nurses and practice nurses have been pooled for the majority of the analysis; however, there were some differences in nutrition care practices and roles between these two groups of nurses.

Community nurses were the most frequently accessed community service by patients in this study, which concurs with national data (McGee et al., 2005). Community nurses act as the central point of access for patients to social services such as meals-on-wheels, home-help assistants and day-care services. While community nurses were responsible for 22% of referrals to the community dietitian six months after the intervention, practice nurses referred approximately half this number. The reasons
for this difference cannot be directly determined from this study, but it is possible that practice nurses do not have as much day-to-day contact with patients who are at risk of malnutrition as their community nurse counterparts. The working roles of practice nurses are decided by their employers i.e. GPs and there were concerns raised by some GPs during the recruitment stages of this study about time involvement and demands of the intervention upon other staff at the practice i.e. practice nurses. Six months after the intervention, some practice nurses commented that they had not carried out any nutrition screening since the nutrition education programme, because the majority of their work was with children and younger women. These results suggest that consultation at each GP practice about the ongoing role of practice nurses and the relevance of the content included in nutrition education programmes to their role within the practice should be agreed.

The community dietitian filled both the role of educator to GPs and nurses and was also able to provide a clinical service for patients at risk of malnutrition. The role of the community dietitian as a practice based educator was seen to be very acceptable to the healthcare professionals; this has also been reported by others (Cadman & Findlay, 1998). At the beginning of this research, there was almost no community dietetics involvement in decision making around the use of ONS in the community in the geographical region in which this study was carried out.

The role of healthcare professionals other than GPs and nurses was not seen to be an important influence on the use of ONS in the community in this study, but as all patients were not referred, it is not possible to determine if some influence exists. The development of primary care teams means that other healthcare professionals such as social workers, physiotherapists, occupational therapists, and speech and language therapists may be more accessible to GPs and community nurses in the future and could
play a valuable role in addressing some of the social difficulties which are underlying causes for malnutrition. Other healthcare professionals could potentially be trained to carry out MUST (Elia, 2003); however, there is no international evidence available currently on the usefulness of this approach and the benefits of such an approach require investigation.

8.5 The Influence of Nutrition Industry

Many healthcare professionals in this study reported having had contact with nutrition industry representatives who provided education about ONS. The nutrition industry has been successful in increasing sales of ONS exponentially in recent years. Prior to this study, there had been no formal education provided to GPs and limited education offered to community nurses by the community dietetics service in the area where the research was carried out, resulting in a gap in training provision which appears, in part, to have been filled by the nutrition industry.

The ONS industry is worth millions of Euros in Ireland and the UK (Barry, 2009; London Procurement Programme, 2009) and therefore, the nutrition industry has vast resources available to it. It is likely that the nutrition industry may have more capacity to provide nutrition education programmes and interventions to the healthcare professionals who work for the public health service than the health service itself. However, the goal of the nutrition industry to increase sales and the goal of the health services to achieve value for money represents a potential conflict of interest in some situations. Healthcare professionals may question the credibility of nutrition education programmes provided by nutrition industry representatives, particularly when it has been shown that increased GP contact with medical sales representatives is associated
with higher levels of prescribing medicines (Watkins et al., 2004). Equivalent data relating to nutrition product sales representatives are unavailable.

Arnaud-Battandier and colleagues (2004) argued that high expenditure on ONS by GPs is associated with decreased overall healthcare costs in the community. While this may be the case, this research, and previous research from the UK (Cooper, 1997; McCombie, 1999; Gall et al., 2001) has added to the available evidence indicating that when patients are assessed by a community dietitian, a substantial proportion of ONS prescribing is found to be unnecessary. Therefore, it can be argued that the use of community dietetics interventions to address this issue is worthwhile.

Health services are a large customer for the nutrition industry and the results of this study suggest that there is a need for the HSE to engage with the nutrition industry to develop local and national policies in relation to ONS prescribing that are evidence-based. The need for appropriate prescribing of ONS has been recently reiterated by other authors (Elia & Stratton, 2010).

Healthcare professionals need access to non-biased, up-to-date nutrition education programmes which are evidenced based and provided in a way which suits their working environment. This research has added to the available evidence (Gall et al., 2001) that a nutrition education programme provided for healthcare professionals by community dietitians can increase the knowledge of healthcare professionals about ONS, enhance the management of malnutrition, and improve nutrition care practices related to ONS prescribing.
8.6 Limitations of the Research

The findings of this research suggest that this type of dietetics intervention improves the knowledge of healthcare professionals about ONS and improves nutrition care practices related to ONS prescribing; however, the research also highlighted some additional questions which the study was not designed to measure. One such question was the potential benefits of this type of community dietetics intervention on clinical outcomes such as nutritional status, mortality and non-clinical outcomes such as changes in quality of life. Additionally, other factors which influence health service expenditure such as the provision of community services, admission to hospital, number of general practitioner visits and expenditure on medications, all of which have been shown to be positively associated with increased risk of malnutrition, (Elia & Stratton, 2010) were not measured.

The length of the education programme was limited by the time available to access the healthcare professionals. However, the results show that even short (one hour) education sessions can bring about positive changes in knowledge and nutrition care practices. Further research is required to determine if longer sessions would have additional benefits.

This research also raises questions about the relative cost of the community dietetics intervention relative to the cost savings brought about by the intervention. It is not possible to fully determine the answer to this question within this work. It was not an aim of this study to simply reduce ONS expenditure, but to provide better value for money for the health service for the amount that is spent on ONS. This means ensuring that ONS prescribing is in line with current evidence and is targeted to the patients who require it. The other potential benefits to patients, such as improved outcomes, were not
measured and it is unclear how these would balance the costs associated directly with the intervention.

The number of patients recruited to the pre-intervention and post-intervention studies during this research was lower than anticipated and lower than that seen in similar studies by Gall and colleagues (2001) in which the recruitment rate was 65% pre-intervention and 66% post-intervention, and by McCombie (1999) in which the recruitment rate was 53%. It is not possible to determine the exact reason for this finding; there was some evidence that it may be due to poor data management systems within the GP practices (only three were computerised) but this cannot fully account for the discrepancy. Gall and colleagues (2001) reported that the main reasons patients were not referred included GPs requesting that patients should not be contacted, patients refusing a dietetic consultation and patients not being contactable. In this study, few patients were uncontactable or refused to be assessed by the community dietitian (11/89, 12%). During the study, no GP expressed a wish for any patient not to be contacted, but it is possible that there was selective referral of patients.

On completion of the baseline study, it had been hoped to further investigate the characteristics of patients who were not referred to this study using information from patient medical records at GP practices. However, ethical approval for this aspect of the research was not granted on application to the HSE Ethics Committee (Midlands Area). The reason given for not granting ethical approval was that reading the patient medical files of patients who had not been referred by their GP was invasive and was not required to meet the overall aims of this study. Furthermore, it was stated that sufficient information would be available from the patients who were recruited to this study to meet the study aims.
8.7 Conclusions and Recommendations

The results of this study provide evidence which can inform future community dietetics interventions and nutrition education programmes.

8.7.1 Advice to other community dietetics services considering the implementation of similar interventions.

The results of this study add to the published literature on the development of community dietetics interventions to improve nutrition care practices of healthcare professionals related to the prescribing of ONS. Other community dietetic services wishing to implement a similar intervention should consider the following suggestions.

Firstly based on the results of this research it appears that a combined intervention of a nutrition education programme and community dietetics referral service together, rather than the introduction of a dietetics referral service alone may be more beneficial in improving the prescribing of ONS in the community. Comparison of changes in the nutrition care practices of GPs who did not take part in the nutrition education programme with those who did, suggests that there may be specific benefits associated with the nutrition education component of the intervention, including more patients screened using MUST (Elia, 2003), more dietary advice provided by GPs, more written dietary advice offered, a trend towards a reduction in the number of patients being prescribed ONS and no increase in expenditure on ONS. However, it is acknowledged that other community dietetics departments may not be in a position to implement the full intervention.
Secondly, future interventions should consider ways to improve the GP referral rate for dietetic assessment of patients prescribed ONS.

Thirdly, the findings of this study also indicate that nutrition education programmes for community nurses (including public health nurses and community registered nurses in the ROI) to improve the identification of patients who are at risk of malnutrition or are malnourished should be considered by community dietetics services wishing to improve the prescribing of ONS. Community nurses were the healthcare professionals seen to have the greatest contact with patients prescribed ONS in the baseline (pre-intervention) study, were the second highest source of referral to the community dietetics service six months after the intervention and the highest source of referral one year after the intervention.

Finally, future interventions could consider non-monetary incentives such as continuous medical education (CME) points for GPs and nurses. There were no incentives used in this work to encourage healthcare professionals to attend the nutrition education programme other than a free lunch provided during the session. At the time of the study, CME points were not compulsory for GPs. However, this has recently changed in the ROI (in April 2011) and may act as a suitable incentive in similar interventions.

8.7.2 Prescribing of ONS and the health service

The health service management should consider whether the current prescribing arrangement for ONS (i.e. GPs as the sole prescribers) offers the best service to patients and best value for money to the health service given the level of unnecessary prescribing by GPs observed in this and other studies (Cooper, 1997; McCombie, 1999;
Hood & Welch, 2000; Forth Valley Primary Care Trust, 2001; Gale et al., 2001; Gall et al., 2001; Murdock et al., 2002; Panico, 2002; Oladipo, 2006; Fitzgibbon, 2008; Forrest, 2008; Skinner & Smith, 2008; Wigley et al., 2009; Noble, 2011; Wilkie & Forrest, 2011). The nutrition education programme used in this study focused on improving the knowledge of the prescribers i.e. GPs and on community nurses who are the other important group in the community seen to influence ONS prescribing (Loane et al., 2004).

The community dietetics referral service used in this study focused on building a referral structure (based on a validated nutrition screening tool i.e. MUST (Elia, 2003)) between these healthcare professionals and the community dietitian and, using this two pronged approach, it was hoped that the majority of patients prescribed ONS would be referred to the community dietetics service. The results of this study indicated that approximately half the patients prescribed ONS were referred and therefore, it is likely that the full potential of the community dietetics intervention to improve the prescribing of ONS was not reached.

Alternative models of ensuring that ONS are prescribed appropriately other than educating the prescribers of ONS i.e. GPs and other healthcare professionals in the community have been developed and evaluated. The model of dietitian prescribing of ONS has been implemented in the Rotherham Primary Care Trust (PCT) in the UK (Ward, 2009) since this study was carried out. The Rotherham PCT community dietetic service in co-operation with the local prescribing advisory team, and with the support of senior management, developed structures and policies to allow ONS to be taken off the FP10 system§§§, and for the responsibility for prescribing of ONS to be handed over from GPs to community dietitians. The budget for ONS (which was the amount of

§§§ The NHS prescription system which allows GPs to prescribe medications to patients.
money spent on ONS in previous years by GPs) was transferred to the manager of the community dietetics service with the arrangement that any savings made could be re-invested in the dietetics service. Community dietitians then set up clinics and carried out the prescribing and monitoring of patients on ONS. Over 1,000 patients were transferred to the community dietetics service in January 2006, and by January 2007, the number had reduced to 650 after patients were assessed and advised by a community dietitian (35% reduction) and ONS were prescribed according to best practice guidelines by community dietitians. This resulted not only in management of the budget within previous ONS expenditure levels but in further costs savings (Ward, 2009).

The potential benefits of non-physician prescribing has been examined in the ROI by the Department of Health and Children, The HSE and professional organisations for nurses which have worked together to achieve legislative changes to allow nurses to prescribe certain medications under the supervision of doctors (Department of Health and Children, 2007). A similar model to allow for dietitian prescribing of ONS could be investigated by the HSE in future research. Professional organisations for dietitians such as the Irish Nutrition and Dietetic Institute (INDI) could highlight the potential advantages of such a role for dietitians in the future using evidence from studies such as this.

Alternatively, the health service in the ROI could consider methods to incentivise or compel GPs to refer patients to a community dietetics service, if available, before prescribing ONS. Further research and GP stakeholder consultation is required to determine what methods would be effective in achieving such a change in practice.
The development and dissemination of national and local written guidelines to guide prescribers in the community on the use of ONS is one strategy to promote evidence-based use of these products in the UK (National Health Service National Prescribing Centre, 1998a; National Health Service National Prescribing Centre, 1998b). However, international evidence suggests that written guidelines alone are not an effective way to change medicine prescribing practices in the long term (Ostini et al., 2009) and there has been some evidence from a study in the UK to suggest that written guidelines without a nutrition education programme have not been effective in changing ONS prescribing practices (Noble, 2011).

8.7.3 Nutrition screening: the need for national and local policy development and implementation

It is known that malnutrition is linked to poorer health outcomes for individuals and that patients who are malnourished have increased healthcare costs compared to those who are not malnourished (Stratton, 2005; Elia et al., 2005b). In order to treat existing malnutrition and prevent the development of malnutrition in those who are at risk, these individuals must be identified. It has been recommended that the most effective way to do this is for nutrition screening programmes to be put in place (NICE, 2006).

This study showed that in the geographical region where the study was carried out there was an absence of nutrition screening in the community in general practices, private nursing homes, and by community nurses before the implementation of the community dietetics intervention.

The results of this research suggest that there is an urgent need for national and local policies in the ROI for nutrition screening in the community, as have been
developed in the UK (NICE, 2006). Nutrition screening cannot be considered optional as evidence exists to show that healthcare professionals do not identify all patients at risk of malnutrition during routine clinical practice (Elia et al., 2005a; NICE, 2006; Fikree, 2010; Volkert et al., 2010; Leslie, 2011).

In order to ensure that nutrition screening is carried out in the community, there needs to be national and local policies developed jointly by healthcare providers, relevant government agencies, and professional organisations with an interest in addressing malnutrition. However, there is evidence that policy development alone will not ensure that nutrition screening is carried out by healthcare professionals (Porter et al., 2009). Policy implementation needs to be linked to nutrition education programmes and appropriate referral structures, to ensure that healthcare professionals are competent and have sufficient knowledge and support to implement nutrition screening.

Following the completion of this research in 2008, the community dietetics service met with all relevant stakeholder groups including GP representatives, local acute hospital management, and community nurse management to discuss the need to develop local policies in relation to nutrition screening for malnutrition in adults.

One of the benefits to carrying out this research was that local data was made available to demonstrate the need for the development of such policies and to identify some of the potential barriers and difficulties to the implementation of nutrition screening. One such example was the lack of nutrition education provision for healthcare professionals apart from that provided by the nutrition industry. While there is international evidence available for the benefits of the implementation of nutrition screening, it may be advantageous for community dietetics services to collect local data to convince their own healthcare management to implement and support nutrition
screening policy development and the channelling of resources into the development of new structures to support these policies.

8.7.4 Prevention of malnutrition: the need for health promotion nutrition interventions for older persons

The results of this study particularly the influence of social factors on patients requirement for ONS suggest that health promotion initiatives for healthy older persons to address the prevention of malnutrition may be worthwhile.

It has been argued that that although interventions aimed at secondary prevention of malnutrition such as nutrition screening have been adopted with some success in different healthcare settings, there has not been equal emphasis on the development or evaluation of nutrition education programmes for healthy older people and that research in this area is lacking (Sahyoun, 2002). There is some evidence that nutrition education programmes for older people have been successful in changing food related behaviours, such as increasing fruit and vegetable consumption and improving overall health status (Wellman et al., 2007). The use of peer educators as facilitators for nutrition education programmes for older persons has been found to be acceptable to participants and facilitators (Hyland et al., 2006). However, studies which have investigated health promotion programmes, peer-led or otherwise, specifically targeting a future risk of malnutrition for healthy older persons are lacking in the ROI. This represents a potential area for future research and development by community dietetics and health promotion services.
8.7.8 References


O’ Dwyer, C. & Timonen, V. (2008) The Role and Future Development of the Meals-


CHAPTER 9

DISSEMINATION AND EXPLOITATION

9.1 Dissemination

9.1.1 Conferences and publications

9.1.2 Dissemination within the health service executive

9.1.3 Dissemination to stakeholders

9.2 Exploitation

9.2.1 Oral nutritional supplement national guidance for healthcare professionals

9.2.2 Community nurse training and guideline development

9.2.3 Further use of the community dietetic intervention

9.2.4 Health promotion initiative for older persons
9. DISSEMINATION AND EXPLOITATION OF THE RESULTS

9.1 Dissemination

The importance of dissemination of the results of the research outside the Community Nutrition & Dietetic Department where the study was carried out was recognised from the outset of the research. The research methods and results were described in three academic papers which were published by a British peer-reviewed nutrition and dietetics journal in order to disseminate the results to academic, healthcare professional and other interested parties both nationally and internationally (Chapter 5, Chapter 6, Chapter 7). Dissemination of the study results to local hospital and community dietitians and to relevant local and national senior managers within the Health Service Executive (HSE) was also important. Since 2008, some of the findings from the research have been used by the HSE in a number of initiatives which aim to achieve economies within the organisation, while maintaining high standards of patient care.

9.1.1 Conferences and publications

The list of publications and presentations presented at the beginning of this thesis includes the details of oral and poster presentations, peer- and non-peer reviewed publications arising from the work carried out for this thesis. Copies of abstracts and posters are included in Appendix I. Chapter 5, Chapter 6 and Chapter 7 describe the peer-reviewed academic papers.
9.1.2 Dissemination within the Health Service Executive (HSE)

The results of this research were communicated to HSE senior management in the following internal reports and presentations:


- Presentation to directors and assistant directors of the HSE Shared Care Primary Care Reimbursement Service (PCRS). 2007.

The results of the project were included in a number of national internal reports within the HSE including:


Local dissemination of the research results included:

- Presentation by SK to directors and assistant directors of public health nursing Co. Westmeath (2008).
• Presentation by SK to joint working group of hospital consultants and GP representatives (Longford/Westmeath) chaired by the local healthcare manager (2009)
9.1.3 Dissemination to stakeholders

Dietetics colleagues:

- Oral Presentation by SK at Irish Nutrition and Dietetic Bi-Annual research study day (2008).
  Title: „An educational intervention including „MUST’ is successful in improving knowledge about oral nutritional supplements and prescribing practice among community-based health professionals’
- Presentation by SK to the annual national meeting of hospital and community dietitian managers in the ROI (January 2009).

Dissemination to other stakeholders:

- Presentation to Third Age Foundation **** (date). (March 2010).
- Presentation to the National Senior Helpline†††† (date). (March 2010).
- Presentation to clinical nutrition industry (date). (May 2010).

**** The Third Age Foundation is a voluntary, community organisation which aims to empower local communities throughout Ireland by promoting to best effect the resource its older people represent.
†††† The Senior Help Line is a national confidential listening service for older people provided by trained older volunteers
9.2 Exploitation

Evidence for the exploitation of the study results is provided in the following documents and HSE initiatives:

9.2.1 Oral nutritional supplement national guidelines for healthcare professionals

In 2009, the HSE also established a multidisciplinary working group\(^{15}\) to develop “user-friendly” guidance for the prescribing of ONS by GPs. The prescribing guidance developed by this group was disseminated to all GPs and community nurse managers in the ROI (HSE, 2009). A copy of the guidance is included in Appendix III.

9.2.2 Community nurse training and guideline development

A HSE Dublin Mid-Leinster multidisciplinary policy development group led by community nursing and supported by the community nutrition and dietetic service was formed and published guidelines in 2009:


The HSE Dublin Mid-Leinster Community Nutrition and Dietetic Service has used the nutrition education programme described in this research to educate 180 community nurses in the four midlands counties during 2009 and 2010. Community nurse patient

\(^{15}\) SK was invited to participate in this working group as a result of this research
records are currently (2011) being audited to assess compliance with Guideline Number PHN015 described above.

9.2.3 Further use of the community dietetics intervention

- Management of malnutrition in the community information sharing day for community dietitians (March 2009).
- Management of malnutrition in the community information sharing day for community dietitians (May 2010).

By December 2010, community dietitians in eight of the ten community dietetic departments in the ROI had used the community dietetics intervention described in this thesis and the nutrition education programme had been used to educate almost 400 healthcare professionals nationally (122 GPs, 216 community nurses, 35 practice nurses, and eight other healthcare professionals). The work carried out by SK, CG and the other community dietitians involved in the initiative was formally acknowledged by HSE senior management in 2010 (Appendix III).

A report on Dietitian prescribing was published by the Irish Nutrition and Dietetic Institute in 2010.

9.2.4 Health promotion initiative for older persons

The results of this research have been used to inform the development of a health promotion intervention for older persons. In 2010, collaboration between the Community Nutrition & Dietetic Service HSE Dublin Mid-Leinster (Midlands Area), the National ONS Working Group, the Health Promotion Service HSE Dublin Mid-Leinster, and relevant consumer groups (listed above) resulted in the development of a health promotion initiative for healthy older persons called ‘Eating Well into the Future’ which aims to help prevent older persons developing future malnutrition through a peer nutrition education model.
APPENDICES