A cluster randomised trial of the leg ulcer prevention programme (LUPP) in venous leg ulcer patients within an Irish Community Care setting.

Emer Shanley
Royal College of Surgeons in Ireland, emershanley1@gmail.com

Citation
Shanley E. A cluster randomised trial of the leg ulcer prevention programme (LUPP) in venous leg ulcer patients within an Irish Community Care setting. [MSc Thesis]. Dublin: Royal College of Surgeons in Ireland; 2012.
A cluster randomised trial of the leg ulcer prevention programme (LUPP) in venous leg ulcer patients within an Irish Community Care setting.

1 Volume.

Emer Shanley,
RGN, PG Dip Tissue Viability and Wound Management.

Registered College Address: Royal College of Surgeons in Ireland,
123 St Stephen’s Green, Dublin 2.

Member of the Royal College of Surgeons in Ireland.

Submitted to the Royal College of Surgeons in Ireland, School of Postgraduate Studies.

Submitted for the award of the degree of Master in Science (Research).

May 2012.

Research registered at the Royal College of Surgeons in Ireland, School of Postgraduate Studies.

Supervisor: Dr. Zena Moore, PhD, MSc, PG Dip, FFNMRCSCI, Dip Management, RGN, Lecturer in Wound Healing & Tissue Repair & Research Methodology, Faculty of Nursing & Midwifery, Royal College of Surgeons in Ireland.
# Table of Contents

<table>
<thead>
<tr>
<th>Acknowledgements</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abstract</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Chapter 1: Introduction and significance of the study</strong></td>
<td>1</td>
</tr>
<tr>
<td>1.1 Overview</td>
<td>2</td>
</tr>
<tr>
<td>1.2 Research Question</td>
<td>6</td>
</tr>
<tr>
<td>1.3 Research Aims</td>
<td>6</td>
</tr>
<tr>
<td>1.4 Research Objectives</td>
<td>6</td>
</tr>
<tr>
<td>1.5 Definition of Terms</td>
<td>7</td>
</tr>
<tr>
<td>1.6 Presentation of Dissertation</td>
<td>7</td>
</tr>
<tr>
<td>1.7 Summary</td>
<td>8</td>
</tr>
<tr>
<td><strong>Chapter 2: Literature Review</strong></td>
<td>10</td>
</tr>
<tr>
<td>Introduction</td>
<td>11</td>
</tr>
<tr>
<td>2.1 Search Strategy</td>
<td>12</td>
</tr>
<tr>
<td>2.2 Prevalence</td>
<td>12</td>
</tr>
<tr>
<td>2.3 Cost/impact</td>
<td>13</td>
</tr>
<tr>
<td>2.4 Guidelines</td>
<td>14</td>
</tr>
<tr>
<td>2.5 Education</td>
<td>15</td>
</tr>
<tr>
<td>2.6 Self- management</td>
<td>17</td>
</tr>
<tr>
<td>2.7 Change Management</td>
<td>19</td>
</tr>
<tr>
<td>2.8 Definition of recurrence of leg ulcers</td>
<td>20</td>
</tr>
<tr>
<td>2.9 Preventing recurrence</td>
<td>20</td>
</tr>
<tr>
<td>2.10 Leg ulcer clinics</td>
<td>23</td>
</tr>
<tr>
<td>2.11 Adherence</td>
<td>24</td>
</tr>
<tr>
<td>2.12 Education to reduce recurrence of venous leg ulcer</td>
<td>26</td>
</tr>
<tr>
<td>2.13 Conclusion</td>
<td>28</td>
</tr>
<tr>
<td>2.14 Methodology issues and discussion</td>
<td>29</td>
</tr>
</tbody>
</table>
CHAPTER 3: Methodological Underpinnings of Research

3.1 Introduction 33
3.2 Evidence Based Practice 33
3.3 The application of research 34
3.4 Economics and Evidence-Based Practice 36
3.5 Generation of evidence in nursing: the qualitative versus quantitative debate 36
3.6 Bias 39
3.7 Quantitative research designs: Survey design 40
3.8 Quasi-experimental design 41
3.9 Randomised controlled clinical trials 42
3.10 Randomisation 43
3.11 Allocation concealment 45
3.12 Baseline comparability 45
3.13 Blinding 46
3.14 Intention to treat 47
3.15 Reporting clinical trials 47
3.16 Summary 48

Chapter 4: Methods

4.1 Introduction 50
4.2 Research Question 50
4.3 Hypotheses 50
4.4 Research Aims and Objectives 50
4.5 Research design 51
4.6 Study Outcomes 52
4.7 Methods 53
4.8 Study Setting 54
4.9 Access 54
4.10 Ethical Issues 54
4.11 Randomisation Schedule 55
4.12 Sample Size 56
4.13 Study Subjects 57
4.14 Subject recruitment 58
4.15 Staff Education 58
4.16 Baseline screening 59
4.17 Interventions 59
4.18 Reliability & Validity 61
4.19 Study Duration 61
4.20 Data Collection 61
4.21 Data Analysis 63
4.22 Summary 64

Chapter 5: Findings 65

5.1 Introduction 66
5.2 Methodology 66
5.3 Findings 66
5.3.1 Demographics 68
5.3.2 Age: Control and Intervention 70
5.3.3 Compression Therapy Use 70
5.4 Research Hypothesis 72
5.5 Client Health Knowledge & Behaviours – Control versus Intervention groups at baseline 74
5.6 Baseline Knowledge 75
5.7 Compression awareness 80
5.8 Satisfaction with LUPP 81
5.9 Client Health Knowledge – Pre / Post (Intervention group) 82
5.10 Client Health Behaviours - Pre / Post (Intervention group) 87
5.11 Control group – baseline knowledge versus post-LUPP knowledge 89

5.12 Qualitative Findings 94

Chapter 6: Discussion of Findings 97

6.1 Introduction 98

6.2.1 Gender and Age 98

6.2.2 Number and duration of current ulcer(s) 99

6.2.3 Diagnosis 99

6.2.4 History of recurrence 100

6.2.5 Body-Mass Index 101

6.3 Compression for management of Venous Leg Ulceration 102

6.4 Compression for prevention of recurrence of Venous Leg Ulceration 104

6.5 Knowledge 106

6.6 Knowledge post intervention 109

6.7 Knowledge and the Adult Learner 113

6.8 Client Health Behaviours 116

6.9 Participant Satisfaction with LUPP 120

6.10 Wound Status 121

6.11 Qualitative Findings 121

6.12 Summary of Main Findings 123

6.13 Conclusion 125

Chapter 7: Conclusion 127

7.1 Introduction 128

7.2 Strengths and Limitations of the study 131

7.3 Recommendations for Practice 134

7.4 Dissemination for practice 136
7.5 Reflection

7.6 Conclusion

References 140

Appendices 165

Appendix 1: Letter to Director of Nursing 166
Appendix 2: Ethical Approval 168
Appendix 3a: Participant Invitation Letter 169
Appendix 3b: Study information Leaflet 171
Appendix 4: Consent Form 174
Appendix 5: Pre-LUPP questionnaire 178
Appendix 6: Post-LUPP questionnaire 184
Appendix 7: LUPP booklet 194

Tables

Appendix A: Pre-LUPP knowledge score control/intervention 250
   Post-LUPP knowledge score control/intervention 251
   Pre & post-LUPP knowledge score intervention group 251
   Pre & post-LUPP knowledge score control group 252
Appendix B: Post-LUPP % score control/intervention 253
   Post-LUPP frequency control/intervention 254
   Pre-LUPP score-age related 255
Acknowledgements

The researcher wishes to thank the following whose help and support assisted in the completion of this dissertation.

Dr. Zena Moore for her constant encouragement, direction and support. Zena, you are truly an inspiration and it has been a pleasure working with you.

Suzanne Kapp, and her colleagues in Australia, who graciously, allowed me to implement their LUPP.

The Nursing Management in my place of work who facilitated me to study for my Masters Degree in Nursing (Research), and in particular to Violet who has been a constant support throughout this journey.

The Faculty of Nursing and Midwifery, Royal College of Surgeons in Ireland, who awarded a research bursary, to carry out this research.

My colleagues, in all the primary care centres, where this research was carried out.

The participants who took part in this research and completely engaged with the program.

To my amazing children, Brian and Mai, who have encouraged and supported me throughout my studies and never once complained about late dinners or having to sort out computer glitches for their technophobe Mum. Also to Paraic and Liam for all their help, I hope I haven’t put you off college for life.

Anthony, you have been a rock and I know I couldn’t have done this without your support and advice.

A special word of thanks, to Phil, Yvonne, Mick, Maurice, Karen, Bill, and Joan for their help, support and encouragement throughout this study. I could not have completed this dissertation without you all.
Abstract

Objective: This purpose of this study was to determine the effects of a Leg Ulcer Prevention Programme (LUPP) on patient’s knowledge of, and attitudes and behaviours towards, leg ulcer prevention within the Irish community care setting. Method: The research design employed in this study was a multi-centre, open label, cluster, randomised controlled trial. Participants (average age 74.8 years) had attended the nurse-led clinic in the previous twelve months and had a history of venous leg ulceration. Participants (51) were divided into two groups: a control group, which received ‘usual’ care and an intervention group, which was exposed to the education programme. A pre and post-intervention evaluation was used and a control group was included in the design to examine any statistical difference between patients participating in the education programme and those receiving usual care. Data were analysed, stored and presented using Predictive Analytics Software (PASW) Statistics for MS Windows Release 18.0 (SPSS Inc. Chicago, IL, USA). Results: There was no statistical significant difference between groups regarding baseline knowledge. Post-LUPP the knowledge score of the control group was lower, whilst there was a statistically significant improvement in the knowledge score of the intervention group ($p < .001$). The proportion of correct answers for the intervention group increased statistically significantly in nearly every case. Conclusion: LUPP was developed to provide an evidence-based resource for clinicians and organisations to optimise the prevention of recurrence. The programme is delivered in multimedia format and is focused on key elements, which prevent recurrence and promote healing. The findings suggest that LUPP has a positive impact on patients’ knowledge of venous leg ulcer prevention.
Chapter 1: Introduction
Introduction and significance of study

1.1 Overview

Leg ulceration is defined as a breakdown of the epidermal and dermal tissue of the leg or foot due to any cause, which fails to heal (Moffat & Harper, 1997). Leg ulcers are a significant healthcare issue impacting negatively on healthcare costs and quality of life (Hyde et al. 1999; Edwards et al. 2002; Rich and Mc Lachlan, 2003; Harrison et al. 2005). Approximately 70% of ulcers are caused primarily by chronic venous insufficiency, with 20-25% attributed to arterial or mixed disease (Nelson et al. 2003). In Ireland, the prevalence of leg ulcers has been noted as 0.12% increasing to 1.03% in people over 70 years of age (Cornwall et al. 1986; Baker et al. 1991; O’Brien et al. 2000). Recurrence rates are poorly researched, as there is no consensus on the definition of recurrence (Nelson et al. 2000), however, some studies report a variation in rates from 10% to 69% at twelve months (Harper et al. 1995; Moffatt 1995). Many ulcers recur within the first three months of healing (Moffatt and Dorman, 1995; Vowden and Vowden, 2006). A 2006 study found that up to 28% of people with leg ulcers had up to ten episodes of ulceration (Vowden and Vowden). Interestingly, this study also found that for people who did not comply with compression stockings post healing all had a recurrence within 36 months.

The literature clearly outlines the impact of leg ulcers on the individual; all activities of daily living are affected, with pain being a constant problem (Persoon et al. 2004). From an economic perspective, the costs associated with leg ulcer management are substantial; indeed it is estimated that €9.9 million is spent annually on leg ulcer management in Ireland (Posnett and Franks, 2008).
The purpose of this research is to determine the effect of an education programme on patients’ knowledge, attitudes and behaviours towards leg ulcer prevention. As with other chronic conditions, venous leg ulceration requires self-management and in order to enable patients to engage in preventative behaviours, a structured education programme is necessary. A change in the focus of leg ulcer care is needed; viewing wound healing as the only desirable outcome is inappropriate as the underlying cause, chronic venous insufficiency, will always be present. Thus, merely focusing on healing does not address the problem of recurrence; prevention also needs to be considered. Therefore, Briggs and Flemming (2007) suggest that leg ulceration is addressed as a chronic, rather than an acute event.

The Health Service Executive’s (HSE) Transformation Document 2007-2010 (HSE 2006) expresses a fundamental purpose; to enable people to live healthier and more fulfilled lives. Included in its priorities is a desire to configure primary, community and continuing care in order to implement a model for prevention and management of chronic diseases. The Madden Document, ‘Building a Culture of Patient Safety’ (2008:page 3), discusses how the Irish healthcare system should be based on the vision “knowledgeable patients receiving safe and effective care from skilled professionals in appropriate environment with assessed outcomes”. The National Best Practice and Evidence Based Guidelines (2009), although outlining the importance of education, do not currently recommend a specific formal education programme.

Nurse-led clinics offer an opportunity to provide on-going education to patients (Brooks, 2004). Indeed, a literature review of the effects of leg ulcer clinics found that
when offering a comprehensive assessment and management service, they could improve healing rates, reduce the incidence of leg ulcer recurrence and home visit costs, and enhance individual quality of life (Rayner, 2007). For nurses working in a community setting it can be difficult to implement an education component in leg ulcer care as the HSE does not provide patient information leaflets, even though the guidelines do stress the importance of patient education (National Best Practice and Evidence–Based Guidelines). The advice given to patients varies depending on the nurses’ knowledge and attitudes. Indeed a study by Van Hecke et al. (2008) found that patients with leg ulceration often received less than optimal care, with a discrepancy between the evidence base and the provision of leg ulcer care.

It is based on this background that the writer therefore, evaluated a Leg Ulcer Prevention Programme (LUPP) produced by the Royal District nursing service in Melbourne, Australia, to determine its impact on patient’s knowledge, attitudes and behaviours towards leg ulcer prevention. This education programme comprises six sessions delivered once a week over a six-week period. It addresses some of the major issues surrounding prevention of recurrence, such as compression therapy, exercise, nutrition, skin care and the role of compression in preventing recurrence. The programme was delivered using electronic media, hard copy materials, activities and client diaries. A control group was included to examine any statistical difference between patients participating in the education programme and those receiving standard care.

The implications of this study are multi-dimensional: it is proposed that patient compliance will be improved through appropriate education thereby enhancing health
related quality of life. Furthermore, it is proposed that in the long term, leg ulcer recurrence will be reduced, which will have a positive impact on the costs associated with leg ulcer management. This information has not been gathered previously in an Irish setting. Data gathered will be used to guide staff and patients and will help inform development of future education programmes in the community setting for other chronic conditions.

Knowledge has been recognised as the predecessor to self-management. Chase (2000) asserts that one aspect of being able to control a phenomenon is the ability to understand the phenomenon. To enable patients to make informed decisions about their care, it is very important that they understand the implications of interventions such as compression, leg elevation and diet. A quantitative study by Brooks (2004) confirmed that there are no published trials comparing recurrence rates in patients with and without compression. However, findings by a recent Cochrane Review (2009) state that venous leg ulcers heal more rapidly with compression than without and so, in order to encourage people to wear compression long term, it is vital that they understand the importance of compression in prevention of recurrence (Nelson et al. 2009).

The National Best Practice and Evidence Based Guidelines (2009) suggest that education provided to the patient should pertain to both prevention and management of leg ulceration; furthermore, this education should be delivered in a structured manner. To date, no such education package is available in Ireland with the specific emphasis on leg ulcer prevention. Therefore, to follow the guidance of the HSE, it is essential that any such structured education programme is assessed, implemented and
evaluated. LUPP has a positive impact on patients’ knowledge and compliance with leg ulcer prevention regimens (Kapp et al. 2010). This study evaluated the impact of the LUPP on leg ulcer patients’ knowledge, attitudes and behaviour within the Irish health care setting. If the results are consistent with those in Australia, the writer will propose the adoption of the LUPP within the wider health service in Ireland. The ultimate endpoint is to enhance the quality of life of those who utilise leg ulcer services within Ireland.

1.2 Research question
The research question for this study was ‘What is the impact of education on patient’s knowledge of and attitudes and behaviours towards leg ulcer prevention?’

1.3 Research aims
The aim of this study was to evaluate the impact that a structured education programme had on patients’ knowledge of and attitudes and behaviours towards leg ulcer prevention.

1.4 Research objectives
The objectives of this study were:

- To implement the LUPP education programme and measure its impact on knowledge, attitudes and behaviours among leg ulcer patients in an Irish community setting
- To make recommendations for practice
- To contribute to the body of knowledge of venous leg ulcer management and prevention
The potential benefits for the intervention group were:

- Standardised patient education in line with evidence based practice
- Improved patient knowledge, healthy behaviours and self management practices
- Increased use of best practice compression bandaging for leg ulcer prevention
- Enhanced patient and nurse engagement in health promotion

1.5 Definition of terms

LUPP – Leg Ulcer Prevention Programme

VLU - Venous Leg Ulcer

CVI - Chronic Venous Insufficiency

HSE – Health Service Executive

1.6 Presentation of dissertation

The thesis is presented in seven chapters. It begins with an introduction followed by the literature review. This is followed by the methodological underpinnings of research and the research methods adopted. The results are presented and discussed and the strengths and limitations of the study are outlined. The writers recommendations arising from the study are presented and a conclusion is then provided.
1.7 Summary

Venous leg ulceration is a significant health care issue that requires good clinical judgement in order to enable the nurse to provide best practice, evidence based care. In Ireland, prevalence rates for venous leg ulceration are on a par with other European countries. However, with the Irish population of 65 years and over continuing to rise, one can expect an increase in prevalence accordingly. Good clear guidelines are easily available from the HSE to assist in diagnosis and management of venous leg ulceration; however, they do not address appropriate strategies for patient education. Nurses must recognise that venous leg ulceration is, in the majority of cases, a chronic condition, and care planning should focus on enabling patients to live with the condition. For optimal self management to be effective, patients need comprehensive knowledge to enhance their ability to support attitudes and behaviours towards prevention of leg ulcer recurrence. This research explored whether implementing the educational aspects of the National Best Practice and Evidence Based Wound Management guidelines (2009) is effective when carried out in the community. This writer conducted quantitative research, using a cluster randomised, open label design to establish current levels of knowledge that patients have regarding venous ulceration and prevention of recurrence. After implementation of the education programme the writer reassessed the level of knowledge of participants to establish if there was a statistical difference between the two arms of the study. The results will be disseminated to the local community care area, the health service in general and also to interested parties such as wound management groups, to maximise its positive impact.
There are many wound care programmes which deal with issues such as assessment, treatment and healing. However, for nurses working in a community setting it can be difficult to implement an education component in prevention of leg ulcer recurrence, because at present the HSE does not provide any patient information leaflets and the advice given to patients varies depending on the nurses’ own knowledge and attitudes. This research is a first step in addressing this issue as the (LUPP) is designed around key elements which promote chronic disease management and it encourages patients to participate in self management activities.
Chapter 2: Literature Review
Chapter 2: Literature Review

Introduction

Venous leg ulceration occurs as a result of impaired return of venous blood from the tissues to the heart, as a result of venous outflow obstruction, valvular insufficiency or calf muscle pump failure (Briggs and Closs, 2003). The ulcers develop as a result of the skin and tissue changes caused by chronic venous insufficiency and the associated venous hypertension (Fowkes, 1996). Leg ulceration is defined as a breakdown of the epidermal and dermal tissue of the leg or foot due to any cause, which fails to heal (Moffat & Harper, 1997). Approximately 70% of ulcers are caused primarily by chronic venous insufficiency, with 20-25% attributed to arterial or mixed disease (Nelson and Bradley, 2003). Other causes of leg ulcers include diabetic neuropathy, rheumatoid vasculitis and malignancy (Moffatt et al.1992; Simon et al.1996). In order to appropriately manage patients with venous leg ulceration, evidence based treatment must focus on optimal wound healing, which includes; reduction in oedema, prevention of complications and appropriate topical treatment (Morrison et al.1998). However, once the venous leg ulcer is healed it is important that effective strategies are provided to prevent recurrence (Finlayson et al.2009).

The challenges facing nurses in the community setting are well documented; community nurses cite difficulty in accessing wound care knowledge and lack of appropriate facilities for treating patients (Walsh and Gethin, 2009). The provision of guideline driven, evidence based care is essential to the well being of the patient. Nurses are the most regularly encountered care giver, so it is vital that nurses are well educated in leg ulcer care and that they deliver this care in a patient centred environment to achieve best possible clinical outcomes (Van Hecke et al. 2008).
2.1 Search strategy
An electronic search was carried out of CINHAL, Medline, Ebsco, The Cochrane Library databases, using key words: “leg ulcer” and “recurrence” and “patient education” with limits of “2000-2011” and “English language”, which yielded 83 studies. The limitation of English language was set as the writer was not fluent in any other language, and due to time constraints it was not practical to translate foreign language articles. Further articles were identified by following Medline links, by cross-referencing from the reference lists of major articles and by following citations from these studies. A hand search of relevant journals and conference proceedings was also undertaken and the websites of various wound care organisations were viewed. A further search was carried out of the above databases, using keywords “healthcare education” and “patient education” which yielded 145 studies. A hand search of the articles bibliographies and the guidelines bibliographies yielded more articles. The author also referred to the author’s own collection of reference material. The final amount of papers located was 170 papers. The themes that emerged were the importance of patient knowledge in relation to prevention of recurrence. The literature supported the value of nurse led clinics and outlined the importance of a structured educational programme to improve concordance amongst patients.

2.2 Prevalence
Two Irish studies have looked at prevalence of venous leg ulceration in Ireland (O’Brien et al. 2002; Mc Dermott-Scales et al. 2009). O’Brien et al. (2002) looked at the prevalence of leg ulcers in the Mid Western Health Board area, which has a rural/urban population and age and sex distribution similar to the national profile. This showed a prevalence of 0.12%, increasing to 1.03% in people over 70, with
women twice as likely as men to be affected by venous leg ulceration. This study had an excellent response rate from health care workers and therefore it was unlikely that the prevalence was underestimated. This study compares with earlier studies in Scotland and Harrow which showed a similar prevalence (Callum et al. 1985; Cornwall et al. 1986).

A multi-site census point prevalence wound survey was carried out by McDermott-Scales et al. (2009) and it found a point prevalence rate of 15.6% for wounds across nursing disciplines, with leg ulcers recording a crude point prevalence of 2.9%. This study identified a high prevalence of wounds in the community, although the true prevalence was possibly higher as this study did not include wounds from acute settings and was conducted on one day. The study also reported that 42% of patients with leg ulcers had undiagnosed aetiologies, which raised concerns about appropriate management of these patients. Recurrence rates are poorly researched, as there is no consensus on the definition of recurrence (Nelson et al. 2000); however, some studies report a variation in rates from 10% to 69% at twelve months (Harper et al. 1995, Moffatt, 1995).

2.3 Cost/impact

The literature clearly outlines the impact of leg ulcers on the individual; all activities of daily living are affected, with pain being a continuous problem (Persoon et al. 2004). From an economic perspective, the costs associated with leg ulcer management are substantial. Indeed it is estimated that €9.9 million is spent annually on leg ulcer management in Ireland (Posnett and Franks, 2008). A document by the Department of Health and Children (DoHC 2009) shows a continuing increase in
population in Ireland, with the population of those aged 65 and over set to triple in the next 30 years, and a sharp rise in life expectancy in the same age group over the last decade. This has obvious implications for health care delivery in Ireland as prevalence of leg ulcers increases with age (Callam et al.1985; O’Brien et al.2000 Graham et al.2003). With the shift in emphasis from acute settings to primary care settings, community care services are attempting to deliver quality health care to an aging population (HSE guidelines, 2009).

Up to 4% of healthcare resources are spent on the delivery of wound care (Posnett et al. 2009). When exploring the economics of leg ulcer management, other factors which should be included in the costings are nursing time, General Practitioner (GP) visits, medications, hospital care, aids and appliances and loss of work time and transport costs (Grace, 2003). Indeed, it is estimated that between 20% and 30% of community nursing time is spent delivering wound care with the majority of wounds managed in the community (O’Keefe, 2006). Addition of these factors revises upwards the estimated cost of leg ulcers and whilst it is difficult to actually cost these factors, it is apparent that venous leg ulcers have a significant financial impact on both the health care system and the patient themselves.

2.4 Guidelines

Guidelines are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances (Field & Lohr, 1990; An Bord Altranais, 2000a). The National Best Practice and Evidence Based Guidelines (2009, page 29) state that the principles of wound management (3.2) include “The clinician should provide relevant information to individuals for the
prevention of wounding and promotion of healing” and that the “clinician should maximise opportunities for teaching and learning for the individual and/or their carer”. To ensure implementation of the principles of wound management it is essential that a structured education programme is assessed, implemented and evaluated (Van Hecke et al. 2008).

A Gap analysis of guidelines for the management of venous leg ulceration by Van Hecke et al. (2008), recommended that guidelines should involve a multidisciplinary approach and involve patients. It suggested that recommendations on lifestyle advice, compliance and other quality of life factors should be addressed in future guidelines. This paper acknowledged however, that there was little research available to assess strategies to enhance patient compliance, even though compliance with compression was recognised as a critical factor in preventing recurrence.

2.5 Education

Adult education has its roots in andragogy and Malcolm Knowles introduced the concept that children and adults learn differently in the 1970’s (Knowles, 1973). Andragogy focuses on the learner and provides an alternative to the “methodology-centred instructional design perspective (Feur et al. 1988). Knowledge has been recognised as the predecessor to self-management, particularly when living with a chronic condition such as venous ulceration (Chase et al. 2000). Chase also asserts that one aspect of being able to control a phenomenon is the ability to understand the phenomenon; however, they found that patients with venous leg ulceration did not have a clear understanding of their condition nor the factors that influence healing.
To enable patients to make informed decisions about their care it is very important that they understand the implications of interventions such as compression, elevation and diet (Brookes et al, 2004). Nurses need to establish and maintain a therapeutic relationship with patients, and it is essential that patients feel that their suffering can be eased by sensitive collaboration no matter how challenging that may be (Morgan and Moffatt, 2008).

Multimedia is defined as “the delivery of information using a variety of formats” (Ciceriello et al. 2010). This includes text, audio graphics and video, all of which are provided by the LUPP. According to Ciceriello et al. (2010), the benefit of multimedia is that the combination of information delivery such as audio and video may help to override the problems presented by poor literacy and help to reinforce the information provided. The content of multimedia can be delivered at a pace that suits the viewer and repeat viewing is possible. This also helps to involve carers and families, in the education programme, and allows the information to be widely disseminated. Multimedia education can be used to deliver education to a wide range of health literacy abilities, and can also supplement teaching presentations to enable the healthcare professional to reinforce learning with patients (Adsit, 1996).

Computer aided technology (CAT) has been used to improve knowledge in patients with eating disorders (Andrews et al.1996), cancer (Wydra, 2001), in an orthopaedic setting (Yeh et al. 2005), stoma care (Shu-Fen Lo, 2010), and spinal cord injury (Pellerito, 2003). There is growing evidence that CAT programs can play a major part in health education by either augmenting traditional care or providing an educational intervention in resource challenged healthcare settings (Shu-Fen Lo, 2010). However,
qualitative evaluation of CAT needs to be incorporated into future research to assess patient satisfaction, and analyse if CAT interventions have an impact on health related quality of life (HRQoL). Furthermore, Eng et al. (1999) recommended future research using a group design with a control group to rigorously explore the effectiveness of CAT on health status as there are few randomised controlled studies available. However, Pellerito’s (2003) study did show that CAT was effective in engaging the learner in the learning process.

2.6 Self-management

The World Health Organization document ‘Shaping the future” (2003) discusses the work currently underway which is attempting to develop, improve and distribute self-management guidelines. It focuses on the need to support patients’ efforts in self-management. This document acknowledges global changes in health care delivery and the need for patients to be able to engage in self-management strategies aimed at optimal treatment management and encouraging adherence to prevention strategies.

Self-management is not intended as an alternative to medical care, rather it intends to allow the person to engage with the healthcare provider in an active way (Lorig, 1993). As factors that influence wound healing involve the whole patient, treatment is continuous, not episodic and therefore self-management is vital. To optimise self-management, patient education has to be part of the care plan (London, 2007). Health outcomes are optimised if treatment is holistic and addresses all factors that influence wound healing and prevent recurrence.
The Expert Patient Approach (National Health Service, UK, 2001) discusses how self-management programmes are intended to enable patients to manage their condition by providing the information and skills needed by the patient. These programmes are designed to work within the parameters of the medical regimen. McGowan (2005) states that self management is said to take place when an individual participates in treatment (Creer, 1976), or when the individual participates in a certain type of education, such as interdisciplinary group education based on principles of adult learning, individualised treatment and case management theory (Alderson et al. 1999).

Empowerment is defined as “the process by which individuals and groups gain power, access to resources and control over their lives” (Robbins et al. 1998 page 1). Whilst health professionals cannot empower patients, they can use strategies to enable patients to achieve it. An empowered patient is one who has the knowledge, skills, attitudes and self-awareness needed to change their behaviour and therefore improve their quality of life (McGowan, 2005). Self-management forms an essential part of the expanded Chronic Care Model (Wagner 2001). This model suggests that when informed patients cooperate with a proactive team, the result is better clinical outcomes. Even though chronic diseases are the most common and costly health issues, they are considered to be preventable and most can be effectively controlled (Centre for Chronic Disease Management). Indeed a recent document by the NHS (Equity and Excellence: liberating the patient) summarises well with the patient statement “No decision about me, without me”.
2.7 Change management

According to Lewin (1951) there are some general rules to be observed when introducing any change. It should only be introduced for good reason, such as to solve a problem, to make procedures more efficient, or to reduce unnecessary workload. Change interventions are particularly useful in addressing lifestyle changes for disease prevention and chronic disease management (Zimmerman, 2000). A change in patient lifestyle is essential in managing long-term illness such as venous leg ulceration and recurrence can often be attributed to lapses in healthy behaviour. This can often lead to patients being labelled as non-compliant or non-adherent; however labelling patients in this way shows a poor understanding of the complex nature of the behaviour change process (Zimmerman, 2000).

The stages of change model, also known as the Trans-theoretical Model of Change, (Prochaska et al. 1997), shows that patients move gradually through the pre-contemplation, contemplation, preparation, action, maintenance and relapse stages. Relapses are almost inevitable in the process of making life long changes in healthy behaviour (Zimmerman, 2000). Studies into smoking cessation and alcohol abuse (Miller et al. 1997; Kahan et al. 1995) have given researchers a new direction for health promotion and a better understanding of the change process. The developers of the “Stages of Change” model, used retrospective, prospective and cross sectional studies of the way in which people cease smoking (Prochaska et al, 1983). The National Institute for Health and Clinical Excellence (NICE) Guidelines (2007) suggests a behavioural approach can have a major impact on health by changing health related behaviour. The principles of behavioural approach are to modify current behaviour, replace it with a new behaviour and problem solving using a
collaborative approach. Helping patients to change behaviour is an important role for nurses.

2.8 Definition of recurrence of leg ulcers
The definition of leg ulcer recurrence has not been standardised but two studies reviewed by Nelson et al. (2000) suggest that recurrence is “a break in the skin lasting for six weeks”. This definition did not include whether the recurrence happened in the same position as the previous ulcer. Furthermore, Nelson et al. (2000) did not discuss the time frame between healing and recurrence, and as such the definition remains unclear. Many ulcers recur within the first three months of healing (Moffatt and Dorman, 1995; Vowden and Vowden, 2006). A 2006 study found that up to 28% of people with leg ulcers had up to ten episodes of ulceration over a lifetime (Vowden and Vowden, 2006). Interestingly, this study also found that for people who did not comply with compression stockings post-healing all had a recurrence within 36 months.

2.9 Preventing recurrence
The literature shows both gaps in and diverse approaches to preventing leg ulcer recurrence, particularly in regard to skin care, adherence and when to establish maintenance therapies (Kapp et al. 2008).

Many of the principles of managing venous leg ulcers are also important in preventing recurrence. Compression therapy is the application of externally applied pressure or static support to the lower extremity as a means of facilitating normal venous blood flow (Bryant and Nix, 2007). It has been used as early as the 17th
century and remains the cornerstone of venous ulcer management (Nelson et al. 2009). The correct compression system to use is an accurately applied system with the highest compression the patient can tolerate (Nelson et al. 2009). Nelson et al. (2000) questioned whether the application of compression bandages or stockings aids venous ulcer healing, and found evidence that venous ulcers heal more rapidly with compression than without. The outcome measures of healing were time to complete healing, proportion of ulcers healed within trial period, change in ulcer size and rate of change in ulcer size. The review was carried out to assess the effects of compression hosiery or bandages in preventing recurrence, and to determine if there was an optimum pressure or type of compression. Two randomised controlled trials were selected: Harper (1996) compared class 2 hosiery, versus class 3, in a hospital setting and reported recurrence rates of 21% and 34% respectively at 18 months, with no statistically significant difference detected; Franks (1995) compared two types of class 2 stockings in a community setting. The primary outcome measured was an incidence of ulceration anywhere on the treated leg irrespective of cause. Secondary outcomes included duration of episode of recurrence, proportion of follow up time the patient was ulcer free, patient comfort and compliance, cost of treatment and quality of life.

While Harper (1996) defined recurrence as a break in the skin lasting six weeks or more, Franks did not define recurrence and therefore a faster qualifying time may have increased reported recurrence rates (Franks, 1995). Recurrence rates at 60 months were 39% and 32% with no statistically significant difference being reported in the Franks (1995) study. The review found that whilst there is no evidence that compression prevents recurrence, this may be due to lack of evidence of benefit rather
than evidence of lack of benefit (Nelson et al. 2000). It also suggests that there is circumstantial evidence that people who do not adhere to compression therapy have a higher incidence of recurrence than those who do, but the evidence to support this is less robust. However, a limitation of both these studies was that they did not include a control group, which could segregate the effects between treatment groups (Parahoo, 1997). A quantitative study by Brooks (2004) confirmed that there were no published trials comparing recurrence rates in patients with and without compression.

In 2008, Van Hecke et al. conducted a study to determine how evidence based venous leg ulcer care was implemented in a community setting. This study found that patients with leg ulceration received less than optimal care, with a discrepancy between evidence and leg ulcer care given. Indeed, only 58.7% of patients received compression therapy with nurses mentioning the considerable cost of compression therapy as a reason for inadequate application of it. Interestingly, this study found that nurse’s knowledge was a predictor to providing leg ulcer care and that a personal interest in leg ulcer care influenced the level of lifestyle advice given. In order for the post healing or maintenance phase to be successful, patients need knowledge and understanding of their condition (Cameron, 1996; Poore et al. 2002). Vowden et al. (2006) state that patients are unlikely to commit to lifelong maintenance strategies to prevent recurrence unless they understand that they have a lifelong condition with an associated risk of recurrence.

Another element of the prevention of recurrence mentioned in the HSE guidelines is leg exercises and leg elevation (Van Hecke et al. 2008). In 2004, Heinen et al. found that leg exercises may positively affect wound-healing conditions, whilst Brooks
(2004) stated that full ankle movement and full mobility decreased the incidence of recurrence. This was disputed, by Dix et al. (2004), who found no positive effect, on venous leg ulcer healing, by leg exercises or elevation.

Skin care is necessary in the maintenance phase to promote normal skin pH. Soap substitutes can be beneficial (Kapp et al. 2008). Keeping skin moisturised is important, as dry or rough skin is more likely to be breached (Morris and Sander 2007). Early referral by patients to healthcare professionals is essential if recurrence presents (RCN guidelines, 2002; HSE, 2009), although this requires understanding of the significance of recurrence by the patient and this further highlights the need for self-management education in patients with venous leg ulcer.

2.10 Leg ulcer clinics

A quantitative study by Wong (2006) defined a nurse-led clinic as a formalised and structured healthcare delivery mode involving a nurse and a patient. With the shift in emphasis from acute settings to primary care settings, community care services are attempting to deliver quality health care to an ageing population (HSE, 2009 guidelines). Developing services, such as nurse-led leg ulcer clinics, has been shown to result in improved outcomes for the patient particularly those with venous leg ulcers (Clarke-Moloney et al. 2008; HSE guidelines 2009). Nurse-led clinics also offer an opportunity for nurses to provide continuing education to patients (Brooks, 2004).

A phenomenological study by Ebbeskog (2005) emphasised the importance of assessing the patient’s view of the health professional carrying out the leg ulcer care.
The data in the study were analysed using a method based on the phenomenological philosophy of Heidegger (1962). Findings showed that staff who explained the treatment options were viewed by participants as caring, competent and skilful, and this created a sense of security for the patient. Hopkins (2004) explored coping strategies of individuals with non-healing leg ulcers, and found that patients and practitioners differed in their understanding of concordance. Overall there is a lack of studies comparing differences in outcomes for patients receiving care in a leg ulcer clinic and through home visits when the nursing services and treatment protocols are standardised. However research suggests that nurse-led leg ulcer clinics have an important role to play in treating individuals with leg ulcers (Wong, 2006).

2.11 Adherence

According to Edwards (2003), the use of the term compliance may imply professional dominance. Searching the literature, the terms “adherent”, “compliant” and “concordant” are used interchangeably, although an awareness of patient autonomy and partnership has led to the term compliant being replaced with adherent or concordant (Lindsay, 2004; Moffatt, 2004a; Seymour, 2005). Research on adherence has dealt predominantly with other chronic medical conditions, such as diabetes and asthma, where patient’s behaviour is vital to the success of treatment (Kyngas et al. 2000). The same is true however, when dealing with chronic leg ulceration (McGuckin et al. 2001). When looking at adherence to compression therapy it is difficult to draw conclusions from studies, or compare findings, as there is a variation in the researchers’ definition of adherence (Van Hecke et al. 2008; Moffatt et al. 2009).
A study by Miller et al. (2011) explored the relationship between concordance with multilayer bandaging and patient and wound characteristics. The authors found that pain, wound size, age and wound depth were all predictors of non-concordance. This information was gathered as part of a randomised clinical trial to compare two antimicrobial products. The results showed less than 50% of patients were concordant. However, the limitations for inclusion in the trial mean that this was not representative of all patients with leg ulcers and therefore restricts the generalisability of the findings (Bowling, 2009).

Jull (2004) explored factors influencing concordance with compression stockings after venous leg ulcer healing and found many variables previously thought to influence concordance had no impact in this group of patients. Two factors were cited as distinguishing those who wore stockings and those who did not: the belief that wearing stockings was worthwhile and the belief that wearing stockings was uncomfortable. This was the first study to compare patient beliefs and attitudes in patients who are concordant and who are not. The limitations included the fact that the design relied on self-report and recall and therefore concordance may have been exaggerated (Parahoo, 1997). Also, it is difficult to measure the impact of belief in the value of stockings (Parahoo, 1997). Despite these limitations, the study does underpin the value of patient education in the promotion of wearing compression stockings to prevent recurrence. Furthermore, the authors suggest that healthcare professionals should aim to enhance the perceived value of compression stockings in order to promote adherence. Jull (2004) suggests that it is important that healthcare professionals have a positive attitude towards wearing elastic stockings in order to encourage patient’s to wear them. It may be difficult to change patient’s belief that
wearing stockings is uncomfortable, however it is important that healthcare professionals instil confidence in patient's belief that wearing them is beneficial.

A qualitative review of the literature by Van Hecke et al. (2011) looked at processes underlying patient adherence to treatments for venous leg ulceration and discussed why non-adherence was an issue. The authors found that trust in the nurse was central to patient adherence and recommended that nurses should be aware of the factors that promote adherence such as outcome expectations and fear of recurrence.

2.12 Education to reduce recurrence of venous leg ulcer

Education to prevent recurrence has to focus on key elements, which promote chronic disease management (Kapp et al. 2010). This is necessary to promote adherence to prevention strategies through empowering patients to participate in self-management strategies to supplement traditional care (Van Hecke et al. 2008). The Leg Ulcer Prevention Programme (LUPP 2010) was developed to provide an evidence-based resource for clinicians and organisations to optimise the prevention of recurrence. The programme is delivered in a multimedia format and is focused on key elements, which prevent recurrence and promote healing. It promotes chronic disease management and seeks to empower patients and encourage participation in self-management activities. Furthermore, the programme seeks to address key issues surrounding prevention of recurrence and educational requisites.

Health promotion activities have been shown to be effective in chronic disease management (Zwar et al.2006). However, with prevention of ulcer recurrence, the
challenge is to reduce the risk factors associated with peripheral vascular disease whilst actively promoting adherence to prevention strategies. Yet to date, there is a scarcity of literature on programmes, which attempt to combine these two aspects (Kapp et al. 2010).

Brook’s (2004) study explored the effect that leg elevation, exercise and ankle movement had on preventing leg ulcer recurrence, and found that patients exposed to a structured concordance programme were nine times less likely to develop a leg ulcer within one year than the controls receiving “usual care”, that is patient’s who were not exposed to the concordance programme. The sample size of this study, however, was small, and no rationale was given by the author for this (Polit and Beck, 2004). Nonetheless, further work by Flaherty (2005) also suggests that improving patient education to allow an informed choice, developing a collaborative approach between nurse and patient, and the use of health promotion activities will also improve concordance. However, despite these recommendations Flaherty (2005) does not provide validating references for this approach.

Clarke-Moloney et al. (2005) conducted a prospective study to ascertain if information leaflets for patients with VLU were effective and found that they were of limited value. However the sample size for this study was small and this may have accounted for the results (Polit and Beck, 2004). The authors (Clarke-Moloney et al. 2005) stressed the need for continuing education with reinforcement of information for this patient cohort. Other studies have also explored use of patient information leaflets (Barlow et al. 1997; Callaghan et al.1998) demonstrating more favourable outcomes. However, Patterson and Teale (1997) whilst recording better outcomes, acknowledged that the study (which was a postal questionnaire) had design flaws,
which meant the information could have been copied directly from the information leaflet or completed by carers on patient’s behalf. Providing information to patients is clearly useful but often they are followed without the patient being involved in a discussion about the rationale behind the information provided (Van Hecke et al. 2011). In order for education to be effective, the patient has to perceive value in the changes. Perceived physical improvement or feeling better reinforced the positive effects of the advice given (Van Hecke et al. 2011). Understanding the need for compression to prevent recurrence should enable the patient to be informed, skilled and motivated to adhere to the treatment demands of their illness.

2.13 Conclusion

Venous leg ulceration is a significant health care issue that requires good clinical judgement in order to enable the health care professional to provide best practice, evidence based care. In Ireland prevalence rates are on a par with other European countries, but with the Irish population aged 65 years and over continuing to rise, we can expect an increase in prevalence accordingly. Good clear guidelines are easily available to health care professionals to assist in diagnosis and management of venous leg ulceration. Preventing recurrence using compression therapy is proven to be cost effective and clinically effective.

Whilst health care professionals may view healing as a successful outcome, for patients, management of symptoms is often the desired outcome. Healthcare professionals must recognise that venous leg ulceration is a chronic condition and focus must be on enabling patients to live with the condition. Education in self-management strategies for prevention of recurrence is vitally important for patients in

28
order to enable them to understand their condition and the factors that prevent recurrence. Helping patients to change behaviour is an important role for nurses. Patients are unlikely to commit to lifelong maintenance strategies to prevent recurrence unless they understand that they have a lifelong condition with an associated risk of recurrence.

Multimedia delivery is shown to be an effective method to augment usual care and overcome difficulties with health literacy. The purpose of this research was to determine the effect of an education programme (LUPP) on patient’s knowledge, attitudes and behaviours towards leg ulcer prevention. The implications of this study are multi-dimensional: patient adherence is improved through appropriate education which improves patients health related quality of life, which in turn reduces recurrence and reduces the costs associated with treating recurrence. The information generated by this study will be used to guide staff and patients and will provide invaluable data to direct future education in this community setting. This information has not been gathered before in an Irish setting and will be shared with all groups interested in wound care.

2.14 Methodology issues and discussion

The difficulties with research into educational aspects of venous leg ulcer prevention are multi-fold. The paucity of randomised controlled trial data in assessing benefits of modalities of therapy makes comparisons difficult to validate. The usually small sample size in studies and often lack of a control group places severe limitations on what data can be gleaned from comparative trials. This necessitates the use of meta-analyses such as Cochrane review methodology to evaluate overall available data,
which may be less robust from an evidence based perspective, but often is the only meaningful way to provide data of directional importance.

The study by McDermott (2009) revealed a 42% rate of undiagnosed aetiology and is therefore unreliable to measure true prevalence. Recurrence rate is not uniformly defined and researched; a reported variance of 10% to 69% (Nelson et al. 2000) emphasised this point. There is little data available to assess compliance strategies for prevention of recurrence, even when it is widely accepted that compression therapy compliance is a cornerstone in this endeavour. There is also significant variation of definition of compliance/adherence, making it difficult to compare results from various studies. Health promotion strategies to reduce peripheral disease risk factors and promoting adherence to prevention strategies have not been studied together, and little research data is available. Costs are significant drivers in primary care for VLU, but accurate cost data for Ireland is not available, so it is not possible to provide value measures for the costs incurred. Computer aided technology to improve knowledge is used in a wide variety of diseases, but less so in VLU. However, its impact on quality of life and user satisfaction has not been conclusively evaluated.

Much of the literature challenges the parent-child relationship of healthcare professionals when dealing with patients with venous leg ulcers in terms of change management and patient empowerment. The holistic patient management argument is not new to the medical and allied professions, but this needs to be tempered with the demographics of the patient population. Inability to understand information provided, and a tendency to “regress” to the “reductionist” stage when dealing with illnesses, and that balance is not reflected in much of the literature. This is further supported by
the emerging theme that a trust in the nurse remains a key success factor in treating
VLU and its subsequent recurrence prevention. The qualitative nature of the
relationship between healing and recurrence rates and knowledge of illness is a
complex one, and much of previous research attempts to provide a credible link.
There is a huge body of anecdotal data to support a causal link, and indeed intuitively
it makes sense, but nonetheless proving the link is a scientific endeavour that needs to
be completed to support an evidence based argument. Much of the qualitative nature
of education and knowledge depends on the subjective relationship between patients
and their healthcare provider (usually a nurse in venous ulceration), and this
relationship is not often measurable in an objective manner. Finally, there is some
evidence that education of the medical and allied professions is just as critical to
enable the best evidence based practices in venous leg ulceration, but little is found in
the extensive literature search performed.
Chapter 3: Methodological Underpinnings of Research
3.1 Introduction
Florence Nightingale stressed the value of using research to guide nursing practice during the Crimean War, but it was during the 1950s that research first appeared in the nursing literature (Parahoo, 1997). The Briggs Report in 1972 stated, “Nursing should become a research-based profession” and encouraged nurses to engage with current research. The publication of the Norton pressure ulcer risk assessment scoring system by Doreen Norton (Goldstone & Goldstone 1982) was considered to be a foundation piece of research. According to Polit & Hungler (1997) several factors influenced the growth in nursing research, including the development of the nursing research journal, an increase in the numbers of nurses with academic training and funding to support nursing research. As a result, nurses became involved in research relevant to their work and the focal point of research evolved to form the basis for evidence based practice, now the cornerstone of nursing and midwifery practice (Polit & Beck, 2004). Indeed, Parahoo (1997) asserted that the main goal of research in nursing is to improve the quality of care provided to patients.

3.2 Evidence based practice
Evidence based practice (EBP) has its roots in evidence based medicine in general healthcare (Sackett et al.1996). Within nursing there has been a movement away from research-based practice towards evidence-based practice (Watson et al.2008). Consequently, translational research, building on the requirement for excellence in care delivery, has become the central tenet of nursing and midwifery involvement in EBP.
Within the medical arena, randomised controlled trials have been traditionally considered the gold standard of evidence (Sackett et al. 1996). However, true EBP does not limit itself to the RCT alone, rather includes both quantitative and qualitative research approaches. Specifically, EBP encompasses clinician expertise, the best quality evidence along with patient values, preferences and beliefs (Sredl et al. 2008). EBP refers to the identification and critical appraisal of sound evidence, be this anywhere along the hierarchy, finally its application to practice aims to improve the quality of patient care.

Goode (2000) states that although there is not agreement about what constitutes appropriate evidence, research findings from rigorous studies is generally the best evidence for appraising nurse’s decisions about patient care. Ultimately, the move towards EBP has been driven by the changes in healthcare delivery with more emphasis on efficiency and effectiveness (Youngblut and Brooten, 2001). Furthermore, the huge growth in computer aided technology, has empowered patients and improved their health care knowledge, thereby increasing demands on the health service to deliver quality outcomes (Melnyk and Fineout-Overholt, 2005; Youngblut and Brooten, 2001).

3.3 The application of research

Evidence based practice empowers nurses to make well informed, evidence based decisions through the identification of up to date clinical information, therefore leading to greater efficiency in service delivery (Youngblut and Brooten, 2001). However, research has shown that nurses prefer to be informed by colleagues or their own experience rather than from electronic sources or research libraries (Walsh and
Gethin, 2009). Fundamentally, in this way, there is a risk that the information imparted may not be up to date and as such this may impact on quality of care.

Walsh et al. (2009) explored the lived experiences of community nurses treating clients with chronic leg ulceration in a community setting, and found that a lack of structured education and access to nursing expertise were cited as factors adversely affecting practice. However, a cross-sectional survey conducted by Eizenberg in 2007, explored the relationship between nurses personal and professional factors and their involvement in evidence based practice. The authors found that nurses who held a degree were more likely to practice evidence based practice compared to those who did not. Furthermore, evidence based practice was more evident where there was workplace access to a library containing medical and nursing journals, and access to a computer and internet. Interestingly, the variables considered as predictors of evidence based practice were education, research skills, organisational support for literature searching and knowledge sources based on reading literature and experience (Eizenberg, 2010). This emphasises the importance of education and training, such that nurses may possess the skills to critically appraise and apply evidence into the clinical practice as appropriate. However, nurses striving to achieve evidence based practice can be overwhelmed by the amount of published literature available. Indeed, Levin (2001) states that over 6000 health related articles are published daily, which ultimately challenges individuals to keep abreast of the emerging literature. The Cochrane Collaboration was developed in response to this difficulty and has developed a database of systematic reviews to provide high quality systematic reviews of literature (The Cochrane Collaboration, 2006). However, a limitation of these reviews is that they focus mainly on RCTs or cluster controlled trials (CCTs)
and do not include other potentially relevant sources of information, such as cohort studies or case series (Moore & Cowman 2008).

### 3.4 Economics and Evidence-Based Practice

Evidence based practice consists of five main elements; formulating a question that will provide the correct answer, systematically gathering the most relevant literature, critically appraising the literature, applying the evidence in clinical practice and finally, evaluating the outcomes (Eizenberg, 2010). EBP can benefit healthcare delivery by promoting consistent decision making and thereby improving cost effectiveness (Le May, 1999). It benefits patients by improving access to, and information about, effective treatment (Melnyk and Fineout-Overholt, 2005). Sackett et al (1996) state that research needs to be critically appraised to ensure it has sound methodology and to identify its strengths and limitations. Moore and Cowman (2008) suggest that the researcher needs to identify the contribution the research has made to the body of knowledge. However, it is of value to engage in this process as evidence based nursing leads to streamlined nursing care, which, in turn will eradicate outdated ritualistic practice, and lead to improved clinical outcomes (Youngblut and Brooten, 2001).

### 3.5 Generation of evidence in nursing: the qualitative versus quantitative debate

Nursing research can be accomplished within two broad paradigms, positivism and naturalism (Polit and Beck, 2004). Positivism is entrenched in 19th century philosophy and it encourages the researcher to be objective in their pursuit of knowledge, using order and control to avoid bias during the research process (Polit and Beck, 2004). Naturalistic paradigms on the other hand, present an alternative for
the researcher where research findings are the result of interaction between the researcher and the participant and the findings are interpretations of the participants’ experience (Polit and Beck, 2004). As it was the intention of the writer to explore the impact of the LUPP on the participants, rather than their lived experience of leg ulceration, the research was approached from a positivist paradigm.

A research study may be classified according to whether it originated in a qualitative or a quantitative domain, although some studies involve both approaches. The qualitative paradigm embraces and analyses human speech or writing, rather than the collection of numerical data. More generally, qualitative research is used as an umbrella term for those strategies that seek to explain human behaviour in terms of reasons people have for behaving as they do (Cormack, 2000; Polit and Beck, 2006). Rather than aiming to discover cause and effect, qualitative research seeks to understand the motives that lead to certain actions. Morse (1992) describes the inductive process of qualitative research as a powerful means to develop theory, to examine the conceptual basis of a theory and move it forward in terms of understanding. Qualitative research methods include participant observation, in-depth interviews, oral histories and conversational analysis (Watson et al. 2008).

The quantitative paradigm uses a formal objective, systematic process for obtaining quantifiable information, which is presented in numerical form and analysed through the use of statistics (Parahoo, 1997). Parahoo (1997) states that in using this paradigm one is seeking to investigate the objective reality and manifestation of phenomena by gathering evidence directly or indirectly through the senses, rather than through personal beliefs or hunches (Polit and Beck, 2006). This paradigm is best used to
describe and explore relationships and to examine cause and effect. This type of research usually embraces the traditional positivist, scientific method, with less emphasis placed on individual experience (Spencer, 1983).

Quantitative research uses a reductionist approach, which means that it converts complex phenomena into simple units that can be observed or recorded (Parahoo, 1997). Some researchers argue that the reductionist approach is a limitation as it focuses only on the concept under investigation and these concepts are predetermined, by the researcher, as opposed to naturally emerging from the research (Polit and Beck, 2004). Carter (2000) however, acknowledges that quantitative research makes an important contribution to nursing practice, while Polit and Beck (2006) recognise that it has been used productively to address many nursing issues.

Information for a quantitative study is gathered using formal instruments for example questionnaires, or pre-designed data collection instruments (Polit and Beck, 2004). This information is numeric and thereby enables formal measurement and statistical analysis (Polit and Beck, 2004). Fundamentally, the approach selected by the researcher will depend on the nature of the phenomena being studied and the aim and objective of the of the research question. Quantitative research designs include descriptive, correlational, quasi-experimental and experimental research (Watson et al. 2008). The writer adopted a quantitative research approach using a cluster randomised, open label design, to establish the impact of the LUPP on patients knowledge of, attitudes and behaviour towards leg ulcer prevention.
3.6 Bias

Questionnaire design, construction and administration represent an important aspect of the research process, and if the research findings are to be credible and meaningful, data must be collected in a valid and reliable way (Parahoo, 1997). The measurement tool to be used in any research study should be evaluated in terms of the extent to which reliability and validity have been established, as this has an effect on the findings and as such the internal and external validity of the study.

Validity refers to the extent to which a study, by obtaining relevant data, measures what it is supposed to measure. Burns and Grove (2005) state that when making decisions about which findings are valid to add to the body of knowledge that already exists, uncertainty about the study’s validity provides a substantial basis. Validity is usually established by examining content validity, criterion validity and construct validity. Content validity is established by the ability of the questionnaire to effectively capture the key concepts being examined by the research (Parahoo, 2006). Criterion validity is measured by comparing the findings of a questionnaire with data collected on the same subject by another method such as another questionnaire or by using clinical observations (Parahoo, 2006). Construct validity refers to how well a questionnaire measures a particular construct (Parahoo, 2006). A construct is a concept designed by researchers for a scientific purpose (Polit and Hungler, 2005). Reliability is the extent to which the study produces similar results under the same conditions at all times (Watson et al. 2008). Reliability also refers to getting the best information available.
Bias, or systematic distortion of responses, can occur in many research situations when a set of personal preferences can impair judgement. The main sources of bias are respondents, researchers, methods of data collection, the environment and the phenomenon (Parahoo, 1997). Bias also takes the form of publication bias as non-significant findings can take longer to appear in the literature (Misakian and Bero, 1998). Language restrictions can also lead to bias if the literature search is restricted to one particular language only (Watson et al. 2008). Bias is an important issue in research because of the potential effect on the significance of the research findings (Burns and Grove, 2005). Selection bias can occur when the reviewer selects studies based on their findings (Parahoo, 1997).

3.7 Quantitative research designs

Survey design

A survey involves gaining an overview of a specific phenomenon or situation directly from those involved (Polit and Hungler, 1999). As such, the survey is appropriate for descriptive and correlational studies. Surveys are generally associated with the collection of a wide range of data from large representational samples (Parahoo, 1997). The central focus of a survey is very often “on what people do, how or what they eat and so forth” (Polit and Hungler, 1995). The main methods of data collection include questionnaires, structured and semi-structured interviews, although observations can also be used. Surveys are a design of choice for correlational studies, which attempt to find associations between two or more variables of interest. Cowman (2008) states that in nursing research the questionnaire is one of the most utilised methods of data collection and it provides one of the quickest and least expensive ways to collect large amounts of data. The disadvantages of survey can be
an over-reliance on participants’ recall (Parahoo, 1997). The rationale for using a questionnaire is based on the desire to collect responses from a widely distributed population, and to allow for better statistical analysis and possible generalisation of findings (Watson et al., 2008). A pre-designed questionnaire was considered appropriate in the writer’s study as it is designed to collect large amounts of data.

3.8 Quasi-experimental design

Quantitative research can be described in two main categories; experimental and non-experimental (Watson et al. 2008). Non-experimental research includes correlation and descriptive designs and is intended to describe or examine relationships. According to Parahoo (1997) experimental research should be tightly controlled, use random sampling and include a control and intervention group. A study that lacks one of these attributes is referred to as quasi-experimental (Parahoo, 1997). Brooks et al. (2004) used a quasi-experimental design to evaluate the effects of a structured nurse-led education program that aimed to improve patient concordance and prevent venous leg ulcer recurrence. The control group received usual care whilst the experimental group was exposed to the education program. Outcomes measured were recurrence rates at one year, the effects of education on behaviour and the effect on recurrence of having both ankle movement and general mobility, which were measured at one year. Patients in the experimental group experienced significantly less recurrence over one year (log rank test = 8.28, p = 0.004). However the patients in the control group were less mobile and had less ankle movement at baseline and this may have adversely affected the outcome of recurrence in this group. In quasi-experimental design it is not possible to state with confidence that the intervention is responsible for the effects
measured even though strong links can be established (Parahoo, 1997), and for this reason the quasi-experimental design was not selected.

3.9 Randomised controlled clinical trials

Randomised controlled trials have been used in medical research since the 1940’s (Burns and Grove, 2005). An RCT is described as an experiment where participants are either allocated randomly to a control group or an intervention group or more than one control or intervention groups depending on the number of interventions (Parahoo, 1997). According to Parahoo (1997) experimental research should be tightly controlled, use random sampling and include a control and intervention group. Control refers to controlling factors that may be a threat to the validity of the findings and random selection of participants is a way of ensuring control (Burns and Grove, 2005). Ideally, a representative, randomly selected sample of participants should be equally assigned to either the control or the intervention group (Watson et al. 2008). A control group is included to provide a standard for comparison of a new therapy or intervention, to eliminate positive bias towards intervention such as a placebo effect, to protect against negative bias regarding adverse experiences and to enhance scientific acceptance of study results (Watson et al. 2008).

Moore and Cowman (2011) used a cluster-randomised controlled trial (CRT) to compare the incidence of pressure ulcers amongst older persons nursed using two different repositioning techniques. The 30º tilt was compared with usual care, which was repositioning every six hours using the 90º lateral rotation. The advantages of CRTs include the ability to test interventions under the conditions of actual use, and the ability to control for contamination across individuals. The writer chose to
conduct a cluster randomised controlled trial for this study as it met the criteria to study the intervention chosen for this research.

3.10 Randomisation

A population can be defined as the total number of units from which data can be potentially collected (Parahoo, 1997). Parahoo (1997) defines a sample as a proportion of the population; a carefully selected sample provides data, which represents the population from which the sample is drawn. Probability sampling involves random selection of the elements (Polit and Beck, 2004) and greater confidence can be placed in the representativeness of the sample. Randomisation is the process used to ensure that each individual in the population has a greater than zero chance of being selected for the sample (Burns and Grove, 2005). In non-probability sampling, elements are selected by non-random methods and therefore each element does not have an equal possibility for inclusion (Polit and Beck, 2004).

When conducting inferential statistical analyses of data it is assumed that the sample has been selected randomly (Burns and Grove, 2005). The use of random selection reduces the risk of systematic bias as the researcher theoretically, has no control or influence over selection of individuals and therefore it increases the validity of the study (Burns and Grove, 2005). Simple random sampling can be easily achieved using a computer to randomly select a sample from the sample frame (Burns & Grove, 2005).

Cluster randomisation is the random assignment of intact groups of subjects rather than individual subjects, to treatment conditions (Polit and Beck, 2004). According to
Mazor et al. (2007), cluster randomised trials generally focus on effectiveness of interventions by evaluating outcomes under conditions of actual use. However, Donner et al. (2004) states that cluster randomised trials may have statistically reduced efficiency compared to trials that randomise the same number of individuals due to variance inflation. Mazor et al. (2007) state that the benefits of cluster randomised trials can outweigh these limitations in certain circumstances.

Cluster randomisation is considered appropriate where there is a risk of contamination of data collection, such as when individuals in a group are randomised to receive an intervention and there is a risk that they may influence others within the group (Christie et al., 2009). Cluster randomisation is often considered when the intervention itself, is designed to be delivered to groups of people rather than to individuals. It is also chosen when the intervention itself requires a change of behaviour from the professional delivering the intervention in order to have an impact on the patient outcomes (Christie et al., 2009). Use of cluster randomisation is common in research; for example, Moore and Cowman (2011) used a cluster randomised controlled trial to compare the incidence of pressure ulcers among older persons nursed using two different repositioning techniques. In a further study, O’Halloran et al (2004) used a cluster RCT to evaluate a policy to provide hip protectors and other researchers such as Christie et al (2005), evaluated home visitation schedules offered to first time mothers by health visitors using a cluster RCT. All studies successfully applied the principles of cluster randomisation, and as the writer wished to determine the effect of an educational intervention, cluster randomisation was appropriate for this study.
3.11 Allocation concealment

Watson et al. (2008) state that the process of random allocation should be hidden from the researcher in order to reduce the risk of selection bias. This is important in clinical trials as it reduces the risk of outcome differences potentially explained by the differences between the groups as opposed to the treatment itself (Watson et al. 2008). Methods used to ensure allocation concealment include telephone randomisation, sequentially numbered opaque envelopes and random number sequences. In 2011, Odgaard-Jensen et al. conducted a Cochrane review of randomisation to protect against selection bias in healthcare trials. This review found that results from trials with adequate allocation concealment differed from trials with inadequate allocation concealment. Indeed, the trials with inadequate allocation concealment produced higher estimates of effects than those with adequate allocation concealment. Schulz (1995) concluded that clinical trials without adequate allocation concealment could produce estimated effects of up to 40% higher than trials with adequate allocation concealment, although Odgaard-Jensen et al. (2011) suggest that more reliable results would be available if trials of the same intervention or condition were analysed. Nonetheless, the evidence suggests that care should be taken to apply the principles of allocation concealment such that the researcher does not unwittingly introduce bias to the study. The writer applied this principle in this study.

3.12 Baseline comparability

In clinical trials, baseline data are recorded for each participant and usually include demographics, medical condition and medical history (Pocock, 2002). The purpose of collation of baseline data is to describe the characteristics of the participants in the
study and to determine if the groups are equivalent at the beginning of the study (Pocock, 2002).

The baseline data describe if the randomisation has successfully ensured comparable groups at baseline further adding credibility to the results of the trial (Pocock, 2002). Indeed, Pocock (2002) argues that baseline comparability is important in determining the quality of clinical trials in order to assess if the findings can be extrapolated. The writer achieved baseline comparability in this study, as there was no statistically significant difference between the groups at baseline.

3.13 Blinding

In order for a study to be blinded, outcome assessors and researchers must be unaware which intervention, was received by the participant (Parahoo, 1997). However this is not always possible, as treatments or interventions do not always look the same; for example, different turning regimens or iodine versus non-iodine dressings (Moore and Cowman, 2005b). Thus, it may be impossible to apply the principles of blinding. However, if the participants or researchers have knowledge of which interventions the control or intervention group are receiving this can introduce bias on the part of the participant or the researcher (Parahoo, 1997).

RCT’s can be classified as single-blind, double–blind or triple-blind; however, the Consolidated Standards of Reporting Trials (Consort 2010) statement suggests that authors should only state if blinding was done and how (Moher et al. 2001). Schulz (2000) states that blinding is not the most important consideration in assessing the quality of clinical trials, where blinding is not possible other factors should be used to
assess quality. It was not possible to blind this study as the writer delivered the intervention, which was clearly different to the type of care previously delivered to the participants.

3.14 Intention to treat

Intention to treat (ITT) is a plan of action designed to analyse RCTs to ensure that participants are analysed in the groups to which they were originally randomly assigned (Hollis et al. 1999). It is taken to mean inclusivity of all patients irrespective of whether they actually received the treatment, adhered to the program or withdrew (Hollis et al. 1999). Indeed, the Consort statement acknowledges that RCTs avoid bias by random allocation and thus, in order to preserve this all randomised participants should be analysed in the group to which they were allocated. The Consort group suggests that whilst most RCTs have patients without an observed outcome, if they are excluded from the analysis, it is then not strictly an intention to treat analysis and therefore bias may be introduced. The principle of ITT analysis was applied in the writers study.

3.15 Reporting clinical trials

Randomised controlled trials provide dependable evidence in relation to healthcare interventions, providing they have been conducted well (Higgins et al. 2011). In order for the reader to assess the possibility of bias, reporting of clinical trials needs to be systematic. The Cochrane Collaboration (2005) developed a risk assessment tool to assist in assessing the quality of randomised trials. This tool covers six domains of bias: selection bias, performance bias, detection bias, attrition bias, reporting bias, and other bias.
The Consort statement was developed in 1996 and revised and published in 2001 (Moher et al. 2001). The checklist contains 22 items which were selected based on evidence that suggests that certain information is necessary to judge the relevance of the findings. Indeed, unreported information may be associated with bias (Moher et al. 2001). The Consort statement was designed to encourage openness in reporting methods and results in order to enable the reader to correctly interpret the study findings. The writer in this study, where applicable, adhered to the principles of the Consort statement in order to enable critical appraisal of the study.

3.16 Summary

EBP is now the cornerstone of nursing and midwifery practice. It includes quantitative and qualitative research and values clinician expertise and patient’s values, preferences and beliefs. EBP benefits patients by enabling nurses to make informed evidence based clinical decisions. However, nurses striving to achieve evidence-based practice can be overwhelmed by the amount of published literature available. The Cochrane Collaboration was developed in response to this difficulty and provides a database to provide high quality systematic reviews of literature. The Consort group provides guidelines for reporting clinical trials, which in turn enables the clinician to appraise the literature. Consort was designed to encourage openness in reporting methods and results in order to enable the reader to correctly interpret the study findings. The writer, having cognisance of the methodological aspects of design endeavored to include the recommendations in the current study, as applicable. The specifics of the methods employed are outlined in the next chapter.
Chapter 4: Methods
4.1 Introduction
This chapter describes how research investigating the effect of an education programme on patient’s knowledge, attitudes and behaviour towards leg ulcer prevention was devised, conducted and analysed. The aims and objectives of the study and chosen research design are discussed; and the research setting is described. The rationale for the sampling method is given and the inclusion and exclusion criteria are identified. This is followed by a discussion of the process for ethical approval and the ethical principles and considerations as they pertain to this study. Validity and reliability of the data collection tool and the techniques used in data analysis are examined. Finally, data analysis is outlined and is followed by a conclusion to the chapter.

4.2 Research Question
The research question for this study was ‘What is the impact of education on patient’s knowledge of and attitudes and behaviours towards leg ulcer prevention?’

4.3 Hypotheses
The null hypothesis for this research was that patient’s following the LUPP education program for the prevention of leg ulcers will have no more knowledge than patients receiving usual wound care in the community.

4.4 Research Aims and Objectives
The aim of this study was to evaluate the impact that a structured education programme had on patients’ knowledge of and attitudes and behaviours towards leg ulcer prevention. Findings from a study in the Australian health care setting suggest
that the LUPP has a positive impact on patients’ knowledge and compliance with leg ulcer prevention regimens (Kapp et al. 2010). This current study evaluated the impact of the LUPP on leg ulcer patients’ knowledge, attitudes and behaviour within the Irish health care setting, specifically within community care. The writer aimed to determine if the results from the current study were consistent with those from Australia.

The objectives of this study were:

- To implement the LUPP and measure its impact on knowledge, attitudes and behaviours among leg ulcer patients in an Irish community setting.
- To make recommendations for practice.
- To contribute to the body of knowledge of venous leg ulcer prevention.

The potential benefits for the intervention group were:

- Standardised patient education in line with evidence based practice.
- Improved patient knowledge, healthy behaviours and self-management practices.
- Increased use of best practice compression therapy for leg ulcer prevention.
- Enhanced client and nurse engagement in health promotion.

4.5 Research design

The research design employed in this study, was a multi-centre, open label, cluster RCT. There is no consensus amongst researchers on the classification of designs. What seems to emerge is that, broadly speaking, there are three types of design: experimental (including quasi-experimental), survey and case study (Parahoo, 1997). In experimental design, the principle is to uncover relations of cause and effect, and
researchers use this design to identify relationships between variables and where possible, to establish the exact nature of these relationships, with the aim of making predictions (Parahoo, 1997). This type of design is widely used in nursing research. Indeed, within the Irish health care setting, Clarke–Moloney et al. (2008) used an experimental design to establish the impact of four layer bandaging on quality of life of patients during treatment for venous leg ulceration.

The writer wished to determine the effect of an education programme on patient’s knowledge of, and attitudes and behaviours towards leg ulcer prevention. The writer chose a cluster RCT to answer the research question as it was considered the most appropriate to assess the impact of the intervention. The clusters were sites of the leg ulcer clinics in the community care area. There were three sites in each group. One site in the area was eliminated, as it does not have monthly leg ulcer clinics. The remaining sites were matched according to patient numbers attending the clinics.

4.6 Study outcomes

The primary outcome of interest for this study was the effect of an education programme on patient’s knowledge, attitudes to, and behaviours towards leg ulcer prevention. Therefore, a questionnaire was administered pre and post-LUPP to determine if there was a statistically significant difference in knowledge levels pre and post-LUPP. A control group was included to assess any differences post intervention between groups. The ultimate endpoint was to prevent recurrence of leg ulceration by promoting self-management strategies for the patient’s who utilise leg ulcer services within Ireland.
4.7 Methods

The clinic sites were randomised to either control or intervention groups. The control group received standard wound care from either their local Public Health Nurse or Community Registered General Nurse (RGN). The intervention group received wound care from the writer as part of the LUPP (Figure 1).

**Figure 1: LUPP study protocol**

- Patient records were examined and potential participants were identified. Inclusion and Exclusion criteria were applied. The researcher gained patient consent. All participants completed pre-LUPP questionnaire. Compression therapy used was recorded for all participants.

- **Control**
  - Standard wound care provided by public health nurse and/or RGN.
  - Six weeks later post-study questionnaire completed.

- **Intervention**
  - Researcher provided wound care.
  - LUPP program delivered as per protocol.
  - Six sessions delivered via multi-media.
  - Hard copy materials and client diaries provided.
  - Post-LUPP questionnaire completed.
4.8 Study Setting

The study setting for this research proposal was a rural, geographically large community care area, incorporating seven health centres where nurse-led leg ulcer clinics are run on a monthly, appointment only basis, in six of the centres. The remaining centre has a clinic on a bi-monthly basis, due to the geographical distance involved.

4.9 Access

Permission to access the participants was obtained from the Director of Public Health Nursing in the community care area (Appendix 1).

4.10 Ethical issues

International ethical standards as outlined in The Nuremberg Code (US Government 1947) and the Declaration of Helsinki (World Medical Association, 1964) have been adhered to. The dignity, rights, safety and well being of the participants are paramount in research (Moule and Goodman, 2009). The writer worked within the Code of Professional Conduct for Nurses and Midwives as outlined by An Bord Altranais (2000b) to adhere to these principles. Walker (2007) states that an integral part of research governance is the requirement to obtain an independent scientific and ethical review of the proposed research, thus the writer adhered to these principles. Ethical approval for this study was sought and received from the Clinical Research Ethics Committee of the Local Teaching Hospital Committee (Appendix 2). A fundamental principle of research is that of beneficence or to do no harm. The expectation is that the research should benefit both the individual and society (Burns and Grove, 2005; Polit and Beck, 2006). Veracity relates to truthfulness so that
individuals are informed of the purpose of the study, potential risks and benefits, and the right to participate without influence. Confidentiality is the principle of protecting personal information gathered during the research and how this is achieved. To achieve these principles an information letter was sent to all eligible patients in the catchment area (Appendix 3). An appointment was made no sooner than two weeks after the participant received the letter, and the writer obtained informed consent in person during this appointment. The patient information letter consisted of all information regarding the research, along with the rights and obligations of participants. Participants were assured that anonymity was protected at all times and that data would be combined using statistical analysis and presented in numerical form so that confidentiality and anonymity were secured (Moule and Goodman, 2009). After formal consent was obtained, participants were included in the study (Appendix 4).

**Process for consent**

An Bord Altranais require that respondents will be assured of their right to withdraw at any time without repercussion (2007). Participants were advised that they could withdraw consent at any time, with no loss of any other health entitlement (Appendix 4).

**4.11 Randomisation schedule**

For the purpose of this trial, cluster randomisation was conducted. The clusters were deemed to be the site of the leg ulcer clinics. Six clinics were selected for inclusion in the trial. One centre in the area did not have monthly clinics and was therefore deemed ineligible. The sites were matched on the basis of subject numbers attending
the clinic in order to match numbers of the two arms as closely as possible. Group A had 33 eligible patients and Group B had 31. Each group consisted of three sites. Group A was randomly selected as the control group and Group B was assigned to the intervention group. Two members of staff of the Royal College of Surgeons in Ireland (RCSI) who had no involvement in the research, randomly assigned the groups.

**Figure 2: Flow of clusters through the study**

![Flowchart showing the allocation of clusters to control and intervention arms.](image)

### 4.12 Sample Size

The writer only had access to a total population of 50 patients; therefore, it is on this basis that the sample was selected. The study population was derived from the current patient population that attends the nurse led clinics in the community care area. There are six centres in the area, which were divided into 2 groups of similar size and patient population, through a cluster randomisation process. It was anticipated that a
maximum of fifty patients in total would be recruited, divided into 2 equal sized
groups of twenty-five, from the current patient population in the writer’s catchment
area. Typically, when conducting a Randomised Controlled Trial a power analysis is
conducted to ensure sufficient sample size is included so that the differences between
the groups are attributed to the intervention and not to any other variables. Generally
speaking the larger the sample the more representative of the population it is likely to
be . The challenge in this study was that the available population was limited and
therefore the sample was small . The achieved power for the \( t \)-tests, was calculated to
be, as a minimum, 53 % for independent \( t \)-tests, and for dependent \( t \)-tests: 46%.
In order to achieve a power of 80% with the same effect size, the required total
sample size was computed to be 96 for independent \( t \)-tests and for dependent \( t \)-tests,
110.

4.13 Study subjects
The participants for this study were selected from the list of patients who had
attended the nurse-led wound assessment clinics in the community care area in the
previous twelve months. This clinic takes referrals from Public Health Nurses,
Community RGNs, Day Care Coordinators, GPs, Practice Nurses and Community
Hospitals. Participants were selected subject to meeting inclusion and exclusion
criteria.

Inclusion criteria:

- Patients who had been referred to a nurse led leg ulcer clinic in the community
care area in the previous twelve months.
- Patients with an existing venous ulcer, or a healed venous ulcer.
• Patients who had an Ankle Brachial Pressure Index (ABPI) of between 0.8 and 1.3.

**Exclusion Criteria:**

Individuals were excluded from the study if they had the following characteristics:

• Ulcers of non-venous origin.
• Diabetes mellitus (these subjects, under local protocol are treated directly by the secondary care unit of the catchment area).
• Were involved in another research trial.

### 4.14 Subject recruitment

The writer assessed potential participants by reviewing files of patients who had attended the nurse-led clinic in the previous twelve months. Information leaflets were sent to patients who met the inclusion criteria. This leaflet explained the purpose of the study and invited them to participate (*Appendix 3*). A follow up phone call was made to the participants no sooner than two weeks later and an appointment made to obtain consent (*Appendix 4*). Once consent was obtained, the pre-LUPP questionnaire was completed for both groups at this appointment (*Appendix 5*).

### 4.15 Staff Education

The writer delivered the LUPP to all participants in the study and therefore no education to staff regarding delivery of the programme was necessary. The writer however, addressed all nursing staff at a sector meeting prior to commencement of the study in order to inform staff of the format and delivery of the programme. It was anticipated that participants would discuss the patient information letter received with
their regular caregiver, so it was imperative that all staff were familiar with the research and could answer any questions that the participants might have.

4.16 Baseline screening

The writer collected baseline data for all participants at the initial meeting. Data collected included demographic information, compression use and presence, duration and location of leg ulcer where present. Data regarding knowledge, attitudes and behaviour towards leg ulcer prevention were also recorded.

4.17 Interventions

The Leg Ulcer Prevention Programme (LUPP 2010) was developed to provide an evidence-based resource for clinicians and organisations to optimise the delivery of the information on the prevention of leg ulcer recurrence. The programme is delivered in a multimedia format and is focused on key elements, which prevent recurrence and promote healing. It promotes chronic disease management and seeks to empower patients and encourage participation in self-management activities. Furthermore, the programme seeks to address the key issues surrounding prevention of recurrence, and educational requisites as identified by the literature search (Kapp et al. 2010).

The education programme consists of six sessions delivered once a week over a six-week period. The sessions were as follows:

- Session 1: This session explains why a leg ulcer has occurred and the role of compression bandaging for healing and compression stockings for prevention.
• Session 2: The principles of wound care management in the home are introduced in this session and the role of compression therapy in venous leg ulcer management is focused on extensively.

• Session 3: This session promotes the benefits of walking for older adults and introduces exercises to improve calf muscle pump action and explain the role of leg elevation.

• Session 4: This session is based on recommendations regarding nutrition and hydration as well as specific recommendations for healthy eating whilst wounded.

• Session 5: This session focuses on common skin conditions of the leg and guidelines for skin care.

• Session 6: This session reinforces the recommendations for compression in the post-healing phase and for prevention of recurrence.

LUPP addresses some of the major issues surrounding treatment and prevention of recurrence, such as compression therapy, exercise, nutrition, skin care and the role of compression in preventing recurrence. The programme was delivered using electronic media, hard copy materials, activities and patient diaries (Kapp et al. 2009). A control group was included to provide a comparison between patients participating in the education programme and those receiving usual care.

Permission to use the LUPP materials was granted by the original research team, requesting that the source of material was acknowledged, and the programme is not shared outside of the research.
4.18 Reliability and validity

In order to assess the reliability of the LUPP, the writer needed to assess if it produced similar results under the same conditions at all times. The developers of the programme produced a clinicians training pack for clinicians implementing the program and which the writer also had access to. The LUPP questionnaire was developed by the original LUPP research team and as such is not a validated questionnaire. However, the LUPP was developed by a multidisciplinary team, which included wound management clinical nurse consultants, researchers, allied health professionals, e-learning experts, marketing specialists and a professional photographer. The Flesch-Kincaid Grade Level test applied via Microsoft Word 2003\textsuperscript{tm} suggests a Grade 7 readability level of the written version of LUPP (Kapp \textit{et al.} 2010). The pre and post-LUPP tools evaluated the specific aspects of the program, although they require further validation. Further evaluation of the LUPP program is required and the original research team is currently assessing the effectiveness of the program with a related study using a randomised control trial to assess ulcer recurrence and compression stocking adherence 26 weeks after healing.

4.19 Study duration

Data were collected for each participant in accordance with the LUPP protocol, over a six-week period. This time frame was based on delivering one session once a week as part of usual weekly wound care.

4.20 Data collection

Cowman (2008) states that in nursing research the questionnaire is one of the most utilised methods of data collection and it provides one of the quickest and least
expensive ways to collect large amounts of data. For the purpose of this research, a pre-designed questionnaire was used to measure outcomes. A pre-and-post intervention evaluation was used and a control group was included in the design to examine any statistical difference between patients participating in the education programme and those receiving standard care. The rationale for using a questionnaire was based on the desire to collect responses from a widely distributed population to allow for better statistical analysis and possible generalisation of findings. The questionnaire was designed specifically for use in Australia where this programme was first implemented in 2009. In Australia, due to the vast geographical areas, the use of different media to educate patients is necessary and therefore considered more important than here in Ireland, however the care provision for the management of VLU is similar to Ireland. Upon review of the questionnaire, and comparing the healthcare structures that delivers the care for venous ulcer patients between the two countries, it was considered that the similarities allowed the use of this questionnaire without modification.

Prior to starting the LUPP, both the control and intervention group completed the pre-LUPP questionnaire (Appendix 5). The post–LUPP questionnaire was completed following the completion of session six by the intervention group (Appendix 6). The control group completed the post–LUPP questionnaire six weeks after completing the pre-LUPP questionnaire.

Questions included in the questionnaire focussed on patients’ knowledge, attitude and behaviours towards leg ulcer prevention and adherence to recommendations provided by the LUPP. Section one of the questionnaire consists of 11 multiple choice
knowledge questions and eight true/false questions based on information contained in
the programme. Section two contains questions regarding patient attitudes towards the
LUPP using Likert scale responses and free text. Section three contains questions
regarding patient behaviour and was completed by either the patient or the nurse.

Compression therapy use prior to using LUPP and at each subsequent session was
also collected to allow for analysis of any changes made as a result of LUPP. Body
mass index was also calculated for the intervention group. The status of the patients’
wound was also recorded using three categories: healed pre LUPP, active, or healed
during LUPP.

4.21 Data analysis

Data analysis is the systematic organisation and compilation of research data and the
testing of hypothesis (Polit and Beck, 2006). Data were analysed, stored and
presented using Predictive Analytics Software (PASW) Statistics for Macintosh
Release 20.0 (SPSS Inc. Chicago, IL, USA). This involved computing numbers and
percentages that are presented in words, tables or charts. The completed pre and post-
LUPP questionnaires were numerically recoded, tabulated and entered into the SPSS
Programme. Errors that were recognised during the entering of data were
crosschecked with the original questionnaires and corrected as necessary. This
allowed for analysis and organisation of the findings.

McNemar’s test was used for repeated measures comparison of binary data. A t-test
was used to analyse continuous data. Pearson’s chi-square analysis was used to
analyse other categorical data gathered from a single point in time. An alpha level of
0.05 was used to classify the findings as statistically significant. Descriptive analysis was used to summarise, describe and explain the data, which are presented in numerical form to portray important features. The three main features used to describe the data were frequency, central tendency and dispersion (Parahoo, 2006). This involved the generation of frequency tables and visualisations. Inferential statistics were used to test for possible associations between variables.

4.22 Summary

This chapter focused on the design and process used by the writer in the completion of this research. The aims and objectives were explained, as were the rationale for the research design, setting, sampling and data collection instrument used. Inclusion and exclusion criteria were outlined. Cluster randomisation was by site and each site was randomly assigned to either the control arm or the intervention arm. Participants in the control arm received standard care from either their Public Health Nurse or Community RGN, whilst the intervention group had wound care delivered by the writer as part of the weekly education program. Both groups completed the pre and post-LUPP questionnaire. The criteria for accessing the trustworthiness of the study have been presented. Finally, the procedures undertaken to adhere to ethical principles as they relate to the study have been explained. The essential findings of the study are presented in the following chapter.
Chapter 5: Findings
5.1 Introduction
The aim of this research was to determine the effect of an education programme (LUPP) on patient’s knowledge, attitudes and behaviours toward leg ulcer prevention and the findings are reported in this chapter. The research instrument, as explained in previous chapters consisted of a pre-LUPP and post–LUPP questionnaire and was administered to a control and intervention group. The questionnaire was divided into three sections: section one consisted of a client leg ulcer questionnaire; section two consisted of client feedback and section three addressed health care practices.

5.2 Methodology
The software package used to analyse the data was the Statistical Package for the Social Sciences (SPSS) program, version 20, for Macintosh. Descriptive statistics were generated using frequency tables and cross-tabulations. McNemar’s test was used for repeated comparisons of binary data, while independent samples t-tests were used to analyse continuous data. Chi-Square procedures using Fisher’s exact test were used to compare proportions of categorical data at one point in time. All tests were two-tailed where specified and the usual critical significance level of \( p < .05 \) used.

5.3. Findings
A total of 50 out of 51, participants completed the LUPP program and returned both pre and post-LUPP questionnaires. One client in the control group died in the intervening period. A total of 26 participants (51\%) were in the control group, compared to 25 (49\%) in the intervention group. \( (Figure\ 3) \) On average the LUPP took 40 days to complete \( (SD=6.84) \), and this time ranged from 28 to 56 days.
**Figure 3: Flow of participants through the study**

- **Assessed for Eligibility (n=63)**
  - Excluded (n=12)
    - Not meeting inclusion criteria (n=3)
    - Refused to participate (n=8)
    - Other reasons (n=1)

- **Randomised (n=51)**
  - Allocated to control arm (n=26)
    - Did not receive intervention (n=0)
      - Lost to follow up (n=1)
      - Discontinued (n=0)
    - Analysed (n=26)
      - Excluded from analysis (n=0)
  - Allocated to intervention arm (n=25)
    - Did not receive intervention (n=0)
      - Lost to follow up (n=0)
      - Discontinued (n=0)
    - Analysed (n=25)
      - Excluded from analysis (n=0)
5.3.1 Demographics

Of the 51 participants, the majority (66.7%, \(n=34\)) was female. In the control group, a greater proportion was male (64.7%, \(n=11\)) compared with the intervention group (44.1%, \(n=15\)) but the difference was not statistically significant. The age of participants varied from 50 to 87 years, with an average of 74.8 years (SD=9.22). Both intervention and control groups had similar mean ages (\(M=74.7\) for intervention group versus \(M=74.8\) for control group). Body mass index (BMI) was measured for the intervention group only and a large number (44.0%, \(n=11\)) were found to be in the obese category (>30 BMI).

In both groups, the majority of clients (control=65.3%, \(n=17\), intervention =68%, \(n=17\)) presented with one leg ulcer, although both groups had clients (control=11.5%, intervention =12%, \(n=3\)) with four leg ulcers. The remainder of participants had either two or three ulcers (control=23%, \(n=6\), intervention =20%, \(n=5\)). In both groups, the majority of clients had more than one episode of leg ulceration, with five episodes reported by one client in the intervention group.

To assess differences between groups regarding healing rates during the LUPP, a cross-tabulation was used. It was found that of the control group, 15% (\(n=4\)) healed during the LUPP period, while 36% (\(n=9\)) of the intervention group healed during the LUPP. However, while this result suggests that wound outcomes are improved due to the LUPP, the difference was not significant as assessed by the Chi-Square test, since \(\chi^2(2)=3.87, p=0.165\), using Monte Carlo estimation. In both groups, nearly half (49%, \(n=25\)) maintained an active wound status by the end of the study.
Table 1 presents the exact figures for duration of current episode of leg ulceration for both groups. Table 2 presents the site of the current ulcer/s and if bilateral legs were involved. A total of 49% of clients had active wounds post LUPP (control 50%, \( n=13 \), intervention 48%, \( n=12 \)) and 25.5% of clients had healed pre LUPP (control 34.6%, \( n=9 \), intervention 16%, \( n=4 \)).

<table>
<thead>
<tr>
<th>Duration of current episode</th>
<th>Control (n)</th>
<th>Intervention (n)</th>
<th>Total % (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 3 months</td>
<td>1</td>
<td>2</td>
<td>5.9% (n=3)</td>
</tr>
<tr>
<td>3-6 months</td>
<td>7</td>
<td>6</td>
<td>25.5% (n=13)</td>
</tr>
<tr>
<td>6-9 months</td>
<td>2</td>
<td>4</td>
<td>11.8% (n=6)</td>
</tr>
<tr>
<td>9-12 months</td>
<td>4</td>
<td>2</td>
<td>11.8% (n=6)</td>
</tr>
<tr>
<td>Longer than 1 year</td>
<td>12</td>
<td>11</td>
<td>45% (n=23)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>26</strong></td>
<td><strong>25</strong></td>
<td><strong>100% (n=51)</strong></td>
</tr>
</tbody>
</table>

Table 2: site of ulceration

<table>
<thead>
<tr>
<th>Site of ulcer</th>
<th>Left Leg (n)</th>
<th>Right Leg (n)</th>
<th>Bilateral (n)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>8</td>
<td>12</td>
<td>6</td>
<td>26</td>
</tr>
<tr>
<td>Intervention</td>
<td>10</td>
<td>11</td>
<td>4</td>
<td>25</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>35.3% (n=18)</strong></td>
<td><strong>45.1% (n=23)</strong></td>
<td><strong>19.61% (n=10)</strong></td>
<td><strong>100% (51)</strong></td>
</tr>
</tbody>
</table>
5.3.2 Age: Control and intervention

A highly significant correlation was found to exist between the age of the participant and the baseline scores. The older the participant, the lower their overall knowledge was. This was significant both with Pearson’s test ($r=-.45$, $p<.001$), and Spearman’s rho ($r_s=-.39$, $p=0.005$), and means that 20% of the variance in the pre-LUPP test score could be explained by age. This main effect was basically unchanged when controlled for gender using an OLS regression, as $R^2=.21$.

When the control group ($n=26$) ages were compared with the post-LUPP knowledge scores, this negative relationship held ($r=-.34$, $p=0.092$) but did not reach the critical level of significance, due to the lower power achieved with the smaller sample size. However, for the intervention group, when ages were correlated with the post-LUPP knowledge scores, this relationship disappeared; there was basically no association between age and knowledge ($r=.03$, $p=0.895$). This would seem to indicate that older participants benefit more from a LUPP program. (Appendix B)

5.3.3 Compression therapy use

All those participating in the LUPP had one or more venous leg ulcer and were therefore suitable for compression therapy. The majority (68.2%, $n=35$) at the start of the study required some form of compression therapy on both legs (low <17mmHg, moderate 23mmHg, high 40mmHg), with the remainder requiring compression bandaging on one leg only (13.7%, $n=7$ left leg; 7.8%, $n=4$ right leg), or not at all (9.8%, $n=5$). The compression therapy used immediately prior to and during the education was gathered in the post-LUPP questionnaire. These results have been combined in the presentation of frequency data with data representing all instances
(legs and not participants) where compression therapy was indicated for a leg, and compared by control or intervention group.

Both control and intervention groups showed similar levels of bandaging use, and no statistically significant differences were found as assessed by the Chi-Square tests (left leg $p=0.474$, right leg $p=0.511$). For both groups together, use of compression systems of 40mmHg (four-layer bandage system) before the LUPP education was low ($7.8\% n=4$). The compression therapy most widely in use was that of 23mmHg ($35.3\%, n=18$), while the proportion of clients receiving no compression therapy was approximately $20.6\%, n=10$ at this time.

By the end of the sessions, the control and intervention groups differed considerably in their relative proportions, both on the right ($\chi^2(5)=10.82, p=0.023$) and left legs ($\chi^2(4)=9.99, p=0.022$). The proportion of clients receiving no treatment in the intervention group was reduced from $18.0\% (n=4)$ to $4.0\% (n=1)$ by the sixth session, but in the control group, the proportion increased from $23.1\% (n=6)$ to $32.7\% (n=8)$. However, in the intervention group, there was no increase in compression of 40mmHg or 23mmHg; instead the use of “moderate” compression treatment increased from $30.0\% (n=8)$ before intervention to $58.0\% (n=15)$ by the sixth session. This reflected participants whose wounds healed during LUPP and were commenced on compression hosiery to replace compression bandaging.
5.4 Research hypothesis

The null hypothesis for this research was “Client’s following the LUPP education program for the prevention of leg ulcers will have no more knowledge than client’s receiving standard wound care in the community”. Based on the findings presented in this chapter the writer rejects this hypothesis because there is a statistically significant difference in knowledge pre and post-LUPP in the intervention group. Figure 4 shows the overall baseline knowledge for both groups pre-LUPP. Figure 5 presents the overall knowledge scores post-LUPP for both groups.

Figure 4: Overall baseline knowledge pre-LUPP
Figure 5: Overall knowledge scores post-LUPP
5.5 Client health knowledge and behaviours – control versus intervention groups at baseline

The control and intervention groups were compared at baseline using the independent two-sample *t*-test. The intervention group scored slightly lower (*M*= 9.48) than the control group (*M*= 11.11) overall. Levene’s test rejected the null hypothesis between groups (*F*= 5.88, *p*= 0.19), therefore equal variances were not assumed.

As *t*= 45.75, *t*= 2.08, *p*= 0.043, the null hypothesis was rejected using the *t*-test. The mean differences between the two groups (*M diff*= 1.64) represented an effect size of *d*= 0.58 which shows that the two groups differed by over ½ of a standard deviation. The 95% confidence intervals of the population mean difference were wide with the minimum-approaching zero (0.05 ≤ *μ*₁ – *μ*₂ ≤ 3.22), and therefore non-parametric tests were used to attempt to confirm the statistical significance of the difference. In this case, Wilcoxon’s rank-sum test was used. This evaluates the null hypothesis that the two sets of scores are sampled from identical populations, by ranking scores. Here, it was found that *W*= 570.5, *p*= 0.133 meaning that the null hypothesis was not rejected. Given the relatively low number of discrete intervals in the data (13), this result is probably more appropriate to the data, and therefore, the two groups can be assumed to come from the same population. Table 3 presents the scores and dispersion for both group’s pre and post-LUPP.
Table 3 Scores and dispersion for both group’s pre and post-LUPP

<table>
<thead>
<tr>
<th>%</th>
<th>Mean</th>
<th>Std.Dev</th>
<th>Median</th>
<th>Range</th>
<th>z-Kurt</th>
<th>z-Skew</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-LUPP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>11.11</td>
<td>3.22</td>
<td>11.0</td>
<td>5-17</td>
<td>-1.17</td>
<td>0.27</td>
</tr>
<tr>
<td>Intervention</td>
<td>9.48</td>
<td>2.35</td>
<td>10.0</td>
<td>5-13</td>
<td>-0.47</td>
<td>-0.87</td>
</tr>
<tr>
<td>Post-LUPP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>10.68</td>
<td>3.21</td>
<td>11.0</td>
<td>4-16</td>
<td>-0.56</td>
<td>-0.50</td>
</tr>
<tr>
<td>Intervention</td>
<td>15.80</td>
<td>1.11</td>
<td>15.0</td>
<td>14-16</td>
<td>-1.30</td>
<td>0.50</td>
</tr>
</tbody>
</table>

5.6 Baseline Knowledge

Baseline knowledge was measured for both control and intervention groups and is considered here together. The answers to the 11 multiple-choice questions were coded as “correct” and “incorrect” categories at the data entry stage. In the vast majority of variables, no statistically significant differences were found between the groups in the baseline knowledge, as assessed by the Chi-Square test. However, the scores regarding the question “checking the skin on legs” were statistically significantly different (p<0.05 intervention 57.7%, n=15, control 73.1%, n=19), as with the question on “compression” (16% n=64) of the intervention group scored correct compared to 42.3% (n=11) of control p=0.490).

Regarding activity and skin care behaviours, the intervention group was much more likely (68.0%, n=17) compared with the control group (42.3%, n=11). This finding was noted to be statistically significant (p<.001). The intervention group was also more likely to include a soap substitute as part of their skin care plan.
(intervention 92.0\%, \( n=23 \), control 61.5\%\( n=16 \) \( p< 0.19 \)). The exact figures for all questions are detailed in Tables 4-7.

Table 4 outlines the percentage of correct responses to the multiple response knowledge questions in the pre–LUPP questionnaire for both groups. No statistically significant differences were noted for the vast majority of variables. However, the scores regarding the question “checking the skin on legs” were statistically significantly different (\( p=0.05 \), intervention 57.7\%, \( n=15 \), control 73.1\%, \( n=19 \)).
Table 4: Multiple response questions in pre-LUPP questionnaires (% correct)

<table>
<thead>
<tr>
<th>Question</th>
<th>Control % (n)</th>
<th>Intervention % (n)</th>
<th>P (X^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most common cause of leg ulcers is...[poor veins]</td>
<td>69.2 (18)</td>
<td>60.0 (15)</td>
<td>.490</td>
</tr>
<tr>
<td>A leg ulcer is best described as ... [a break in the skin that takes more than 6 weeks to heal]</td>
<td>69.2 (18)</td>
<td>52 (13)</td>
<td>.208</td>
</tr>
<tr>
<td>A dressing should ...[keep the ulcer moist]</td>
<td>23.1 (6)</td>
<td>24 (6)</td>
<td>.938</td>
</tr>
<tr>
<td>The most important treatment for a leg ulcer is ...[Compression bandaging]</td>
<td>69.2 (18)</td>
<td>80 (20)</td>
<td>.378</td>
</tr>
<tr>
<td>The most important activity I can do to support my leg ulcer is ... [walking]</td>
<td>61.5 (16)</td>
<td>64 (16)</td>
<td>.856</td>
</tr>
<tr>
<td>I should elevate my legs ...[3–4 times a day]</td>
<td>61.5 (16)</td>
<td>40 (10)</td>
<td>.124</td>
</tr>
<tr>
<td>An optimal diet ... [includes all major food groups]</td>
<td>69.2 (18)</td>
<td>56 (14)</td>
<td>.329</td>
</tr>
<tr>
<td>Most people should drink ...[8 or more glasses of water each day]</td>
<td>34.6 (9)</td>
<td>24 (6)</td>
<td>.406</td>
</tr>
<tr>
<td>I should check the skin on my legs ... [every day]</td>
<td>57.7 (15)</td>
<td>28.0 (7)</td>
<td>.032</td>
</tr>
<tr>
<td>If something goes wrong with the skin on my legs I should ... [contact my doctor or nurse immediately]</td>
<td>73.1 (19)</td>
<td>56 (14)</td>
<td>.202</td>
</tr>
<tr>
<td>The best way to avoid another venous leg ulcer is ...[wear compression stockings]</td>
<td>73.1 (19)</td>
<td>80 (20)</td>
<td>.560</td>
</tr>
</tbody>
</table>
Table 5 compares the correct responses for both groups in the true/false section of the pre-LUPP questionnaire. No statistically significant differences were noted with the exception of the compression question (intervention group 16%, \( n=4 \), control group 42.3%, \( n=11 \), \( p<.05 \)).

**Table 5: True/false questions in pre-LUPP questionnaires (% correct)**

<table>
<thead>
<tr>
<th></th>
<th>Control % (n)</th>
<th>Intervention % (n)</th>
<th>P (X²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compression will fix the problem with my veins (False)</td>
<td>42.3 (11)</td>
<td>16 (4)</td>
<td>.039</td>
</tr>
<tr>
<td>Wounds should be cleansed at every dressing change (False)</td>
<td>23.1 (6)</td>
<td>8 (2)</td>
<td>.139</td>
</tr>
<tr>
<td>While I have a leg ulcer it is important that I rest and not be too active (False)</td>
<td>50 (13)</td>
<td>40 (10)</td>
<td>.473</td>
</tr>
<tr>
<td>My diet needs to be more nutritious than usual when I have a leg ulcer (True)</td>
<td>53.8 (14)</td>
<td>60 (16)</td>
<td>.657</td>
</tr>
<tr>
<td>Some medications will slow the healing of my ulcer (True)</td>
<td>30.8 (8)</td>
<td>20 (5)</td>
<td>.378</td>
</tr>
<tr>
<td>Soap and water is the best way to clean my skin (False)</td>
<td>65.4 (17)</td>
<td>44 (11)</td>
<td>.125</td>
</tr>
<tr>
<td>Four-layer compression bandaging is the best bandaging treatment available for venous leg ulcers? (True)</td>
<td>92.3 (24)</td>
<td>100 (25)</td>
<td>.157</td>
</tr>
<tr>
<td>After my ulcer heals I will need to use compression stockings for the rest of my life (True)</td>
<td>92.3 (24)</td>
<td>96 (24)</td>
<td>.575</td>
</tr>
</tbody>
</table>
Table 6 outlines the nutrition behaviours for both groups pre-LUPP and no statistical differences were noted at baseline.

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Intervention</th>
<th>P (X2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition. Usual Food Intake</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Adequate/Excellent]</td>
<td>88.5 (23)</td>
<td>88 (22)</td>
<td>1.000</td>
</tr>
<tr>
<td>Water. [At least 8 glasses]</td>
<td>23.1 (6)</td>
<td>8 (2)</td>
<td>.248</td>
</tr>
<tr>
<td>Client recommended to take nutritional supplement [Yes]</td>
<td>23.1 (6)</td>
<td>40 (10)</td>
<td>.237</td>
</tr>
<tr>
<td>Client takes nutritional supplement [Yes]</td>
<td>19.2 (5)</td>
<td>24 (6)</td>
<td>.743</td>
</tr>
<tr>
<td>Client recommended to take multivitamin [Yes]</td>
<td>34.6 (9)</td>
<td>56 (14)</td>
<td>.164</td>
</tr>
<tr>
<td>Client takes multivitamin [Yes]</td>
<td>30.8 (8)</td>
<td>48 (12)</td>
<td>.258</td>
</tr>
<tr>
<td>Client believes they are eating a well-balanced diet [Yes]</td>
<td>92.3 (24)</td>
<td>92 (23)</td>
<td>1.000</td>
</tr>
<tr>
<td>Client believes they have been drinking plenty of fluids [Yes]</td>
<td>65.4 (17)</td>
<td>52 (13)</td>
<td>.336</td>
</tr>
</tbody>
</table>

Table 7 outlines the activity and skin care behaviours for both groups at baseline. For the majority of variables, no statistically significant differences were noted. However, the intervention group was much more likely to walk (88%, n=22) compared with the control group (42.3%, n=11). The intervention group was also more likely to include a soap substitute as part of their care plan (92%, n=23, versus 61.5%, n=16, p<.01).
Awareness of compression bandaging recommendations and actual compression bandaging use prior to the LUPP education was examined. Clients who already knew that compression bandaging was “the most important treatment for a venous leg ulcer” were more likely to use moderate (class 2) bandaging (39.5%, n=20 left leg; 34.2%, n=17 right leg) compared to clients who answered this question incorrectly (23.1%, n=11 left leg; 15.4%, n=8 right leg), but other differences were small. Analysis using the Chi-Square statistic and Fisher’s Exact Test did not find the overall group differences to be statistically significant.
5.8 Satisfaction with LUPP

Participants in the intervention group responded to a number of statements about their satisfaction with the LUPP education. All of them agreed that the LUPP improved their understanding of venous ulcers and of how to avoid another ulcer occurring. Furthermore, the LUPP provided them with information they did not have previously. The only statement that did not provide unanimous agreement was that of “the activities included in the LUPP education were very helpful”, where 92 % (n=23) of respondents “completely” agreed, and the remaining 8% (n=2) “moderately” agreed. In the intervention group, the majority (56%, n=14) of LUPP sessions were delivered to the client only, the remainder to the client and a carer.

Participants were also asked to rate each session individually on a Likert-type scale of “poor” to “excellent”. The majority of participants found all sessions to be “excellent”. The results can be seen in Table 8 below.

<table>
<thead>
<tr>
<th>Session</th>
<th>Session 1</th>
<th>Session 2</th>
<th>Session 3</th>
<th>Session 4</th>
<th>Session 5</th>
<th>Session 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>% (n)</td>
<td>% (n)</td>
<td>% (n)</td>
<td>% (n)</td>
<td>% (n)</td>
<td>% (n)</td>
<td>% (n)</td>
</tr>
<tr>
<td>Poor</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Fair</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Good</td>
<td>8 (2)</td>
<td>4 (1)</td>
<td>0.0</td>
<td>4 (1)</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Very Good</td>
<td>36 (9)</td>
<td>40 (10)</td>
<td>40 (10)</td>
<td>40 (10)</td>
<td>40 (10)</td>
<td>40 (10)</td>
</tr>
<tr>
<td>Excellent</td>
<td>56 (14)</td>
<td>56 (14)</td>
<td>60 (15)</td>
<td>56 (14)</td>
<td>60 (15)</td>
<td>60 (15)</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
5.9 Client Health Knowledge; pre / post-LUPP (intervention group)

Intervention group– baseline versus post

The knowledge scores of the intervention group were compared both before and after application of the LUPP. As seen below in (Figure 6), the post-LUPP scores were higher ($M=15.80$) compared to the pre-LUPP scores ($M=9.48$) and the Standard Deviation values were also lower, indicating not only greater but also more consistent levels of knowledge in the post-LUPP group.

Figure 6: Pre and post-LUPP scores

To test whether these differences were statistically significant, a paired-sample $t$-test was used initially. Repeated measures designs have greater statistical power to detect real effects compared to procedures where the different groups being compared are
assumed to come from independent groups. This is due to the fact that when the same participants are used across conditions the *unsystematic variance* (or error) is dramatically reduced, making it easier to detect the “real” *systematic variance*.

It was found that the differences between the two groups were highly significant, as $t(24)=11.49, p<.001$. The 95% confidence interval of the knowledge improvement was 5.19-7.46, which is a notable gain even at the lower end of the interval. Cohen’s $d = 2.30$, indicating that the knowledge gain was of over two standard deviations compared to their pre-LUPP knowledge level. Wilcoxon’s signed ranks test confirmed this result, as $Z=4.39, p<.001$; since there were no ties or negative ranks, this means that every respondent in the intervention group showed some improvement.
Figure 7: Post-LUPP score

The proportion of correct responses for the multiple choice questions increased statistically significantly between the pre- and post-assessments for the intervention group in nearly every case ($P<0.05$). The McNemar statistic could not be calculated for every group; however, as the relatively low sample size meant that a few variables remained constant in the two-way tables, i.e. there were no counts in more than one cell. Furthermore, the difference between the pre and post-intervention answers fell slightly outside the level of significance in the case of describing the leg ulcer accurately.

Table 9 displays these differences.
<table>
<thead>
<tr>
<th>Question</th>
<th>Pre Intervention % (n)</th>
<th>Post Intervention % (n)</th>
<th>McNemar (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most common cause of leg ulcers is ... [poor veins]</td>
<td>60 (15)</td>
<td>100 (25)</td>
<td>-</td>
</tr>
<tr>
<td>A leg ulcer is best described as ... [a break in the skin that takes more than 6 weeks to heal]</td>
<td>52 (13)</td>
<td>84 (21)</td>
<td>.057</td>
</tr>
<tr>
<td>A dressing should ... [keep the ulcer moist]</td>
<td>24 (6)</td>
<td>72 (18)</td>
<td>.000</td>
</tr>
<tr>
<td>The most important treatment for a leg ulcer is ... [compression bandaging]</td>
<td>80 (20)</td>
<td>100 (25)</td>
<td>-</td>
</tr>
<tr>
<td>The most important activity I can do to support my leg ulcer is ... [walking]</td>
<td>64 (16)</td>
<td>92 (23)</td>
<td>.016</td>
</tr>
<tr>
<td>I should elevate my legs ... [3–4 times a day]</td>
<td>40 (10)</td>
<td>68 (17)</td>
<td>.039</td>
</tr>
<tr>
<td>An optimal diet ... [includes all major food groups]</td>
<td>56 (14)</td>
<td>88 (22)</td>
<td>.039</td>
</tr>
<tr>
<td>Most people should drink ... [8 or more glasses of water each day]</td>
<td>24 (6)</td>
<td>76 (19)</td>
<td>.000</td>
</tr>
<tr>
<td>I should check the skin on my legs ... [every day]</td>
<td>28.0(7)</td>
<td>92.0(23)</td>
<td>.000</td>
</tr>
<tr>
<td>If something goes wrong with the skin on my legs I should ... [contact my doctor or nurse immediately]</td>
<td>56 (14)</td>
<td>96 (24)</td>
<td>.002</td>
</tr>
<tr>
<td>The best way to avoid another venous leg ulcer is ... [wear compression stockings]</td>
<td>80 (20)</td>
<td>100 (25)</td>
<td>-</td>
</tr>
</tbody>
</table>

*NB: McNemar’s test not computed where at least one variable in 2-way table is a constant.*
Responses to the eight true and false response questions also showed improvements in every case. However, the McNemar statistic was unable to be computed for three of these due to constant values/low cell counts, and one improvement (re wound cleansing) was not found to be statistically significant. Table 10 outlines these differences.

**Table 10 True/False responses pre/post (intervention group)**

<table>
<thead>
<tr>
<th>% Pre Intervention</th>
<th>Post Intervention</th>
<th>McNemar (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compression will fix the problem with my veins (False)</td>
<td>16 (4)</td>
<td>56 (14)</td>
</tr>
<tr>
<td>Wounds should be cleansed at every dressing change (False)</td>
<td>8 (2)</td>
<td>12 (3)</td>
</tr>
<tr>
<td>While I have a leg ulcer it is important that I rest and not be too active (False)</td>
<td>40 (10)</td>
<td>96 (24)</td>
</tr>
<tr>
<td>My diet needs to be more nutritious than usual when I have a leg ulcer (True)</td>
<td>60 (15)</td>
<td>100 (25)</td>
</tr>
<tr>
<td>Some medications will slow the healing of my ulcer (True)</td>
<td>20 (5)</td>
<td>52 (13)</td>
</tr>
<tr>
<td>Soap and water is the best way to clean my skin (False)</td>
<td>44 (11)</td>
<td>96 (24)</td>
</tr>
<tr>
<td>Four-layer compression bandaging is the best bandaging treatment available for venous leg ulcers? (True)</td>
<td>100 (25)</td>
<td>100 (25)</td>
</tr>
<tr>
<td>After my ulcer heals I will need to use compression stockings for the rest of my life (True)</td>
<td>96 (24)</td>
<td>100 (25)</td>
</tr>
</tbody>
</table>
5.10 Client health behaviours - pre / post (intervention group)

Nutrition behaviours measured with before and after questionnaires showed no statistically significant differences \( (p=0.5) \) (Table 11).

**Table 11 Client health behaviours – pre/post (intervention group)**

<table>
<thead>
<tr>
<th></th>
<th>Pre Intervention % (n)</th>
<th>Post Intervention % (n)</th>
<th>McNemar (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition. Usual Food Intake</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Adequate/Excellent]</td>
<td>88 (22)</td>
<td>92 (23)</td>
<td>1.000</td>
</tr>
<tr>
<td>Water. [At least 8 glasses]</td>
<td>8 (2)</td>
<td>24 (6)</td>
<td>.289</td>
</tr>
<tr>
<td>Client recommended to take nutritional supplement [Yes]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>40 (10)</td>
<td>24 (6)</td>
<td>.219</td>
</tr>
<tr>
<td>Client takes nutritional supplement [Yes]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 (6)</td>
<td>20 (5)</td>
<td>1.000</td>
</tr>
<tr>
<td>Client recommended to take multivitamin [Yes]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>56 (14)</td>
<td>40 (10)</td>
<td>.219</td>
</tr>
<tr>
<td>Client takes multivitamin [Yes]</td>
<td>48 (12)</td>
<td>36 (9)</td>
<td>.375</td>
</tr>
<tr>
<td>Client believes they are eating a well-balanced diet [Yes]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>92 (23)</td>
<td>96 (24)</td>
<td>1.000</td>
</tr>
<tr>
<td>Client believes they have been drinking plenty of fluids [Yes]</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>52 (13)</td>
<td>56 (14)</td>
<td>1.000</td>
</tr>
</tbody>
</table>
With respect to physical activities, which assist healing or prevent ulcer recurrence, changes in all recorded variables were noted; although statistical significance tests were unable to be computed for several variables due to low cell counts (Table 12).

### Table 12: Activity and skin care behaviours in pre and post-LUPP questionnaires (Intervention group)

<table>
<thead>
<tr>
<th></th>
<th>Pre Intervention % (n)</th>
<th>Post Intervention % (n)</th>
<th>McNemar (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical activity [Walks frequently]</td>
<td>68 (17)</td>
<td>80 (20)</td>
<td>.500</td>
</tr>
<tr>
<td>Client believes they have been keeping active [Yes]</td>
<td>72 (18)</td>
<td>92 (23)</td>
<td>.063</td>
</tr>
<tr>
<td>Client usually crosses legs when sitting [No]</td>
<td>64 (16)</td>
<td>96 (24)</td>
<td>.021</td>
</tr>
<tr>
<td>Client recommended to do heel raises and squats [Yes]</td>
<td>0 (0)</td>
<td>100 (25)</td>
<td>-</td>
</tr>
<tr>
<td>Client regularly does heel raises and squats [Yes]</td>
<td>0 (0)</td>
<td>100 (25)</td>
<td>-</td>
</tr>
<tr>
<td>Client recommended to elevate legs when sitting/resting [Yes]</td>
<td>0 (0)</td>
<td>100 (25)</td>
<td>-</td>
</tr>
<tr>
<td>Client usually elevate legs when sitting/resting [Yes]</td>
<td>84.0(21)</td>
<td>0 (0)</td>
<td>-</td>
</tr>
<tr>
<td>Care plan includes use of a soap substitute [Yes]</td>
<td>92 (23)</td>
<td>0 (0)</td>
<td>-</td>
</tr>
<tr>
<td>Soap substitute is being used [Yes]</td>
<td>72 (18)</td>
<td>0 (0)</td>
<td>-</td>
</tr>
<tr>
<td>Care plan includes use of a moisturiser [Yes]</td>
<td>100 (25)</td>
<td>0 (0)</td>
<td>-</td>
</tr>
<tr>
<td>Moisturiser is being used [Yes]</td>
<td>88 (22)</td>
<td>0 (0)</td>
<td>-</td>
</tr>
</tbody>
</table>

*NB: McNemar’s test not computed where at least one variable in 2-way table is a constant.*
5.11 Control group –baseline versus post-LUPP

The knowledge scores of the control group were also compared before and after completion of the LUPP. The paired differences showed that the control group post-LUPP had in fact, a lower score than at the start ($M=10.68$ versus 11.36). Although this would have represented a modest effect size of $d=.27$, this difference was not statistically significant, as $t(24)=1.37$, $p=.183$. The Wilcoxon Signed Ranks Test confirmed this diagnosis as $Z=-1.56$, $p=.126$. (Figure 8)

![Figure 8: Knowledge Score control group](image)

Table 13 outlines the correct responses to the multiple response knowledge questions in pre and post –LUPP questionnaire for the control group, and no statistically significant difference is noted.
Table 13: Multiple response questions in pre- and post-LUPP questionnaires (% Correct, control group)

| Question                                                                 | Pre-Control | Post-Control | McNemar (Sig.) |
|--------------------------------------------------------------------------|-------------|--------------|----------------|----------------|
| Most common cause of leg ulcers is ... [poor veins]                      | 69 (18)     | 60 (15)      | .687           |
| A leg ulcer is best described as ... [a break in the skin that takes more than 6 weeks to heal] | 69 (18)     | 64 (16)      | 1.000          |
| A dressing should ... [keep the ulcer moist]                            | 23 (6)      | 20 (5)       | 1.000          |
| The most important treatment for a leg ulcer is ... [compression bandaging] | 69 (18)     | 84 (21)      | .375           |
| The most important activity I can do to support my leg ulcer is ... [walking] | 61 (16)     | 56 (14)      | .774           |
| I should elevate my legs ... [3–4 times a day]                          | 61 (16)     | 52 (13)      | .549           |
| An optimal diet ... [includes all major food groups]                    | 69 (18)     | 56 (14)      | .289           |
| Most people should drink ... [8 or more glasses of water each day]      | 34 (9)      | 40 (10)      | 1.000          |
| I should check the skin on my legs ... [every day]                      | 57.7 (15)   | 60 (15)      | 1.000          |
| If something goes wrong with the skin on my legs I should ... [contact my doctor or nurse immediately] | 73.1 (19)   | 84. (21)     | .625           |
| The best way to avoid another venous leg ulcer is ... [wear compression stockings] | 73.1 (19)   | 60 (15)      | .344           |
Table 14 presents the true/false knowledge questions pre and post for the control group with no statistically significant differences noted.

**Table 14: True/false questions in pre and post-LUPP questionnaires**  
(% correct, control group)

<table>
<thead>
<tr>
<th>畢竟</th>
<th>Pre-Control</th>
<th>Post-Control</th>
<th>McNemar (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compression will fix the problem with my veins (False)</td>
<td>42.3 (11)</td>
<td>28 (7)</td>
<td>.344</td>
</tr>
<tr>
<td>Wounds should be cleansed at every dressing change (False)</td>
<td>23.1 (6)</td>
<td>24 (6)</td>
<td>1.000</td>
</tr>
<tr>
<td>While I have a leg ulcer it is important that I rest and not be too active (False)</td>
<td>50 (13)</td>
<td>56 (14)</td>
<td>1.000</td>
</tr>
<tr>
<td>My diet needs to be more nutritious than usual when I have a leg ulcer (True)</td>
<td>53.8 (14)</td>
<td>52 (13)</td>
<td>1.000</td>
</tr>
<tr>
<td>Some medications will slow the healing of my ulcer (True)</td>
<td>30.8 (8)</td>
<td>24 (6)</td>
<td>.687</td>
</tr>
<tr>
<td>Soap and water is the best way to clean my skin (False)</td>
<td>65.4 (17)</td>
<td>68 (17)</td>
<td>1.000</td>
</tr>
<tr>
<td>Four-layer compression bandaging is the best bandaging treatment available for venous leg ulcers? (True)</td>
<td>92.3 (24)</td>
<td>92. (23)</td>
<td>1.000</td>
</tr>
<tr>
<td>After my ulcer heals I will need to use compression stockings for the rest of my life (True)</td>
<td>92.3(24)</td>
<td>88. (22)</td>
<td>.625</td>
</tr>
</tbody>
</table>
Table 15 presents the nutrition behaviours pre and post-LUPP in the control group with no statistically significant differences noted.

**Table 15: Nutrition behaviours in pre and post-LUPP questionnaires (% correct, control group)**

<table>
<thead>
<tr>
<th>Nutrition/Behaviour</th>
<th>Pre-Control</th>
<th>Post-Control</th>
<th>McNemar (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutrition. Usual Food Intake [Adequate/Excellent]</td>
<td>88.5 (23)</td>
<td>84.0 (21)</td>
<td>1.000</td>
</tr>
<tr>
<td>Water. [At least 8 glasses]</td>
<td>23.1 (6)</td>
<td>24.0 (6)</td>
<td>1.000</td>
</tr>
<tr>
<td>Client recommended to take nutritional supplement [Yes]</td>
<td>23.1 (6)</td>
<td>20.0 (5)</td>
<td>1.000</td>
</tr>
<tr>
<td>Client takes nutritional supplement [Yes]</td>
<td>19.2 (5)</td>
<td>16.0 (4)</td>
<td>1.000</td>
</tr>
<tr>
<td>Client recommended to take multivitamin [Yes]</td>
<td>34.6 (9)</td>
<td>28.0 (7)</td>
<td>.625</td>
</tr>
<tr>
<td>Client takes multivitamin [Yes]</td>
<td>30.8 (8)</td>
<td>20.0 (5)</td>
<td>.375</td>
</tr>
<tr>
<td>Client believes they are eating a well-balanced diet [Yes]</td>
<td>92.3 (23)</td>
<td>92.0 (23)</td>
<td>1.000</td>
</tr>
<tr>
<td>Client believes they have been drinking plenty of fluids [Yes]</td>
<td>65.0 (17)</td>
<td>68.0 (17)</td>
<td>1.000</td>
</tr>
</tbody>
</table>
Table 16 presents the activity and skin care behaviours for the control group pre and post-LUPP. Overall, few differences were found with the exception of “walks frequently” and “use of soap substitute”. In the post questionnaire, respondents reported greater use of a soap substitute in the care plan, but only the “walks frequently” as an activity pattern showed a significant difference according to the McNemar test.

**Table 16: Activity and skin care behaviours in pre and post-LUPP questionnaires (% correct, control group)**

<table>
<thead>
<tr>
<th></th>
<th>Pre-Control % (n)</th>
<th>Post-Control % (n)</th>
<th>McNemar (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical activity [Walks frequently]</td>
<td>42.3 (11)</td>
<td>76 (19)</td>
<td>.008</td>
</tr>
<tr>
<td>Client believes they have been keeping active [Yes]</td>
<td>73.1 (19)</td>
<td>92 (23)</td>
<td>.219</td>
</tr>
<tr>
<td>Client usually crosses legs when sitting [No]</td>
<td>73.1 (19)</td>
<td>64 (16)</td>
<td>.687</td>
</tr>
<tr>
<td>Client recommended to do heel raises and squats [Yes]</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>-</td>
</tr>
<tr>
<td>Client regularly does heel raises and squats [Yes]</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>-</td>
</tr>
<tr>
<td>Client recommended to elevate legs when sitting/resting [Yes]</td>
<td>96.2 (25)</td>
<td>100 (25)</td>
<td>-</td>
</tr>
<tr>
<td>Client usually elevate legs when sitting/resting [Yes]</td>
<td>88.5 (23)</td>
<td>88 (22)</td>
<td>1.000</td>
</tr>
<tr>
<td>Care plan includes use of a soap substitute [Yes]</td>
<td>61.5 (16)</td>
<td>96 (24)</td>
<td>.008</td>
</tr>
<tr>
<td>Soap substitute is being used [Yes]</td>
<td>46.2 (12)</td>
<td>76 (19)</td>
<td>.065</td>
</tr>
<tr>
<td>Care plan includes use of a moisturiser [Yes]</td>
<td>100 (26)</td>
<td>100(25)</td>
<td>-</td>
</tr>
<tr>
<td>Moisturiser is being used [Yes]</td>
<td>92.3 (24)</td>
<td>100 (25)</td>
<td>-</td>
</tr>
</tbody>
</table>
5.12 Qualitative findings

Parahoo (2006) states that qualitative research is an approach, which explores human experience, perceptions, motivations, intentions and behaviour, in doing so the researcher seeks to understand them from the perspective of the individual. The same phenomenon has many different interpretations (Van der Zalm, 2000), and as a result, health professionals and clients can view the same situation, problem or event differently (Parahoo, 2006).

Question 21 of the post –LUPP questionnaire asked participants to record any comments about the LUPP. Of the twenty-five participants, seven did not comment. The remaining 17 participants recorded overwhelmingly positive remarks with the words “enjoyable, interesting and informative” recurring most often throughout. One participant commented that she was stressed before commencing the programme as she thought she would be part of a group and was worried she would not be able to understand as well as others in the group. However, this was clarified with her before starting the programme and she commented on completion, “there was no need to be stressed”.

Participant’s satisfaction with the programme was high and they commented regularly on how enjoyable it was. Some participants commented on how beneficial the program would be for people with leg ulcers and asked if it would be available in the future. The LUPP book was described as very practical and towards the end of the programme, many books showed signs of being well read and thumbed through. Indeed, one participant bought plastic covers for the book and gave them to the writer for other participants so that they could “mind their copy”.

94
One participant felt that the programme acknowledged the pain and suffering he had experienced whilst living with leg ulcers and found comfort in the acknowledgement. This 75-year-old man also commented that any knowledge he acquired during his lifetime he had shared with others and he felt this programme provided him with knowledge that he would actively attempt to share with others. A 66-year-old participant with a background in computer programming loved the opportunity to work with computers again. Two of the older participants (both 87 years old) especially liked the exercise session and found that it helped and encouraged them to become more active again. Both ladies had been particularly active in earlier years and enjoyed their newfound interest in getting active. Another patient with a long standing history of leg ulcers commented that she now felt more equipped to become proactive about her treatment and become involved in her own care.

Interestingly, three participants contacted their vascular surgeon with a view to discussing surgical intervention as a direct result of the programme. Throughout the programme delivery, patients commented on their satisfaction with the continuity of care as the programme was delivered by the writer only, whereas usual treatment is generally delivered by a team of nurses and it is unusual in this care setting for one person to regularly deliver the treatment. Although the continuity of care may be related to the fact that the researcher in this instance delivered the education program, the LUPP provides a consistent message to patients and therefore provides continuity for the patient.

Appointments were given to patients for each session and the intervention was delivered as close as possible to the appointed time; patients commented that it was
beneficial, as they “did not spend all day waiting for the nurse to arrive”. However, it was explained to participants that this was a direct result of the trial and it would be difficult for the team to provide this on an ongoing basis but it should be considered as a more satisfactory form of delivery for the patients and future service planning needs to consider this. One comment in particular summarised well the feedback received from the participants “I have learned so much during this programme; I had no idea how to treat or look for treatment until my nurse came, eased my pain, and with the treatment she gave me, healed my ulcer. (Thanks a million to Nurse …..)”
Chapter 6: Discussion of Findings
6.1 Introduction

The findings from the RCT are discussed in this chapter in relation to the aims and objectives of the research. The aim of this study was to evaluate the impact that a structured education program (LUPP) had on patient’s knowledge of, and attitudes and behaviours towards leg ulcer prevention, within the Irish healthcare setting, specifically in a community care environment. Findings from an earlier study within the Australian healthcare setting suggest that the LUPP has a positive impact on patient’s knowledge and compliance with leg ulcer prevention regimens (Kapp et al, 2010). The writer aimed to determine if the results from the current study were consistent with those from Australia and indeed, the wider literature.

The findings are discussed with reference to the existing body of literature. The chapter begins with a discussion of the demographic profile of the sample. This is followed by a discussion of compression use, knowledge, health behaviours and the participants overall satisfaction with the LUPP. Finally, some qualitative data derived from the open-ended aspects of the data collection instrument will be alluded to with reference to current thinking. This is followed by a summary and conclusion.

6.2 Demographic profile

6.2.1. Gender and Age

Of the fifty-one participants in this study, the majority were female (66.7%, n=34). In addition, the age profile varied from 50-87 years with an average age of 74.8 years. These findings indicate similarity with the national profile of individuals with leg ulceration (O’Brien et al et al, 2002, Mc Dermott-Scales et al, 2009). The older age of the study population provides some insight into the association between age and leg
ulceration. Demographic forecasts predict an older aged population growth into the future. Indeed, by the year 2050, it is estimated that older individuals will comprise almost 17% of the global population compared to 7% in 2002 (U.S. Census Bureau, 2004). As the population continues to age, a corresponding increase in the prevalence of chronic wounds is likely (Department of Health and Children, 2009). Therefore, it is important to establish good preventative strategies, such that the burden of illness will be reduced rather than increased into the future (WHO 2008).

6.2.2 Number and duration of current ulcer(s)

The majority of participants in this study presented with one leg ulcer (control 65.3%, \( n=17 \), intervention 68%, \( n=17 \)). The duration of the current episode of ulceration varied from less than 3 months to longer than one year, with 45.1% (\( n=23 \)) of all participants presenting with a leg ulcer which was present for longer than one year. This finding is not in keeping with previous work of McDermott-Scales (2009), who reported that just 38% of patients had an ulcer for longer than one year. Vowden and Vowden (2009) however, reported that 45.4% participants in a prevalence study had venous leg ulcers that had been present for over one year.

6.2.3 Diagnosis

McDermott-Scales (2009) found that 35% of patients attending public health services had no leg ulcer diagnosis, whereas in the current study all participants had a confirmed diagnosis of a venous leg ulcer. This variance is possibly due to the fact that the inclusion criteria included that patients had attended the leg ulcer clinic in the area and Ankle Brachial Index Pressure is routinely measured for all patients presenting with leg ulceration. A prevalence study by Vowden and Vowden (2009)
found that of 195 participants with venous leg ulceration, only 66.4% of cases had ABPI measured. An audit carried out in Australia found that over half the study participants with leg ulcers had no confirmed aetiology and of these, only 19% of participants deemed suitable for compression therapy were receiving it.

6.2.4. History of recurrence

The majority of participants had a history of more than one episode of leg ulceration (62.7%, n=32) with one participant reporting more than five episodes. This is in keeping with recurrence rates reported in the literature, which, though poorly researched, are reported as being between 10% and 69% at twelve months (Harper et al. 1995, Moffatt 1995). Indeed, a 2006 study found that up to 28% of people with leg ulcers had up to ten episodes of ulceration over a lifetime (Vowden and Vowden, 2006). The literature shows both gaps in and diverse approaches to preventing leg ulcer recurrence, particularly in regard to skin care, adherence and when to establish maintenance therapies (Kapp et al. 2008).

Many of the principles of managing venous leg ulcers are also important in preventing recurrence. Education to prevent recurrence has to focus on key elements, which promote chronic disease management (Kapp et al. 2010). This is necessary to promote adherence to prevention strategies through empowering patients to participate in self-management strategies to supplement usual care (Van Hecke et al. 2008). It is evident that recurrence is an issue in the participants in this study. In order to reduce the likelihood of recurrence, education on strategies to reduce recurrence is important. By participating in the LUPP participants are more likely to commit to
lifelong maintenance strategies to prevent recurrence, as they understand that they have a lifelong condition with an associated risk of recurrence.

6.2.5 Body mass index

Public Health nurses in the community setting do not routinely measure body mass index where this study was conducted, and therefore it was not measured in the control group. However, it was measured in the intervention group as part of the LUPP session on nutrition, and interestingly 44% (n=11) of this group was determined to be in the obese category (>30 BMI). This finding reinforces the National Taskforce on Obesity report (2005), which reported that 39% of adults in Ireland are overweight. Obesity is associated with premature death and excessive morbidity (National Taskforce on Obesity report 2005). BMI is a convenient measurement in the general population, but not a suitable measurement for some individuals as it does not distinguish between weight associated with fat and weight associated with water or muscle (National Taskforce on Obesity, 2005). Obesity can induce venous hypertension by preventing ambulation and therefore exacerbating venous hypertension (Wilson & Clark, 2003). Tissue oxygenation can also be reduced as obesity impairs chest expansion leading to reduced vital capacity and tidal function, which compromises tissue oxygenation, thereby adversely affecting wound healing (Clark & Wilson, 2003). A common misconception about obese individuals is that they cannot be malnourished when in fact they can. Obese patients are not routinely screened for nutritional deficits and there is a paucity of research into the nutritional needs of this cohort (Tobón et al. 2008).
A pilot study by Tobón et al (2008) studied the nutritional status of overweight and obese patients with VLU and found that average calorific intake was suboptimal which indicates that nutritional deficiencies should be assessed in this cohort. The LUPP addresses some of the issues surrounding nutrition and fluid intake and therefore is a valuable resource to enable health care professionals to address these issues. The writer would suggest that routine assessment of body mass index could be incorporated into the assessment phase of wound assessment in the nurse led clinics that are available in this particular community care area.

6.3 Compression for management of venous leg ulceration

Compression therapy is the cornerstone of venous leg ulcer management in ambulatory patients; furthermore, compression hosiery is commonly used for the prevention of ulcer recurrence (O’Meara et al, 2009). The evidence pertaining to the importance of compression in the management of leg ulceration is good. Compression bandages are used initially to reduce oedema and overcome venous insufficiency. The Cochrane Review (2009) questioned if the application of compression bandages or stockings aids venous ulcer healing, and found evidence that venous ulcers heal more rapidly with compression than without. The outcome measures of healing were time to complete healing, proportion of ulcers healed within trial period, change in ulcer size, and rate of change in ulcer size. It also questioned which compression bandage or stocking system is the most clinically effective and found evidence that multi-component systems achieve better outcomes than single component systems (O’Meara et al. 2009). Van Hecke et al, (2008) found that only 58.7% of patients with leg ulceration received compression therapy, with nurses citing cost of compression therapy as a reason for inadequate application. Vowden and Vowden
(2009) however, reported that 24.6% of patients with VLU were not wearing compression. Clarke-Moloney et al. (2006) reported 34.5% of patients with VLU not wearing compression.

Both control and intervention groups showed similar levels of bandaging use, and no statistically significant differences were found between the groups (left leg $p=0.474$, right leg $p=0.511$). Looking at both groups together, use of high compression systems of 40mmHg before the LUPP education was low (7.8%, $n=4$). The compression therapy most widely in use was that of 23mmHg (35.3%, $n=18$), while the proportion of clients receiving no compression therapy was approximately 20.6% ($n=10$) at this time. A qualitative study by Field (2004) found that district nurses were cautious of applying compression therapy for fear of causing trauma to the leg through inappropriate compression. This fear led the nurses to err on the side of caution when deciding treatment choices. As the use of high compression systems in this area is low, the writer would suggest that further education of staff is also required to encourage the appropriate use of compression therapy in treatment of venous leg ulceration.

Participants in the LUPP study required either compression bandaging or hosiery on either one or both legs, with the proportion of individuals receiving no compression therapy at the beginning of the trial being 20.6%. By the end of the LUPP, the proportion of patients in the control group receiving no compression therapy increased from 23.1% to 32.7%. Conversely, the proportion receiving no compression therapy in the intervention group reduced from 18% to 4%. This is similar to the original LUPP study, which found that 33.5% (of legs) suitable for compression were
not wearing compression prior to LUPP but this figure reduced to 13.8% post LUPP, which would indicate that the education program positively impacts on compression therapy use. The writer is unable to ascertain if the reduction in participants in the intervention group not wearing compression bandaging/hosiery is as a result of the education received or if the participants in the group were more concordant with compression because they were encouraged to do so, on a weekly basis by the writer.

6.4 Compression for prevention of recurrence of venous leg ulceration

Venous leg ulcers frequently recur and the impact of chronic leg ulcers is well documented in the literature (Chase et al. 2000; Persoon et al. 2004). Evidence available on prevention of recurrence is limited to two effective strategies: compression (Nelson et al. 2000) and/or venous surgery (Gohel et al. 2007). Surgery is not an option for many patients with venous insufficiency due to co-morbidities, age or reluctance to have surgery (Warwick et al. 2007). Education to prevent recurrence therefore tends to focus on compression therapy, leg elevation and exercise (RCN, 2006; HSE Guidelines, 2009). Concordance with compression therapy can be difficult to achieve as physical and psychosocial factors can influence concordance with compression therapy (Nelson, 2005).

A systematic review by Nelson et al. (2009) was carried out to assess the effects of compression hosiery or bandaging in preventing recurrence. This review found that there was no evidence that compression prevents recurrence; this finding may relate to a lack of evidence of benefit rather than evidence of lack of benefit. In other words, there is a dearth of evidence exploring the role of compression in this regard. Vowden et al. (2000) suggest that the pathology of venous leg ulceration consists of a period
of healing followed by a period of recurrence. Patients are unlikely to commit to lifelong maintenance strategies unless they understand that they have a lifelong condition with an associated risk of recurrence (Vowden et al, 2006).

Patients must understand that venous leg ulceration is a lifelong condition and that they will need to wear compression for life unless the underlying pathology is corrected by surgery (Poore, 2002). Therefore, patient awareness of compression bandaging recommendations and actual compression bandaging and compression hosiery use prior to the LUPP education was examined. Clients who already knew that compression bandaging was “the most important treatment for a venous leg ulcer” were more likely to use moderate (class 2) bandaging or hosiery (39.5%, n=20 left leg; 34.2%, n=17 right leg) compared to clients who answered this question incorrectly (23.1%, n=11, left leg; 15.4%, n =8, right leg). Maybury (1991) found that patients who are not compliant with compression hosiery all had recurrence within 36 months. In order to encourage compliance with hosiery patients need to understand the benefits of it to prevent recurrence. Patients who do not understand the value of compression during treatment are unlikely to be aware of its importance in preventing recurrence. Jull et al. (2004), looked at factors affecting concordance with compression stockings after venous leg ulcer healing. This study of 129 participants with a mean age of 75 years found that people who wore stockings were more likely to believe this was worthwhile (82% versus 16%) and were also more likely to believe that compression hosiery prevented recurrence (71% versus 42%). However, the study suggests that patients were at least three times more likely to wear compression stockings if they believed in their worth. In the writer’s study, as previously discussed, the participants were more likely to wear compression
bandaging or hosiery if they believed it was the best treatment for venous leg ulceration and understood the benefits of hosiery in preventing recurrence. Despite the consensus in the literature identifying the important link between compression therapy and prevention of recurrence, many patients do not get offered this therapy and the LUPP study is a way of addressing this issue. Indeed, a survey conducted of nurses’ perspectives on the LUPP, found that it was a valuable tool for the purpose of health promotion, and it provided a means of engaging the patients and the nurses in the education of patients with venous leg ulceration. Nurses involved in this survey rated the quality of education they provided using the LUPP as higher than the quality of education they provided prior to their involvement in the LUPP study (Kapp et al. 2010). This suggests that LUPP provides a means to standardise the education provided to patients with leg ulcers, and ensures that the information provided by nurses is structured and consistent with evidence based practice.

The clients in the original LUPP study all had active ulceration when they commenced the education programme, whereas in the writers study 25.5% (n=13) had ulcers that healed pre-LUPP. This was due to the inclusion criteria of having attended the leg ulcer clinic in the previous 12 months and the small population available to the writer. A future study to evaluate the LUPP in a larger population would be beneficial to evaluate the study in a population where all participants have active venous leg ulceration.

6.5 Knowledge
Baseline knowledge of venous leg ulcer aetiology and treatment was assessed in both the control and intervention group prior to commencing the LUPP. Eleven multiple
response questions were provided in section one of the pre-LUPP questionnaire 
(Appendix 5) and no statistically significant differences in responses between both 
groups were noted for the vast majority of variables. Participants were well informed 
about contacting their doctor or nurse immediately if something went wrong with the 
skin on their legs (control 73.1%, n=19; intervention 56%, n=14, p=0.202). 
Knowledge regarding compression therapy being the most important treatment for leg 
ulcers was also high (control 69.2%, n=18; intervention 60%, n=15, p=0.378) as was 
knowledge regarding compression stockings for managing venous hypertension 
(control 73.1%, n=19; intervention 80%, n=20, p=0.560). However in the control 
group, 57.7% (n=15) of participants knew that they should check the skin on their 
legs daily, whilst only 28% (n=7, p=0.032) of the intervention group correctly 
answered this. The participants in the original LUPP study had similar knowledge 
levels to the participants in the writers study. Edwards et al. (2002) however, found 
that patients do not have a clear understanding of the cause and treatment of VLU 
with only 27% of the participants in that study citing compression as the best 
treatment.

Approximately half of the participants correctly answered the remainder of the 
questions with two exceptions. Few participants knew that a dressing should keep an 
ulcer moist (control 23.1%, n=6; intervention 24%, n=6, p=0.938), perhaps due to 
the fact that historically, the belief was held that maintaining a drier wound would 
allow healing to occur more rapidly. However, this reflects a lack of insight into the 
concept of moist wound healing and education around dressing selection (Schultz et 
al.2003). Edwards et al. (2002) also found participants believed ulcers should be kept
dry. The participants in the original LUPP study also did not understand the concept of moist wound healing.

Participants also incorrectly answered that most people should drink eight or more glasses of water a day (control 34.6%, n=9; intervention 24%, n=6). These findings were also similar to the findings in the original LUPP study (Kapp et al. 2010). Clearly this is an area that needs to be addressed in clinical practice.

In the true/false knowledge section, knowledge was highest in both groups for the question indicating that multilayer compression was an appropriate treatment for venous leg ulcers and that compression stockings would be required post healing. However, participants mistakenly believed that compression would “fix” their veins (control 42.3%, n=11; intervention 16%, n=4). This finding is similar to findings in the original LUPP study where only 24.7% of the participants correctly answered. Whilst patients have a good understanding of the necessity for compression therapy they do not understand that it will not “fix” their veins.

Knowledge regarding the impact of medications on healing and appropriate wound cleansing was low, as was the amount of physical activity required to accrue benefits when living with a leg ulcer. These findings confirm an earlier study by Chase et al, (2000) which found that patients with venous leg ulceration did not have a clear understanding of their condition or the factors that influence healing. In the original LUPP study, participants had a higher knowledge score regarding the impact of medications on healing and clearly this is an area of patient education that requires further attention in the Irish setting. The writer did find an improvement in the post-
LUPP scores (52%, n =13, versus 20%, n=5, p=0.039) regarding medication; therefore the programme does address this issue.

### 6.6 Knowledge post intervention

The knowledge scores of the control group were compared pre and post-study and the paired difference showed that the control group had a lower score at the end of the study, compared to pre-study ($M=10.68$ versus $M=11.36$). This difference was not statistically significant ($p=0.183$). The intervention group scored higher in post-LUPP compared with pre-LUPP ($M=15.8$, SD: 5.19-7.46 $M=9.48$ respectively). The SD values were also lower, indicating not only greater, but also more consistent levels of knowledge in the post-LUPP group. The original LUPP study did not include a control group so the results cannot be compared with the writers study. The control group received usual wound care from the Public Health Nurses/Community RGNs during the course of the LUPP study, and education regarding leg ulcer prevention would not have been delivered to them. Reinforcement of information is an important component of the LUPP and the lower knowledge scores for the control group could be accounted for by the fact that this group did not have any education during the study time frame.

The proportion of correct answers in the multiple-choice questions increased statistically significantly between the pre and post-assessments in nearly every case in the intervention group ($p=<0.05$). The number of correct responses in the true /false section also showed improvement in almost every case. The exception was the question on whether wounds needed to be cleansed at every dressing change. Participants did not seem to distinguish between wound cleansing and skin care.
Indeed, skin care, i.e. washing and moisturising the leg at dressing change was felt to be the same as cleansing the wound, and therefore the question may have been unclear. In the original LUPP study, almost all participants incorrectly answered that wounds need to be cleansed at dressing change and this did not significantly improve post LUPP. However the terminology used in the program may not have clearly distinguished between skincare and wound cleansing and this may reflect that the LUPP did not communicate the right message.

The responses to the question regarding compression bandaging “fixing” the problem with veins, did show a statistically significant improvement post-LUPP with just 56% (n=14) of participants correctly responding compared to 16% (n=4) in the Pre LUPP. There is room for improvement in this area of knowledge and as such this has significance for subsequent prevention practice. This finding is similar to the original LUPP study and suggests that the LUPP did not clearly demonstrate the difference between the role of compression supporting the veins and actually fixing the problem.

The question regarding medications slowing the healing of ulcers showed a statistically significant improvement post-LUPP (p=0.378) even so, only 52%, (n=13) correctly responded post-LUPP. This demonstrates that the education here could be improved; indeed, this finding was also demonstrated in the original LUPP study (Kapp et al, 2010).

Post–LUPP, all participants were well informed about the most common cause of leg ulcers and the importance of compression therapy. Edwards et al. (2002), explored patients understanding of leg ulceration by examining their knowledge of the disease
process and found that of the 101 participants who took part, 34% were unable to state the cause of ulceration. The age range in this study was 23-91 with a median age of 75 years. The median age of the sample in this study was similar to the writer’s study and the results show that this patient cohort does not have a good understanding of the pathology of venous disease. However, the study found that whilst patients with chronic ulceration want more information on their condition and treatment, this information must be written in simple, clear language if it is to be effective. The LUPP provides information on the pathology of venous disease and in the intervention group, of the writer’s study; all the participants demonstrated understanding of the cause of their ulcer post-LUPP.

Clarke-Moloney et al, (2006), conducted a prospective study to ascertain if information leaflets for patients with VLU were effective and found that they were of limited value. This study had a small sample of 20 divided into control and intervention groups. The mean age was 67.5 years and the follow up period was six weeks, which is the same timeframe as the LUPP study. Both groups received verbal information and the intervention group also received leaflets. The leaflets were given to the intervention group to reiterate education key-points; however, there was no statistically significant difference between the groups at follow up. The authors point out that factors that may have inhibited recall in this cohort were the fact that the information was provided in a hospital clinic, and this may have contributed to patient anxiety, and that difficulty with hearing, language barriers and confusional states may have contributed to poor recall. However, other studies have had more favourable outcomes (Barlow et al, 1997; Callaghan et al, 1998). Clarke–Moloney (2006) however stressed the need for continuing information with reinforcement of
information for this patient cohort. The writer’s study did have a statistically significant difference in knowledge scores post LUPP and as the programme is delivered by nurses in a multimedia format, it addresses some issues surrounding education delivery for this cohort of patients. When evaluating these results it is important to consider the Hawthorne effect and whether the fact that the writer delivered all the education had an affect on the findings. Whilst acknowledging the value of regular one to one encounters between the writer and the participants, the original LUPP study involved many different healthcare professionals delivering the LUPP in real-world delivery, and the findings were similar to this study. This would suggest that the program is responsible for the findings and diminish the possibility of a Hawthorne effect.

Brooks et al, (2004), conducted a quasi-experimental study to ascertain if a structured nurse-led education programme was effective in improving patient concordance and preventing recurrence of venous leg ulceration. Forty-nine participants were included with an average age of 80 years. The study found that participants in the experimental group experienced significantly less recurrence over one year. Secondary outcomes suggest this may be due to ankle movement, mobility level and sustained leg elevation. The authors conclude that nurse led education was effective in preventing venous leg ulcer recurrence. In order for this behaviour to be prolonged over a longer period nurses need to provide regular re-enforcement of education. The LUPP facilitates this as it provides an opportunity to revisit any session in the programme if the need arises, and the provision of the LUPP booklet provides the participants with an opportunity to revisit the information at any time.
6.7 Knowledge and the adult learner

As previously stated, the age of participants in this study varied from 50-87 years with an average age of 74.8 years. Both groups had similar mean ages (control \( M=74.8 \); intervention \( M=74.7 \)). When dealing with older adults many myths can prevail (Fenter et al. 2002; Zurakowski et al. 2006; Merriam et al. 2007). Older adults may be described as low performing and slow thinking (Fenter, 2002) or unable to retain new information and adverse to change (Zurakowski et al. 2006) despite research showing that mental capacity is commonly preserved throughout the ageing process (Merriam et al. 2007). Memory may change with age and some older adults may have an increase in delayed recall of information (Park et al., 1999) but this is not universal. Park et al., (1999) suggest that delayed recall of information may be directly related to the delivery of information and the speed at which it is delivered.

Malcolm Knowles received considerable attention in the literature when he introduced the concept that children and adults learn differently (Knowles, 1973). His theory is that adults need a reason to learn, or to put it differently; adults are prompted to learn if they believe that the knowledge will be advantageous to them. A desire for independence or a need for education to be of use is a motivator for adult learners (John, 1988). The literature presents recommendations in keeping with these theories and the LUPP is delivered with these recommendations in mind.

One recommendation by Zurakowski et al. (2006) is the provision of hand-outs, which can be reviewed at home. At the end of each LUPP session, a summary sheet was provided which highlighted the important points of each session. Participants were recommended to place these sheets in a prominent place at home such as the
fridge door, where the participant and/or carer could easily refer to them. Indeed, Thomas (2007) states that self-directed learning can be boosted by a combination of bulletin boards and one to one education. Thus, the use of hand-outs, which were accessed in the home, acted as bulletin boards, reinforcing the information.

Short educational sessions with prioritisation of important information are another recommendation (Best, 2001) and each multimedia session in the LUPP was delivered in less than ten minutes and on a one to one basis. The sessions were well received by the participants, with the majority ranking them as excellent on a Likert style scale.

Multimedia delivery of information can help to override the problems presented by poor literacy and also serves to reinforce the information provided (Ciceriello et al., 2010). The content of multimedia education can be delivered at a pace that suits the viewer and repeat viewing is possible, making it a suitable method of delivery for the adult learner. Computer aided technology has been used to improve knowledge in patients with eating disorders (Andrews et al., 1996), cancer (Wydra 2001) in an orthopaedic setting (Yeh et al., 2005), stoma care (Shu-Fen Lo, 2010) and spinal cord injury (Pellerito 2003). There is growing evidence in the literature that CAT programmes can play a major part in health education by either augmenting traditional care or providing an educational intervention in resource challenged healthcare settings. The LUPP provides a cost effective solution by providing an educational program to prevent leg ulcer recurrence by engaging the learner in the learning process.
The findings of this study would suggest that the concepts of adult learning were successfully incorporated into the programme. A highly significant correlation was found to exist between the age of the participant in both groups and the baseline scores. The older the participant, the lower their overall knowledge pre-LUPP was. This was statistically significant (Pearson $r=-0.45$, $p<0.001$, Spearman $r_s=-0.39$, $p=0.005$), and means that 20% of the variance in the pre-LUPP test score can be explained by age. This main effect was basically unchanged when controlled for gender using an OLS regression, as $R^2=0.21$. When the control group ($n=26$) ages were compared with the post-LUPP knowledge scores, this negative relationship held ($r=-0.34$, $p=0.092$) but did not reach the critical level of significance, due to the lower power achieved with the small sample size. However, for the intervention group, when ages were correlated with the post-LUPP knowledge scores, this relationship disappeared; there was basically no association between age and knowledge ($r=0.03$, $p=0.895$). This would seem to indicate that older participants benefit more from a LUPP (Appendix B), and therefore the lower the baseline score, the more benefits accrued. The writer had expected the scores post-LUPP in the intervention group to still be negatively related to age, but that the scores would be at a higher intercept. Instead, the fact that that negative relationship disappeared altogether post-LUPP implies that older participants learnt proportionally more than their younger participants.

A study investigating the patient/physician interaction in older women with breast cancer in 2004 identified that women with breast cancer were underinformed (Maly et al. 2004). This study found that physicians provided less information to older patients and that less cancer knowledge was associated with decreased survival. However, the
same study showed that the provision of more interactive support for older women is significantly associated with increased knowledge levels. This is in keeping with the writer’s study which found that older participants benefit more from the LUPP and as practitioners we need to assess our approach to education and the older adult to ensure that we are providing the appropriate education in the appropriate format.

6.8 Client Health Behaviours

The HSE (2009) guidelines on wound management recommend leg elevation and leg exercises for prevention of recurrence of venous leg ulcers. Leg exercises positively affect wound healing (Heinen et al., 2004), whilst full ankle movement and full mobility decrease the incidence of recurrence (Brooks, 2004). At baseline (pre-LUPP) the intervention group was more likely to walk frequently (88%, n=22) compared with the control group (42.3%, n=11). Walking frequently, as defined by the LUPP questionnaire, was defined as “walks frequently outside room at least twice a day and inside room at least once every two hours during waking hours”. The exercise session in the LUPP program however recommended walking for thirty minutes each day, with participants advised to start with short walks and gradually increasing the length of walks. Whilst many participants described themselves as walking frequently according to the LUPP definition, few were reaching the target of thirty minutes a day, and as such the definition of walks frequently was not reflective of the level of activity required for optimal activity levels.

The National taskforce on obesity (2005) found that a large number of adults are not meeting the recommended levels of daily physical activity and those people who are not physically active are more likely to be obese. It also found a statistically significant association with age, with physical activity decreasing with age. This is
similar to the Slán Report (2007), which found older people reported the highest level of physical inactivity with 44% reporting low level of physical activity.

Heel raises and squats are particular exercises recommended by the LUPP, but these particular exercises are not routinely recommended to patients in the Irish setting and so neither group was recommended to do heel raises and squats pre LUPP in the writers study. Many patients did do some degree of ankle exercises, however these were not the particular exercises recommended by the LUPP and therefore could not be recorded as such. Post-LUPP all intervention participants were recommended to do heel raises and squats and all participants stated that they did these exercises regularly. There is evidence in the literature that poor ankle mobility has an adverse affect on healing and prevention of recurrence (Vowden & Vowden, 2006, Brooks, 2004) and therefore it is important that the issue is addressed and the exercises provided by the LUPP are a way of approaching this issue. Pre and post–LUPP all participants responded that they were recommended to elevate their legs when sitting and resting, however post–LUPP all participants (100%, n=25) responded that they were elevating their legs versus 84%, n=22 pre-LUPP. As both groups were actually elevating their legs pre and post–LUPP there was no statistical significant difference. Leg elevation above the level of the heart is recommended to prevent recurrence in many guidelines (RCN, 2006) although there is not a lot of literature to support this and it is considered expert opinion. Recent studies however have associated longer periods of leg elevation with reduced levels of recurrence (Brooks et al. 2004, Finlayson et al. 2009).
Skin care is necessary in the maintenance phase in order to promote normal skin pH (Kapp et al., 2008). Furthermore, moisturised skin is important, as the integrity of skin is more likely to be breached if it is dry or rough (Morris and Sander, 2007). Baseline findings suggest that the majority of patients in both groups were recommended to use a moisturiser and actually did do so. However, fewer participants were recommended to use a soap substitute and as would be expected in this case, the participants did not do so. Post-LUPP, all participants in the intervention group reported the use of a soap substitute, but this finding may have arisen due to the fact that skin care was incorporated into the wound care regimen provided by the writer during the LUPP. Participants received a sample of a soap substitute and moisturiser, which was used during the programme, as did participants in the original study (Kapp et al., 2010), and it may be that participants were exposed to the benefits of the products without having to purchase them initially. The findings here are similar to the original LUPP study which found a statistically significant difference in the proportion of clients using a soap substitute post-LUPP (Kapp et al., 2010).

Nutrition behaviours were measured pre and post-LUPP for both groups and interestingly, neither group showed a statistically significant difference post-LUPP. Whilst a high proportion of both groups described their usual food intake as adequate /excellent (control 88.5%, n=23 pre-study; versus 84%, n=21 post-study; intervention 88%, n=22 pre-LUPP versus 92%, n=23), the writer intuitively feels that the measures used were limited. Participants in the intervention group completed a three-day nutrition diary as part of the nutrition session. Analysis of the recorded food intake described by the participants did not reflect their beliefs that their food intake was adequate /excellent. Participants exhibited poor understanding of a well-balanced
diet; however, more research is required to explore this further. The Irish Universities’ Nutrition Alliance (IUNA) conducted a survey in March 2011 of 1500 adults to assess nutrition and found that many adults do not meet the daily requirements of fruit and vegetables and fibre. It also found inadequate daily intake of vitamins A, D, C, B2 and calcium and folate. It found that obesity is increasing in people over 65 year, while physical activity is decreasing. This was also found in the Slán report (2007). The IUNA study reports on the complex relationship between diet and health, and identifies other factors that affect health such as lifestyle and physical activity (IUNA 2011). The findings in the writers study therefore are similar to findings published in the Slán report (2007) and the IUNA report (2011) and so the findings can be extrapolated to the general population. There were no statistically significant differences in nutrition reported post-LUPP in the original Australian study (Kapp et al, 2010).

Fluid intake is also a problematic area, with the majority of participants in both groups failing to reach the recommended target of eight glasses per day. Post–LUPP in the intervention group 24% (n=6) were drinking at least eight glasses of fluid per day. Interestingly 56% (n=14), believed they were drinking plenty of fluids, despite not reaching the recommended goals. In the control group, the figures were similar with 24% (n=6) reaching the target of eight glasses, but 68% (n=17), still believing they were drinking enough. These findings are similar to the original LUPP study (Kapp et al, 2010) which found that 64.9% of the participants in pre and post-LUPP not meeting the recommended fluid intake, even though the participants described their fluid intake as adequate. Welch (2010) states that sustaining the correct fluid balance is essential for individual health. Barriers to adequate fluid intake include
functional weakness, cognitive impairment, refusal to drink, nausea and restricted fluid intake (McMillen and Pitcher, 2011). Long-term chronic mild dehydration can lead to increased risk of constipation, urinary tract infections, hypertension and coronary heart disease (Manz and Wentz, 2005b). Older adults who are ill or have high levels of physical dependency are more at risk of dehydration than those in good health (Primrose et al. 1999). As the majority of participants in this study were clearly not drinking enough this is an area of patient education that requires further work and research.

6.9 Participant satisfaction with LUPP

Participants in the intervention group responded to a number of statements about their satisfaction with LUPP. There was unanimous agreement from participants that the LUPP improved their understanding of venous ulcers and how to prevent ulcers from recurring. Participants felt that the LUPP provided them with information they previously were unaware of. However, not all participants agreed that the activities included in the LUPP education were very helpful; 92% (n=23) completely agreed, 8% (n=2) moderately agreed. Participants rated the sessions individually on a Likert-type scale and the majority of participants found all sessions to be “excellent”. These findings are in keeping with the findings of the original LUPP study. The writer proposes the adoption of the LUPP within the Irish Health Service as it is proven to have a statistically significant impact on patient’s knowledge of leg ulcer prevention and the participants in this study described the program as excellent. There would be cost and resource implications associated with the implementation of the LUPP in Ireland, such as training and education of staff and longer visits with patients. However, if the LUPP was evaluated in larger studies, the outcomes achieved would
be applicable and therefore the resource implications would be reduced by better clinical outcomes for patients.

6.10 Wound status

Wound status was measured in this study, and for both groups 49% \((n=23)\) had active wounds at the end of the study. However, 15% \((n=4)\) of the control group healed, whereas 36% \((n=9)\) of the intervention group healed which would suggest that wound outcomes are improved due to the LUPP study, but this was not statistically significant. This is an area where further research is warranted as suggested by the authors in the original LUPP study (Kapp et al. 2010).

6.11 Qualitative Findings

Participants in the intervention group were asked to record any comments about the LUPP. Seventeen participants responded with positive remarks: “Enjoyable”, “interesting” and “informative” were recurring comments within this section. One participant commented that she was stressed before commencing the programme as she thought she might not be able to understand as well as others. This finding is reflective of the literature, which states that patients living with chronic leg ulceration do not have a good understanding of their condition (Chase et al., 2000, Edwards et al., 2002). Much of the literature challenges the parent-child relationship of health care professionals when dealing with venous leg ulcer in terms of change management and patient empowerment. An empowered patient is one who has the knowledge, skills attitudes and self-awareness needed to change their behaviour and therefore improve quality of life (McGowan, 2005). It is important, therefore, that nurses use strategies to help empower patients. The LUPP seeks to do exactly that: empower patients,
promote chronic disease management and encourage participation in self-management activities (Kapp et al., 2010).

Nurses also need to establish and maintain a therapeutic working relationship with patients. Ebbeskog (2005) used a phenomenological study to investigate older patients’ experience of venous leg ulcer dressing changes. This study emphasised the importance of assessing the patient’s view of the health professional carrying out the leg ulcer care. The data in this study were analysed using a method based on the phenomenological philosophy of Heidegger (1962). The patients discussed the importance of not seeing the patient as an ailment but rather seeing them as a whole person. They discussed the need to express their suffering, and the need for mutual understanding between patients and their caregivers. This study showed that when staff explained the treatment options and goals, participants viewed them as caring, competent and skilful. This created a sense of security for the patient. In keeping with these themes, one participant in the writer’s study felt that the program acknowledged the pain and suffering he had experienced whilst living with leg ulcers, and he found comfort in that acknowledgement. Another participant with a long history of recurrent leg ulcers commented that after the study she felt equipped to become more proactive about her treatment and to become involved in her own care. All of these are fundamental steps towards self-management. Indeed, the Chronic Care Model (Wagner, 2001) puts self-management at its core and suggests that when informed patients co-operate with a proactive team, the result is better clinical outcomes.

Hopkins, (2004), explored coping strategies in individuals with non-healing leg ulcers, and found that patients and practitioners differed in their understanding of
compliance. This small study of five people discussed the social implications for patients living with non-healing leg ulcers. One theme was the issue of the timing of nurse visits. Because the nurses were unable to provide set visit times the participants felt their lives revolved around waiting for these visits, which in turn led to social exclusion. This theme was also evident in the feedback received from the intervention group in the writer’s study. During the LUPP, appointments were given to patients for each session and the intervention was delivered as closely as possible to the appointed time. Participants commented that this was beneficial, as they “did not spend all day waiting for the nurse to arrive”. This is an issue that warrants further work in future service planning as patients viewed it as a more satisfactory form of care delivery. Set appointment times are generally not the case in the community, as Public Health Nurses and Community Registered General Nurses generally plan visits on a daily basis depending on prioritisation of visits. However, the value to patients of set appointment times should be recognised and potentially delivery of wound care appointments at an agreed time and date could be recognised as a patient centred Key Performance Indicator.

6.12 Summary of Main Findings

- Fifty-one participants took part in the study, of which the majority were female, with an average age of 74.5 years.

- The majority presented with one ulcer and the duration of the current episode varied from less than three months to longer than one year.

- The majority of participants have had more than one episode of ulceration.
• Both groups had similar levels of bandaging use at baseline with moderate compression bandaging system (23mmHg) most widely used. However, 20% of participants were not wearing compression at baseline.

• Post-LUPP the control group had higher proportion of individuals receiving no compression, but in the intervention group this had reduced to 4%. Furthermore, participants who knew that compression bandaging was the most important treatment for VLU were more likely to use compression bandaging.

• There was no statistically significant difference between the groups regarding baseline knowledge. Knowledge regarding compression therapy and compression hosiery to prevent recurrence was high but few participants understood the properties of an ideal dressing or the required daily fluid intake amount. A high percentage mistakenly believed compression would “fix” the problem with their veins and participants had low knowledge regarding the impact of medications and appropriate skin care.

• Post-LUPP the knowledge score for the control group was lower whilst there was a notably improved score in the intervention group. The proportion of correct responses increased statistically significantly in nearly every case. The exceptions were wound cleansing, impact of medications and compression “fixing” the problem with the veins.

• Pre–LUPP no participants in either group were recommended to, or undertaking, heel raises and squats. In the intervention group post-LUPP, all participants stated they regularly did these exercises. They also all recorded that they were recommended to, and did elevate their legs. Soap substitutes were included in all skin care regimens for this group.
• Neither group showed a statistically significant difference pre and post-LUPP for nutrition, with only 24% of the intervention group reaching the recommended fluid intake post LUPP.

• Satisfaction with LUPP was high for the intervention group with the majority describing the sessions as excellent. There was unanimous agreement that the LUPP improved understanding of VLU, prevention of recurrence and provided information that the participants did not have previously.

• The findings of this study would suggest that the concepts of adult learning were successfully incorporated into the programme. A highly significant correlation was found to exist between the age of the participant in both groups and the baseline scores. The older the participant, the lower their overall knowledge. In the intervention group, when ages were correlated with the post-LUPP knowledge scores, this relationship disappeared; there was no longer any association between age and knowledge ($r=0.03, p=0.895$). This would seem to indicate that older participants benefit more from a LUPP program.

6.13 Conclusion

Throughout this chapter the main results reported were discussed and compared within the context of previous research. The first objective of this research was to implement the LUPP and measure its impact on knowledge of, and attitudes and behaviours towards, leg ulcer prevention. The findings suggest that LUPP has a positive impact on patients’ knowledge of venous leg ulcer prevention. Prior to commencing the LUPP participants had good knowledge of venous leg ulceration and the role of compression therapy. However participants had only fair understanding in
the areas of exercise, activity and nutrition. Post-LUPP there was a statistically significant improvement in knowledge in the majority of instances; however in the area of wound cleansing and compression “fixing” the underlying problem the LUPP did not seem to make any observed difference. LUPP recommendations regarding skin care were adhered to in the majority of participants, as was the exercise component of the programme. LUPP did not show statistically significant changes in the area of understanding nutrition and fluid intake. In the area of compression therapy, awareness of the need for compression was high; however 20% of participants were not wearing compression. Post-LUPP in the intervention group, lack of compression use had decreased to 4% whilst in the control group this increased to 32.7%. In the intervention group awareness of the need for compression for healing and prevention of recurrence improved.

Participants in the LUPP rated the program highly with the comments most regularly encountered being “enjoyable”, “interesting” and “informative”. The computer was a novel way to deliver the education and participants responded well to it. The majority of participants found all sessions of the program to be excellent, and the LUPP book provided, showed evidence of being well read and thumbed through. The potential benefits for the intervention group anticipated at the beginning of this study were:

- Standardised patient education in line with evidence based practice.
- Improved patient knowledge, healthy behaviours and self-management practices.
- Increased use of best practice compression therapy for leg ulcer prevention.
- Enhanced patient and nurse engagement in health promotion.
The findings would suggest that the intervention group did achieve the potential benefits of this program.

Chapter 7: Conclusion
7.1 Introduction

The aim of this research was to determine the effect of an education programme (LUPP) on patient’s knowledge of, and attitudes and behaviours towards leg ulcer prevention. Venous leg ulceration is a significant health care issue that requires good clinical judgement in order to enable the nurse to provide, evidence based care (Edwards et al. 2002). In Ireland, prevalence rates for venous leg ulceration are on a par with other European countries (O’Brien et al.2002, McDermott-Scales et al. 2009). However, with the Irish population of 65 years and over continuing to rise, one can expect an increase in prevalence accordingly (DoHC, 2009). Guidelines are available from the HSE to assist in diagnosis and management of venous leg ulceration; however, they do not address appropriate strategies for patient education (HSE guidelines, 2009). Nurses must recognise that venous leg ulceration is, in the majority of cases, a chronic condition, and care planning should focus on enabling patients to live with the condition (Briggs and Flemming, 2007). For optimal self-management to be effective, patients need comprehensive knowledge to enhance their ability to support attitudes and behaviours towards prevention of leg ulcer recurrence (Edwards et al. 2002).

There are many wound care programmes, which deal with issues such as assessment, treatment and healing (RCN, 2006; HSE guidelines, 2009). However, for nurses working in a community setting it can be difficult to implement an education component in prevention of leg ulcer recurrence, because at present the HSE does not provide any patient information leaflets and the advice given to patients varies depending on the nurses’ own knowledge and attitudes (Walsh and Gethin, 2009). This research may be a first step in addressing this issue as the LUPP is designed
around key elements, which promote chronic disease management, and encourage patients to participate in self-management activities. Whilst health care professionals may view healing as a successful outcome, for patients management of symptoms is often the desired outcome (Briggs and Flemming, 2007). Healthcare professionals must recognise that venous leg ulceration is a chronic condition and focus must be on enabling patients to live with the condition. Education in self-management strategies for prevention of recurrence is vitally important for patients in order to enable them to understand their condition and the factors that prevent recurrence (Kapp et al., 2008). Helping patients to change behaviour is an important role for nurses. Patients are unlikely to commit to lifelong maintenance strategies to prevent recurrence unless they understand that they have a lifelong condition with an associated risk of recurrence (Cameron, 1996; Poore et al. 2002). Multimedia delivery is shown to be an effective method to augment traditional care and overcome difficulties with health literacy (Adsit, 1996).

The implications of this study are multi-dimensional: patient adherence is improved through appropriate education, which in turn improves patients’ health-related quality of life, reduces recurrence and reduces the costs associated with treating recurrence. The information generated by this study will be used to guide staff and patients and will provide invaluable data to direct future education in this community setting. This information has not been gathered before in an Irish setting and as such will be shared with all groups interested in wound care.

The first objective of this research was to implement the LUPP and measure its impact on knowledge of, and attitudes and behaviours towards, leg ulcer prevention.
The findings suggest that LUPP has a positive impact on patients’ knowledge of venous leg ulcer prevention. Prior to commencing the LUPP participants had good knowledge of venous leg ulceration and the role of compression therapy. However, participants had only fair understanding in the areas of exercise, activity and nutrition. Post LUPP there was a statistically significant improvement in knowledge in the majority of instances, although in the area of wound cleansing and compression “fixing” the underlying problem, the LUPP did not seem to make any observed difference.

LUPP recommendations regarding skin care were adhered to in the majority of participants, as was the exercise component of the programme. LUPP did not show statistically significant changes in the area of understanding nutrition and fluid intake. In the area of compression therapy, awareness of the need for compression therapy was high; however 20% of participants were not wearing compression. Post-LUPP in the intervention group, lack of compression use had decreased to 4% whilst in the control group this increased to 32.7%. In the intervention group awareness of the need for compression for healing and prevention of recurrence improved.

Participants in the LUPP rated the program highly with the comments most regularly encountered being “enjoyable”, “interesting” and “informative”. The computer was a novel way to deliver the education and participants responded well to it. The majority of participants found all sessions of the program to be excellent, and the LUPP book provided, showed evidence of being well read and thumbed through.
The potential benefits for the intervention group anticipated at the beginning of this study were:

- Standardised patient education in line with evidence based practice.
- Improved patient knowledge, healthy behaviours and self-management practices.
- Increased use of best practice compression therapy for leg ulcer prevention.
- Enhanced patient and nurse engagement in health promotion.

The findings would suggest that the intervention group did achieve the potential benefits of this programme.

7.2 Strengths and Limitations of the study

An RCT is described as an experiment where participants are either allocated randomly to a control group or an intervention group, or more than one control or intervention groups depending on the number of interventions (Parahoo, 1997). According to Mazor et al. (2007), cluster randomised trials generally focus on effectiveness of interventions by evaluating outcomes under conditions of actual use.

The rationale for this research study was based on the incidence and prevalence of venous leg ulceration, a comprehensive review of the literature and the writer’s experience of the challenges faced in preventing recurrence of venous leg ulceration.

The National Best Practice and Evidence Based Wound Management guidelines produced by the HSE (2009) recommend education of patients to prevent recurrence but they do not address appropriate strategies for patient education. The LUPP was identified in the literature search as a means of delivering a standardised education programme, which addresses the key elements which influence ulcer healing.
optimise prevention of recurrence and advocate chronic disease management (Kapp et al. 2010). As the RCT is considered the gold standard in determining the effect of an intervention, the writer considered the research design appropriate to answer the research question.

A strength of the study is that the participants reflect those patients who are usually cared for in the community care setting. The inclusion criteria were such that the participants were representative of patients normally seen in clinical practice in the community and therefore the findings may be generalisable to them. The study was conducted across six sites, which are reflective of community care centres in the Irish setting.

In the original LUPP (2010) study, data were not collected from clients at non-LUPP sites and this eliminated the possibility of comparison with a control group. The inclusion of a control group in the writer’s study allowed for such a comparison and as such is a further strength of the study.

The participants in the study highly rated the use of the computer to deliver the programme with some participants commenting that it was the first time they had been introduced to computers. For the writer, it was also the first time to use a computer for health promotion with clients. However, as Public Health Nurses do not generally have laptop computers provided for work purposes, an alternative form of delivery of the LUPP would have to be considered if this programme was to be implemented throughout the health service in Ireland? One solution might be to deliver the program in DVD format using the client’s home television and DVD
player. Furthermore, day care centres generally have multimedia facilities and thus the program could be delivered in those settings. The researchers in the original LUPP study have produced a DVD of the LUPP and are currently in the process of working through a wider dissemination plan for the LUPP in Australia. They requested that the DVD was not provided to the participants in this study, however, if the LUPP was implemented on a wider scale in Ireland, it is anticipated that permission to use the DVD would be granted. There may be costs associated with the implementation of the LUPP in Ireland but in the longer term the cost may be offset by greater clinical outcomes.

The timing of data collection using the post LUPP questionnaire ensured that the information collected was current. However this may also have exaggerated the knowledge retained and further research is warranted to evaluate the long-term knowledge scores and assess if these persist over time. The behaviour changes assessed also need to be assessed over a longer period of time to evaluate if the participants maintain them. The original Australian research team are currently working on a report to evaluate long-term outcomes for participants who did and did not participate in the LUPP, and this report will contain findings on the longevity of health behaviours for these patients.

A limitation of the study was the small sample size. The study population was derived from the current patient population that attends the nurse-led clinics in the community care area. Therefore the writer only had access to a total population of 60 patients and it is on this basis that the sample was selected. However, subject retention was
excellent, fifty-one participants were recruited to the study, and fifty completed it. Sadly, the remaining participant passed away during the study, although, this was not due to the intervention under exploration.

At the outset of the study the writer aimed to determine if the results from the study would be consistent with the original LUPP study in Australia, as the findings of this study are consistent with the original study, the two studies cross-validate each other.

7.3 Recommendations for Practice

The writer proposes the following recommendations for practice:

*Implement an education program within the Irish healthcare setting for the prevention of recurrence*

The LUPP meets the criteria for adult education strategies and the use of multimedia delivery augments traditional care and overcomes difficulties with health literacy. The LUPP could be easily adapted for use in the Irish setting if the original research team granted permission for its use, or an Irish program could be developed. Education in self-management strategies for prevention of recurrence of leg ulcers is important to enable patients to understand their condition and the factors that prevent recurrence. The participants in this study expressed a high level of satisfaction with the LUPP and therefore the writer would recommend its adoption by the Irish Health Service Executive.
Further research is necessary to study effects in longer term

Additional follow-up research is warranted to determine if the knowledge levels are sustained over a longer period of time and to ascertain if the improved knowledge scores have an effect on adherence to prevention strategies and prevention of recurrence. Research is also warranted to determine if LUPP impacts favourably on healing outcomes.

Nutrition and activity behaviours of patients with venous leg ulceration require further research to ascertain the effect on leg ulcer prevention

Nutrition and fluid intake are important components in prevention of recurrence and the effects of obesity on wound healing warrant further exploration in this patient cohort. Fluid intake for the participants in this study was low and ways of addressing this need to be explored. Leg exercises positively affect wound healing whilst full ankle movement and full mobility decrease the incidence of recurrence. Few participants in the study were achieving the activity level required for optimal activity levels and the LUPP could be a first step in addressing this issue.

Consider having set appointment times for wound care visits

Participants in the LUPP commented on the value of having set appointment times for wound care visits during the implementation of the programme. This is generally not the case in the community, as Public Health Nurses and Community Registered General Nurses generally plan visits on a daily basis depending on prioritisation of
visits. However, the value to patients of set appointment times should be recognised and potentially delivery of wound care appointments at an agreed time and date could be recognised as a patient centred Key Performance Indicator. One way to achieve this would be to provide realistic time frames to enable nurses to carry out dressing changes and provide patients with a timed appointment. Nurses are visiting patients on a regular basis and should strive to structure their visits where possible to facilitate these appointments.

7.4 Dissemination for practice
The results of the completed research will be disseminated to the community care area, the Health Service Executive in general, and to interested parties such as wound management groups. The results will be presented at local, national and international research meetings and will also be published in a peer-reviewed journal. A poster presentation based on the literature review was presented at the 2012 annual international RCSI Nursing and Midwifery research conference. The findings of the study will be presented at the Institute of Community Health Nursing Conference in UCC in May 2012. The findings will also be presented back to the clinical sites that participated in the study and this is planned for September 2012.

7.5 Reflection
My main motive in carrying out this research was to achieve an academic qualification, which was dependent on the participation of my patients, and support from my colleagues. Management of individuals with leg ulcers are an area of particular interest to me as this forms the majority of my daily workload. Undertaking research was a new experience for me, which demanded careful
consideration of many issues along the way. It is appropriate therefore to reflect on the experience. Reflection, according to Reid, (1993: p305) is the process of “reviewing an experience of practice in order to describe, analyse, evaluate and so inform learning about practice”.

This study has been a learning experience particularly in relation to ethical issues and also in gaining an in-depth understanding of the research process. One of the most interesting comments passed by a male participant was that he felt that the programme showed what he went through over the years whilst living with leg ulcers. As nurses we need to recognise the leg ulcer journey undertaken by patients as described by Briggs and Flemming (2007). In my daily work I would generally see patients on a monthly basis, but the programme provided an opportunity to work with patients on a weekly basis and therefore build up more of a rapport with them. This proved to be a very positive experience for me as the time taken to implement the programme provided an opportunity for discussion of issues surrounding wound care and other issues that were affecting the patients. In the course of a discussion with one patient, she told me that her husband was incontinent of urine and had never sought professional help to deal with it, as he was a very private man. Her Public Health Nurse was involved immediately and provided help and support for them. The same lady also confided that she had terrible difficulty in sleeping due to pain and had started to have some alcohol at night to help her sleep. She confided that she was afraid that at eighty years of age she might develop a dependency on alcohol and was very distressed at the prospect. This admission was very difficult for her to make and had been causing her huge distress. With support from her GP who prescribed pain relief, this issue was successfully dealt with over the course of the programme. I feel
however this might not have come to light during the course of a standard wound care visit as the patient possibly would not have felt able to discuss such a sensitive issue during a short visit.

One of the challenges I faced with a minority of participants was to hold their attention during the short presentation. They had difficulty in concentrating on the presentation and tended to talk to me during it. I used different strategies to hold their attention such as stopping the presentation until they finished talking or actively encouraging them to hold the discussion until the end of the presentation with varying degrees of success. This further highlighted the different learning styles of adults in general and served to reinforce to me the learning needs of people in general. Overall, the research has been a positive experience for me and has confirmed for me the need for an education program for this cohort of patients. The use of a multimedia program has been proved to be a valid method of education delivery and I hope to be involved in further implementation of this programme.

7.6 Conclusion

Chronic leg ulceration is a common, debilitating and costly condition. Good, clear guidelines are available to assist in the treatment and management of venous leg ulceration. For optimal self-management to occur patients must be empowered to engage in prevention strategies. Education to prevent recurrence has to focus on key elements, which promote chronic disease management. It is clear from this study that the LUPP improves patients understanding of venous leg ulceration and prevention of recurrence. The use of multimedia delivery of the program is proven in this study to be an effective method of education delivery.
Future recommendations for practice have been previously discussed in this chapter. The writer suggests that the adoption of the LUPP in the Irish Health Service would be an important step in addressing the challenges faced by nurses and patients in preventing venous leg ulcer recurrence.
References


of lower-limb ulceration: a systematic review of prevalence studies. *Advanced Skin Wound Care*, 16(6), 305-316.


*Journal of Wound Care*, 4, 459-462


Sredl D. (2005) Evidence-based Nursing Practice Lippincott Williams & Wilkins, Philadelphia PA.


Appendices
Appendix 1: Letter to Director of Nursing

xxxxxxx,
xxxxxxx,
xxxxxxx
01/10/2011

Dear Director of Public Health Nursing,

I am a year two MSc. Research Student studying in the Royal College of Surgeons, Dublin. As part fulfillment of my programme I hope to carry out some research in your community care area. The title of the study is “A cluster randomised trial of the Leg Ulcer Prevention Program (LUPP) in venous leg ulcer patients in an Irish community care setting”. The aim of this study is to evaluate the impact that a structured education programme has on patient’s knowledge of leg ulcer prevention and healing behaviours. The objectives of this study are:

- To implement the LUPP education programme and measure its impact on knowledge and healing behaviours in an Irish community setting
- To make recommendations for practice
- To contribute to the body of knowledge of venous leg ulcers and prevention

There is currently no Irish literature available that determines this information. I plan to introduce a structured educational programme developed in Australia, called the Leg Ulcer Prevention Program (LUPP) which, hopefully will encourage and enable patients to be concordant with treatment and thereby reduce levels of recurrence. I propose to evaluate the education programme by inviting patients to complete the validated knowledge questionnaire again after they have completed the education
programme to reassess the level of knowledge and identify statistical differences. If you require any more information on this research please do not hesitate to contact me at above address.

I look forward to hearing from you and hope that you will look favourably upon this request.

Yours sincerely,

Xxxx xxxxxx
1st November 2011

Dr Zene Moore
Lecturer in Wound Healing
& Tissue Repair & Research Methodology
Royal College of Surgeons in Ireland
123 St Stephen’s Green
Dublin 2.

Re: A cluster randomised trial of the leg ulcer prevention program (LUPP) in venous leg ulcer patients within an Irish Community Care setting.

Dear Dr Moore

Expedited approval is granted to carry out the above study in:

> West Cork Community Care.

The following documents were approved:

> Application Form
> Consent Form Version 1 dated October 2011
> Invitation letter Version 1
> Study Protocol Version 1 dated June 2011
> Pre-LUPP Client Questionnaire Version 1.2 dated 28th January 2009
> Post-LUPP Client Questionnaire Version 1.3 dated 20th April 2009.

We note that the co-investigator involved in this study will be:

> Emer Shanley.

Yours sincerely

Dr Michael Hyland
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospitals

The Clinical Research Ethics Committee of the Cork Teaching Hospitals, UCC, is a recognised Ethics Committee under Regulation 7 of the European Communities (Clinical Trials on Medicinal Products for Human Use) Regulations 2004, and is authorised by the Department of Health and Children to carry out the ethical review of clinical trials of investigational medicinal products. The Committee is fully compliant with the Regulations as they relate to Ethics Committees and the conditions and principles of Good Clinical Practice.
Dear Sir or Madam,

My name is xxxxxxx and I am a master’s research student in the Royal College of Surgeons in Ireland. I am conducting a study in your area to establish how much people with leg ulcers and healed leg ulcers; understand about the condition and what helps to prevent leg ulcers from recurring. This study will enable nurses to better meet the needs of people with leg ulcers. You will be asked to fill out a questionnaire, which asks some questions about your understanding of the treatment and prevention of leg ulcers. This questionnaire is anonymous, so you are not asked to put your name on it or identify yourself in any way.

I then plan to provide an education program, which will look at some of the issues surrounding leg ulcers such as skin care, diet, and exercise. The program also looks at compression bandages and why they are important in the treatment of leg ulcers. This program will be provided at a time and date that suits you, in your local health centre.

Would you please assist me by agreeing to take part in this research? Your name was selected from a list of people who have attended the leg ulcer clinic in your
area. Your involvement is very important to give us an accurate picture of the understanding people living with leg ulcers have of their condition. You can withdraw from this study at any time and it will not affect your clinical care in any way.

I will contact you in two weeks time to see if you are willing to take part in this study and to arrange an appointment to discuss this further. Thank you very much for your co-operation in this matter.

Yours sincerely,

Xxxxxxxxxx,

Tel: xxxx
Appendix 3b: Study information leaflet

Study Information Sheet

Title of the Research Study
A cluster randomised trial of the Leg Ulcer Prevention Program (LUPP) in venous leg ulcer patients within an Irish community care setting.

Principal investigators name

xxxxxxxxx

Principal investigators title

PG Dip Wound Management & Tissue Viability,
Community Registered General Nurse

Telephone number of principal investigator

xxxxxxxxx

You are being invited to take part in a clinical research study to be carried out in xxxx xxxx.

Before you decide whether or not you wish to take part, you should read the information provided below carefully and, if you wish, discuss it with your family, friends or GP. Take time to ask questions – don’t feel rushed and don’t feel under pressure to make a quick decision.

You should clearly understand the risks and benefits of taking part in this study so that you can make a decision that is right for you. This process is known as ‘Informed Consent’.

You don’t have to take part in this study and a decision not to take part will have no effect on your future medical care.
You can change your mind about taking part in the study any time you like. Even if the study has started, you can still opt out. You don't have to give us a reason. If you do opt out, rest assured it won't affect the quality of treatment you receive in the future.

**Purpose of the study:**

Venous leg ulcers are difficult and costly to treat and more than 2 in 3 will reoccur after healing. People living with leg ulcers need information and understanding of the treatment of leg ulcers in order to improve their own involvement in their care.

**What will happen during the study?**

I plan to provide an education program called the Leg Ulcer Prevention Program or (LUPP). This program consists of six sessions delivered weekly over a six-week period. The topics, which will be covered, include:

- **Week 1:** an introduction to the causes of leg ulcers and an introduction to compression bandaging.
- **Week 2:** Leg ulcer treatment and compression bandaging
- **Week 3:** Getting active includes recommendations for walking for older adults and a range of exercises to improve calf muscle function and information on leg elevation
- **Week 4:** Healthy eating – advice on diet and fluid intake and specific advice on healthy eating while wounded.
- **Week 5:** Looking after your skin - skin products are provided which are suitable for people experiencing itch, scale and eczema
- **Week 6:** Compression stockings and keeping your ulcer healed.

**Will everybody take part in the educational study?**

Only people who have agreed to take part in this study will participate in the educational sessions. Because this is a research study, we are putting people into two groups - those who will receive the educational sessions and those who will not. This decision is made randomly. This helps us to measure if the educational sessions are of benefit to people living with leg ulcers. This means you may not be in the group receiving the educational sessions.
The possible benefits of the study

By taking part in this study, you will help us to decide if this educational program for the treatment and prevention of leg ulcers is of benefit to patients living with leg ulcers. This will help others, involved in the care of patients, to develop an education program for patients, to improve the care of patients living with leg ulcers.

Any risks involved in the study

We hope that the study will benefit patients; however, there are a few points you should be aware of:
You might not be included in the group that receives additional information. In this case your care will remain unchanged.

May I refuse to take part in the study?

You may refuse to take part in the study, without giving a reason and this will not affect your care in any way.

May I withdraw from the study at any time if I wish?

You are free to stop being part of the study at any time, if you want to, without giving a reason. This will not affect your clinical care in any way.

Further information

If you want more information, please feel free to contact me. I will arrange to speak to you at a time that suits you. My contact details are as follows:
Xxxxx xxxxx
xxxxxxxxxx
CONSENT BY SUBJECT FOR PARTICIPATION IN RESEARCH PROTOCOL

Patient Name: _______________________

Title of Protocol: A cluster-randomised trial of the Leg Ulcer Prevention Program (LUPP) in venous leg ulcer patients within an Irish community care setting.

Doctor(s) Directing Research: Dr xxxx xxxx Phone:xxxxxxx

You are being asked to participate in a research study. In order to decide whether or not you want to be a part of this research study, you should understand enough about its risks and benefits to make an informed judgment. This process is known as informed consent. This consent form gives detailed information about the research study, which will be discussed with you. Once you understand the study, you will be asked to sign this form if you wish to participate.

1. NATURE AND DURATION OF PROCEDURE (S):

Venous leg ulcers are difficult and costly to treat and more than 2 in 3 will reoccur after healing. People living with leg ulcers need information and understanding of the treatment of leg ulcers in order to improve their own involvement in their care. It is
planned to provide an education program called the Leg Ulcer Prevention Program or (LUPP). This program consists of six sessions delivered weekly over a six-week period will be provided by xxxx xxxxxxxx in your local leg ulcer assessment clinic. The topics, which will be covered, include:

Week 1: an introduction to the causes of leg ulcers and an introduction to compression bandaging.

Week 2: Leg ulcer treatment and compression bandaging

Week 3: Getting active includes recommendations for walking for older adults and a range of exercises to improve calf muscle function and information on leg elevation

Week 4: Healthy eating – advice on diet and fluid intake and specific advice on healthy eating while wounded.

Week 5: Looking after your skin - skin products are provided which are suitable for people experiencing itch, scale and eczema

Week 6: compression stockings and keeping your ulcer healed.

We hope that the study will benefit patients; however, there are a few points you should be aware of:

You might not be included in the group that receives additional information. In this case your care will remain unchanged.

By taking part in this study, you will help us to decide if this educational program for the treatment and prevention of leg ulcers is of benefit to patients living with leg ulcers. This will help others, involved in the care of patients, to develop an education program for patients, to improve the care of patients living with leg ulcers.
AGREEMENT TO CONSENT

The research project and the treatment procedures associated with it have been fully explained to me. All experimental procedures have been identified and no guarantee has been given about the possible results. I have had the opportunity to ask questions concerning any and all aspects of the project and any procedures involved. I am aware that participation is voluntary and that I may withdraw my consent at any time. I am aware that my decision not to participate or to withdraw will not restrict my access to health care services normally available to me. Confidentiality of records concerning my involvement in this project will be maintained in an appropriate manner. When required by law, the records of this research may be reviewed by government agencies and sponsors of the research.

I understand that the sponsors and investigators have such insurance as is required by law in the event of injury resulting from this research.

I, the undersigned, hereby consent to participate as a subject in the above described project conducted at the Royal College of Surgeons in Ireland. I have received a copy of this consent form for my records. I understand that if I have any questions concerning this research, I can contact the doctor(s) listed above. If I have further queries concerning my rights in connection with the research, I can contact the Clinical Research Ethics Committee of the Cork Teaching Hospitals, Lancaster Hall, 6 Little Hanover Street, Cork.

After reading the entire consent form, if you have no further questions about giving consent, please sign where indicated.

Name ______________________   ______________________
Appendix 5: Pre-LUPP questionnaire

* Forever Healed *

Breaking the cycle of wound recurrence among persons with chronic leg ulceration

<table>
<thead>
<tr>
<th>Client Surname</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client First Name</td>
</tr>
<tr>
<td>Client UR Number</td>
</tr>
<tr>
<td>Today’s Date</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nurse Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name _______________________</td>
</tr>
<tr>
<td>Mobile ______________________</td>
</tr>
</tbody>
</table>

* Pre-Leg Ulcer Prevention Program (LUPP) Client Questionnaire *

This questionnaire is to be completed prior to commencing LUPP Session 1.

Section 1: Client Leg Ulcer Questionnaire *The client is to complete Q1-Q19.*

Please do not assist the client to answer these questions.
The nurse may read the questions to the client and record the client’s responses.

Section 2: Client Health Care Practices *The nurse is to complete Q20-Q39.*

Please complete these questions utilising information available in the Client Care Record and asking the client or their carer as necessary.

* Please do not leave this Questionnaire with the client to be completed at a later date.
* Check that all questions are answered.
* Check that the client’s name, UR number and today’s date as well as the attending nurse’s details are recorded above.
* Return this questionnaire to the Research Department via the internal mail, attention to Suzanne Kapp.
* If you have any queries regarding this tool, please contact the Project Manager, Suzanne Kapp on 95365336 or 0400059482.
Section 1: Client Leg Ulcer Questionnaire *The client is to complete Q1-Q19.*

Please answer each question by *tick[ing]* the box [✓] with the answer you think is most likely to be correct. Please select one answer only per question. Please answer all questions.

<table>
<thead>
<tr>
<th>1. The most common cause of leg ulcers is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ poor arteries</td>
</tr>
<tr>
<td>□ poor veins</td>
</tr>
<tr>
<td>□ diabetes</td>
</tr>
<tr>
<td>□ spider bite</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. A leg ulcer is best described as:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ a deep cavity</td>
</tr>
<tr>
<td>□ a break in the skin that takes more than 6 weeks to heal</td>
</tr>
<tr>
<td>□ a sore, scrape or blister</td>
</tr>
<tr>
<td>□ a wound that is infected</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. A dressing should:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ allow the ulcer to dry</td>
</tr>
<tr>
<td>□ always be an antiseptic</td>
</tr>
<tr>
<td>□ keep the ulcer moist</td>
</tr>
<tr>
<td>□ be changed daily</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. The most important treatment for a venous leg ulcer is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ antibiotics</td>
</tr>
<tr>
<td>□ sunshine and salt water</td>
</tr>
<tr>
<td>□ compression bandaging</td>
</tr>
<tr>
<td>□ honey</td>
</tr>
</tbody>
</table>
5. The most important activity I can do to support my veins is:

- [ ] swimming
- [ ] sitting and resting
- [ ] massage
- [ ] walking

6. I should elevate my legs:

- [ ] all day
- [ ] 3-4 times a day
- [ ] once or twice a day
- [ ] never

7. An optimal diet:

- [ ] includes fewer, larger meals
- [ ] always includes a nutrition supplements and / or multi vitamin
- [ ] includes all major food groups
- [ ] is low in calories

8. Most people should drink:

- [ ] at least 3 glasses of water each day
- [ ] 8 or more glasses of water each day
- [ ] less water when I am taking fluid tablets
- [ ] only when I am thirsty

9. I should check the skin on my legs:

- [ ] once a week
- [ ] every second day
- [ ] every day
- [ ] only when they are sore
10. If I find something wrong with the skin on my legs I should:
- [ ] contact my doctor or nurse immediately
- [ ] treat it myself for 2 weeks then see the doctor or nurse
- [ ] treat it myself for 4 weeks then see the doctor or nurse
- [ ] wait and see what happens

11. The best way to avoid another venous leg ulcer after this one heals is:
- [ ] nothing, my problem is fixed
- [ ] use antiseptics, ointments or creams
- [ ] wear compression stockings
- [ ] protect my legs with long socks

Select true or false by ticking the box [☑️] for the following statements:

<table>
<thead>
<tr>
<th>Question</th>
<th>True □</th>
<th>False □</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q12. Compression will fix the problem with my veins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q13. Wounds should be cleansed at every dressing change</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q14. While I have a leg ulcer it is important that I rest and not be too active</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q15. My diet needs to be more nutritious than usual when I have a leg ulcer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q16. Some medications will slow the healing of my ulcer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q17. Soap and water is the best way to clean my skin</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q18. 4 layer compression bandaging is the best bandaging treatment available for venous leg ulcers?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q19. After my ulcer heals I will need to use compression stockings for the rest of my life</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Thank you very much for completing this section of the Questionnaire. Please return it now to your RDNS Nurse who will complete the remaining section with your assistance.

Section 2: Client Health Care Practices
NURSE TO COMPLETE
Please complete Q20-39 referring to the Client Care Record and asking the client/carer as appropriate.

Considering the descriptors below, record the usual food intake pattern

- **Very Poor**: Never eats a complete meal. Rarely eats more than 1/3 of any food offered. Eats 2 servings or less of protein (meat or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement OR is NPO and/or maintained on clear liquids or IV’s for more than 5 days.
- **Probably Inadequate**: Rarely eats a complete meal and generally eats only about 1/3 of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement OR receives less than optimum amount of liquid diet or tube feeding.
- **Adequate**: Eats over half of most meals. Eats a total of 4 servings of protein (meat/dairy products) each day. Occasionally will refuse a meal, but will usually take a supplement when offered OR is on a tube feeding or TPN regimen which probably meets most of nutritional needs.
- **Excellent**: Eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.

### Q20. Nutrition. Usual food intake pattern (single choice)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Poor</td>
<td>1</td>
</tr>
<tr>
<td>Probably Inadequate</td>
<td>2</td>
</tr>
<tr>
<td>Adequate</td>
<td>3</td>
</tr>
<tr>
<td>Excellent</td>
<td>4</td>
</tr>
</tbody>
</table>

### Q21. How much fluid (including water, juice, flavoured water) is the client drinking each day? (single choice)

<table>
<thead>
<tr>
<th>Amount</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>1</td>
</tr>
<tr>
<td>&lt; 8 glasses</td>
<td>2</td>
</tr>
<tr>
<td>about 8 glasses</td>
<td>3</td>
</tr>
<tr>
<td>&gt; 8 glasses</td>
<td>4</td>
</tr>
</tbody>
</table>

### Q22. How many glasses of tea and coffee (caffeinated) and alcohol does the client drink on an average day?

<table>
<thead>
<tr>
<th>Glasses</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(glasses)</td>
<td></td>
</tr>
</tbody>
</table>

### Q23. Is the client currently recommended to take a nutritional supplement? Yes ☐ No ☐

### Q24. Does the client take a nutritional supplement? Yes ☐ No ☐

### Q25. Is the client currently recommended to take a multivitamin? Yes ☐ No ☐

### Q26. Does the client take a multivitamin? Yes ☐ No ☐

### Q27. Does the client believe they have been eating a well balanced diet? Yes ☐ No ☐

### Q28. Does the client believe they have been drinking plenty of fluids every day? Yes ☐ No ☐
Considering the descriptors below, record the degree of physical activity

<table>
<thead>
<tr>
<th>BEDFAST - Confined to bed</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHAIRFAST - Ability to walk severely limited or non-existent. Cannot bear own weight and/or must be assisted into chair or wheelchair.</td>
</tr>
<tr>
<td>WALKS OCCASIONALLY - Walks occasionally during day but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.</td>
</tr>
<tr>
<td>WALKS FREQUENTLY - Walks outside room at least twice a day and inside room at least once every two hours during waking hours.</td>
</tr>
</tbody>
</table>

Q29. Activity. Degree of physical activity (single choice)

- Bedfast
- Chairfast
- Walks occasionally
- Walks frequently

<table>
<thead>
<tr>
<th>Q30. Does the client believe they have been keeping active?... Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q31. Does the client usually cross their legs when sitting?... Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q32. Was the client recommended to do heel raises and squats?... Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q33. Does the client regularly do heel raises and squats?... Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q34. Was the client recommended to elevate their leg/s (when sitting/resting)?... Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q35. Does the client usually elevate their leg/s (when sitting/resting)?... Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q36. Does the care plan include the use of a soap substitute?... Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q37. Is a soap substitute being used?... Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q38. Does the care plan include the use of a moisturiser?... Yes</td>
<td>No</td>
</tr>
<tr>
<td>Q39. Is a moisturiser being used?... Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

Thank you very much for completing this Questionnaire.

- Check that the client's name, UR number and today's date as well as the attending nurse's details are recorded on page 1
- Return this questionnaire to the Research Department via the internal mail attention to Suzanne Kapp.
Appendix 6: Post-LUPP questionnaire

**Forever Healed**

Breaking the cycle of wound recurrence among persons with chronic leg ulceration

<table>
<thead>
<tr>
<th>Client Surname</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client First Name</td>
</tr>
<tr>
<td>Client UR Number</td>
</tr>
<tr>
<td>Today’s Date</td>
</tr>
</tbody>
</table>

**Nurse Details**

Name ______________________ Mobile ______________________

---

**Post - Leg Ulcer Prevention Program (LUPP) Client Questionnaire**

*This questionnaire is to be completed at the end of LUPP Session 6.*

**Section 1: Client Leg Ulcer Questionnaire** *The client is to complete Q1-Q19.*

**Section 2: Client Feedback** *The client is to complete Q20-Q23.*

Please do not assist the client to answer these questions.

The nurse may read the questions to the client and record the client’s responses.

**Section 3: Health Care Practices** *The nurse is to complete Q24-Q46.*

Please complete these questions utilising information available in the Client Care Record and asking the client or their carer as necessary.

* Please do not leave this Questionnaire with the client to be completed at a later date.
* Check that all questions are answered.
* Check that the client’s name, UR number and today’s date as well as the attending nurse’s details are recorded above.
* Return this questionnaire to the Research Department via the internal mail, attention to Suzanne Kapp.
* If you have any queries regarding this tool, please contact the Project Manager, Suzanne Kapp on 953655336 or 0400059482.
Section 1: Client Knowledge *The client is to complete Q1-Q19.*

Please answer each question by *ticking the box* [✓] with the answer you think is most likely to be correct. Please select one answer only per question. Please answer all questions.

<table>
<thead>
<tr>
<th>1. The most common cause of leg ulcers is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ poor arteries</td>
</tr>
<tr>
<td>☐ poor veins</td>
</tr>
<tr>
<td>☐ diabetes</td>
</tr>
<tr>
<td>☐ spider bite</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. A leg ulcer is best described as:</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ a deep cavity</td>
</tr>
<tr>
<td>☐ a break in the skin that takes more than 6 weeks to heal</td>
</tr>
<tr>
<td>☐ a sore, scrape or blister</td>
</tr>
<tr>
<td>☐ a wound that is infected</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. A dressing should:</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ allow the ulcer to dry</td>
</tr>
<tr>
<td>☐ always be an antiseptic</td>
</tr>
<tr>
<td>☐ keep the ulcer moist</td>
</tr>
<tr>
<td>☐ be changed daily</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. The most important treatment for a venous leg ulcer is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ antibiotics</td>
</tr>
<tr>
<td>☐ sunshine and salt water</td>
</tr>
<tr>
<td>☐ compression bandaging</td>
</tr>
<tr>
<td>☐ honey</td>
</tr>
</tbody>
</table>
5. The most important activity I can do to support my veins is:
- [ ] swimming
- [ ] sitting and resting
- [ ] massage
- [ ] walking

6. I should elevate my legs:
- [ ] all day
- [ ] 3-4 times a day
- [ ] once or twice a day
- [ ] never

7. An optimal diet:
- [ ] includes fewer, larger meals
- [ ] always includes a nutrition supplements and / or multi vitamin
- [ ] includes all major food groups
- [ ] is low in calories

8. Most people should drink:
- [ ] at least 3 glasses of water each day
- [ ] 8 or more glasses of water each day
- [ ] less water when I am taking fluid tablets
- [ ] only when I am thirsty

9. I should check the skin on my legs:
- [ ] once a week
- [ ] every second day
- [ ] every day
- [ ] only when they are sore
10. If I find something wrong with the skin on my legs I should:

- [ ] contact my doctor or nurse immediately
- [ ] treat it myself for 2 weeks then see the doctor or nurse
- [ ] treat it myself for 4 weeks then see the doctor or nurse
- [ ] wait and see what happens

11. The best way to avoid another venous leg ulcer after this one heals is:

- [ ] nothing, my problem is fixed
- [ ] use antiseptics, ointments or creams
- [ ] wear compression stockings
- [ ] protect my legs with long socks

Select true or false by ticking the box [ ☐ ] for the following statements

<table>
<thead>
<tr>
<th>Question</th>
<th>True</th>
<th>False</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q12. Compression will fix the problem with my veins?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q13. Wounds should be cleansed at every dressing change?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q14. While I have a leg ulcer it is important that I rest and not be too active?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q15. My diet needs to be more nutritious than usual when I have a leg ulcer?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q16. Some medications will slow the healing of my ulcer?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q17. Soap and water is the best way to clean my skin?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q18. 4 layer compression bandaging is the best bandaging treatment available for venous leg ulcers?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q19. After my ulcer heals I will need to use compression stockings for the rest of my life?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Please answer each section by ticking the box [☑] which represents what you thought about the LUPP education you have completed.

<table>
<thead>
<tr>
<th>Q20. The Leg Ulcer Prevention Program (LUPP) ...</th>
<th>Completely Agree</th>
<th>Moderately Agree</th>
<th>Moderately Disagree</th>
<th>Completely Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. The LUPP has improved my understanding of venous leg ulcers ..................................</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>b. The LUPP has improved my understanding of how to avoid another ulcer occurring ..........</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>c. The activities included in the LUPP education were very helpful ................................</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>d. The LUPP provided me with information about managing my leg ulcer which I did not know beforehand ................................</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>e. The use of the nurses’ computer was an excellent way to provide the LUPP education ...........</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>f. The presentation itself was clear and conveyed the information well .................................</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>g. It was valuable to have the nurse there during the sessions .................................</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
<tr>
<td>h. Overall, I think the LUPP education was excellent ........................................</td>
<td>☐</td>
<td>☐</td>
<td>☒</td>
<td>☐</td>
</tr>
</tbody>
</table>

Q21. Please record any comments about the LUPP:...........................................................................
..................................................................................
..................................................................................
..................................................................................
..................................................................................
..................................................................................
..................................................................................
..................................................................................
..................................................................................
Please indicate by ticking the box [☑] what you thought of the value and quality for each of the six LUPP sessions you have completed.

<table>
<thead>
<tr>
<th>Q22.</th>
<th>poor</th>
<th>fair</th>
<th>good</th>
<th>very good</th>
<th>excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Session 1: Introduction to the Leg Ulcer Prevention Program (LUPP)</td>
<td>□ 1</td>
<td>□ 2</td>
<td>□ 3</td>
<td>□ 4</td>
<td>□ 5</td>
</tr>
<tr>
<td>b. Session 2: Leg Ulcer Treatment</td>
<td>□ 1</td>
<td>□ 2</td>
<td>□ 3</td>
<td>□ 4</td>
<td>□ 5</td>
</tr>
<tr>
<td>c. Session 3: Getting Active</td>
<td>□ 1</td>
<td>□ 2</td>
<td>□ 3</td>
<td>□ 4</td>
<td>□ 5</td>
</tr>
<tr>
<td>d. Session 4: Healthy Eating</td>
<td>□ 1</td>
<td>□ 2</td>
<td>□ 3</td>
<td>□ 4</td>
<td>□ 5</td>
</tr>
<tr>
<td>e. Session 5: Looking after your Skin</td>
<td>□ 1</td>
<td>□ 2</td>
<td>□ 3</td>
<td>□ 4</td>
<td>□ 5</td>
</tr>
<tr>
<td>f. Session 6: Compression stockings and keeping your ulcer healed</td>
<td>□ 1</td>
<td>□ 2</td>
<td>□ 3</td>
<td>□ 4</td>
<td>□ 5</td>
</tr>
</tbody>
</table>

Q23. Were the sessions delivered to …? The client □ 1 only To the client □ 2 and a carer

Thank you very much for completing this section of the Questionnaire. Please return it now to your RDNS Nurse who will complete the remaining section with your assistance.
Section 3: Client Health Care Practices

NURSE TO COMPLETE

Please complete Q24-46 referring to the Client Care Record and asking the client/carer as appropriate.

Considering the descriptors below, record the usual food intake pattern

<table>
<thead>
<tr>
<th>Q24. Nutrition. Usual food intake pattern (single choice)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Poor .................................................. [ ]</td>
</tr>
<tr>
<td>Probably Inadequate ....................................... [ ]</td>
</tr>
<tr>
<td>Adequate .................................................... [ ]</td>
</tr>
<tr>
<td>Excellent .................................................... [ ]</td>
</tr>
</tbody>
</table>

Very Poor - Never eats a complete meal. Rarely eats more that 1/3 of any food offered. Eats 2 servings or less of protein/meat or dairy products per day. Takes fluids poorly. Does not take a liquid dietary supplement OR is NPO and/or maintained on clear liquids or IV's for more than 5 days.

Probably Inadequate - Rarely eats a complete meal and generally eats only about 1/2 of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement OR receives less than optimum amount of liquid diet or tube feeding.

Adequate - Eats over half of most meals. Eats a total of 4 servings of protein (meat/dairy products) each day. Occasionally will refuse a meal, but will usually take a supplement when offered OR is on a tube feeding or TPN regimen which probably meets most of nutritional needs.

Excellent - Eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.

Q25. How much fluid (including water, juice, flavoured water) is the client drinking each day? (single choice)

None ................................................................. [ ]

< 6 glasses (less than) ........................................... [ ]

about 8 glasses .................................................. [ ]

> 8 glasses (more than) ........................................ [ ]

Q26. How many glasses of tea and coffee (caffeinated) and alcohol does the client drink on an average day?

_________________________ (glasses)

Q27. Is the client currently recommended to take a nutritional supplement? ................................................................. Yes [ ] No [ ]

Q28. Does the client take a nutritional supplement? .................. Yes [ ] No [ ]

Q29. Is the client currently recommended to take a multivitamin? ......................................................................................................................... Yes [ ] No [ ]

Q30. Does the client take a multivitamin? ................................. Yes [ ] No [ ]

Q31. Does the client believe they have been eating a well balanced diet? ................................................................. Yes [ ] No [ ]

Q32. Does the client believe they have been drinking plenty of fluids every day? ................................................................. Yes [ ] No [ ]
Considering the descriptors below, record the degree of physical activity

BEDFAST - Confined to bed
CHAIRFAST - Ability to walk severely limited or non-existent. Cannot bear own weight and/or must be assisted into chair or wheelchair.
WALKS OCCASIONALLY - Walks occasionally during day but for very short distances, with or without assistance. Spends majority of each shift in bed or chair.
WALKS FREQUENTLY - Walks outside room at least twice a day and inside room at least once every two hours during waking hours.

<table>
<thead>
<tr>
<th>Q33. Activity. Degree of physical activity (single choice)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedfast .............................................</td>
</tr>
<tr>
<td>Chairfast ..........................................</td>
</tr>
<tr>
<td>Walks occasionally ..................................</td>
</tr>
<tr>
<td>Walks frequently ....................................</td>
</tr>
</tbody>
</table>

| Q34. Does the client believe they have been keeping active? | Yes [ ] No [ ] |
|-----------------------------------------------------------|
| Q35. Does the client usually cross their legs when sitting? | Yes [ ] No [ ] |
| Q36. Was the client recommended to do heel raises and squats? | Yes [ ] No [ ] |
| Q37. Does the client regularly do heel raises and squats? | Yes [ ] No [ ] |
| Q38. Was the client recommended to elevate their leg/s (when sitting / resting)? | Yes [ ] No [ ] |
| Q39. Does the client usually elevate their leg/s (when sitting / resting)? | Yes [ ] No [ ] |
| Q40. Does the care plan include the use of a soap substitute? | Yes [ ] No [ ] |
| Q41. Is a soap substitute being used? | Yes [ ] No [ ] |
| Q42. Does the care plan include the use of a moisturiser? | Yes [ ] No [ ] |
| Q43. Is a moisturiser being used? | Yes [ ] No [ ] |
Record compression use on the LEFT LEG during LUPP.

*Skip to Q45 if client did not have a VLU on the left leg*

*Tick one selection in each column [☑] for each LUPP time point.*

<table>
<thead>
<tr>
<th>Q44. LEFT LEG</th>
<th>Record recent compression therapy use</th>
<th>At visit prior to LUPP Session 1</th>
<th>At LUPP Session 1</th>
<th>At LUPP Session 2</th>
<th>At LUPP Session 3</th>
<th>At LUPP Session 4</th>
<th>At LUPP Session 5</th>
<th>At LUPP Session 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight tubigrip</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Shaped tubular form</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Low stretch bandage</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>High stretch bandage</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Tubular &amp; bandage</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other bandage</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Compression system up to 17mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Compression system up to 23 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Compression system up to 40mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Stocking 15-20 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Stocking 18-21 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Stocking 20-30 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Stocking 22-27 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Stocking 25-32 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Stocking 30-40 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Stocking 35-48 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Stocking 40 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Unknown</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>None</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Other (specify)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
Record compression use on the RIGHT LEG during LUPP
Skip to Q46 if client did not have a VLU on the right leg
Tick one selection in each column [☑] for each LUPP time point.

<table>
<thead>
<tr>
<th>Q45. RIGHT LEG</th>
<th>Record recent compression therapy use</th>
<th>At visit prior to LUPP Session 1</th>
<th>At LUPP Session 2</th>
<th>At LUPP Session 3</th>
<th>At LUPP Session 4</th>
<th>At LUPP Session 5</th>
<th>At LUPP Session 6</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Straight tubigrip</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Shaped tubular form</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Low stretch bandage</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>High stretch bandage</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Tubular &amp; bandage</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Other bandage</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Compression system up to 17mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Compression system up to 23 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Compression system up to 40mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Stocking 15-20 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Stocking 18-21 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Stocking 20-30 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Stocking 22-27 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Stocking 25-32 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Stocking 30-40 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Stocking 36-48 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Stocking 40 mmHg</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td></td>
<td>Other (specify)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

Q46. Were any of these changes (for either leg) to compression therapy prompted by the LUPP?

Yes ☐ ☐ No ☐ ☐

Thank you very much for completing this Questionnaire.

☑ Check that the client's name, UR number and today's date as well as the attending nurse's details are recorded on page 1.
☑ Return this questionnaire to the Research Department via the internal mail attention to Suzanne Kapp.

RA0003 Post LUPP Client Questionnaire 2004-09 V1.3 - 10 -
Appendix 1 LUPP patient booklet

Welcome to the RDNS Leg Ulcer Prevention Program.

The Leg Ulcer Prevention Program (LUPP) will show you how to properly care for your leg ulcer. It will also show you ways to stop your ulcer from coming back once it is healed.

Leg ulcers are not uncommon. At Royal District Nursing Service (RDNS), we care for many people who have leg ulcers.

Leg ulcers can be painful and cause discomfort. They can also cause problems with walking, moving and sleeping.

People who have a leg ulcer also have a greater chance of getting another ulcer at some point later on.

Our nurses know a lot about leg ulcers and will help to make sure that your ulcer heals quickly and doesn’t return.

Photography: Elisabeth Devereux / RDNS 2009 & 2011
<table>
<thead>
<tr>
<th>Content</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcome</td>
<td>1</td>
</tr>
<tr>
<td>Overview</td>
<td>3</td>
</tr>
<tr>
<td>Session 1 - What is a leg ulcer?</td>
<td>5</td>
</tr>
<tr>
<td>Summary</td>
<td>8</td>
</tr>
<tr>
<td>Session 2 - Leg ulcer treatment</td>
<td>9</td>
</tr>
<tr>
<td>Caring for your ulcer at home</td>
<td>10</td>
</tr>
<tr>
<td>Dressings</td>
<td>11</td>
</tr>
<tr>
<td>Compression bandaging</td>
<td>12</td>
</tr>
<tr>
<td>How important is compression bandaging?</td>
<td>14</td>
</tr>
<tr>
<td>Summary</td>
<td>15</td>
</tr>
<tr>
<td>Session 3 - Getting active</td>
<td>16</td>
</tr>
<tr>
<td>Your activity plan</td>
<td>17</td>
</tr>
<tr>
<td>Leg exercises</td>
<td>18</td>
</tr>
<tr>
<td>Tips for getting active</td>
<td>21</td>
</tr>
<tr>
<td>Summary</td>
<td>22</td>
</tr>
<tr>
<td>Session 4 - Nutrition &amp; Hydration</td>
<td>23</td>
</tr>
<tr>
<td>Nutrition</td>
<td>24</td>
</tr>
<tr>
<td>Hydration</td>
<td>26</td>
</tr>
<tr>
<td>Nutrition and Healing</td>
<td>27</td>
</tr>
<tr>
<td>Tips to improve your nutrition</td>
<td>28</td>
</tr>
<tr>
<td>Summary</td>
<td>30</td>
</tr>
<tr>
<td>Session 5 - Looking after your skin</td>
<td>31</td>
</tr>
<tr>
<td>Allergens and sensitivities</td>
<td>34</td>
</tr>
<tr>
<td>Summary</td>
<td>36</td>
</tr>
<tr>
<td>Session 6 - Compression stockings and keeping your ulcer healed</td>
<td>37</td>
</tr>
<tr>
<td>Compression stockings – what are they &amp; why wear them</td>
<td>38</td>
</tr>
<tr>
<td>Compression stockings application</td>
<td>40</td>
</tr>
<tr>
<td>Care of your stockings</td>
<td>43</td>
</tr>
<tr>
<td>Summary</td>
<td>44</td>
</tr>
<tr>
<td>CONCLUSION</td>
<td>45</td>
</tr>
</tbody>
</table>

APPENDICES: Case study, session sheets, activity plan and nutrition diary
Overview

The RDNS Leg Ulcer Prevention Program is an education program to help you care for your leg ulcer.

Healing a leg ulcer requires a joint effort between you, your nurse and your doctor.

If you need to contact your nurse between regular scheduled visits, please phone 1300 33 44 55.

This number is printed on the yellow fridge magnet you received when RDNS first visited you.

Now that you have commenced the Leg Ulcer Prevention Program you have received a ‘LUPP Pack’ which contains this booklet, some equipment and a DVD of the multimedia Leg Ulcer Prevention Program presentation.

LUPP can be watched on your television if you have a DVD player. If you do not have a DVD player, you will watch the LUPP sessions on the nurse’s mobile computer. Together with your nurse you should aim to view one session about every week until the program is finished.

The LUPP DVD and this booklet are yours to keep. This booklet contains the information included in the LUPP DVD sessions.

The six LUPP sessions give you the information you need to help heal your ulcer and stop it from coming back. Each session takes about half an hour – that includes watching the session and an activity done with your nurse and or carer.

At the end of each session you will be given a summary sheet. This sheet highlights important points from each LUPP session. Hang the summary sheets in a place you will read them, like on the fridge.

If possible your carer and family should also be involved in LUPP. The people who support you are important to your participation in the Leg Ulcer Prevention Program.

Watch the program, read the booklet and discuss the recommendations in LUPP together with your carer, family and nurse.
Session 1

What is a leg ulcer?

In this session of the Leg Ulcer Prevention Program we will look at:

- What the Leg Ulcer Prevention Program is
- What a leg ulcer is and
- The reasons why you have a leg ulcer.

Please note that this booklet contains some pictures of leg ulcers which are quite graphic.

It is important to understand what a leg ulcer is.

A leg ulcer is a ‘break’ or injury in the skin below the knee which takes more than six weeks to heal.

Skin breaks are often accidental. They may occur when you knock or bruise your leg, or if you get a scratch. Sometimes they happen for what seems to be no real reason.

A break in the skin turns into a leg ulcer because of a problem with the way blood flows in your leg. Sometimes the problem is with the arteries in the leg and sometimes the problem is with the veins.

Most leg ulcers are caused by a problem with the flow of blood through the veins. These ulcers are called venous leg ulcers.

You have a venous leg ulcer.

Venous leg ulcers are managed with a special type of treatment called compression bandaging. Compression bandaging will help to heal your leg ulcer.

Once your ulcer is healed, it is recommended you wear compression stockings to help prevent your ulcer coming back.

We will look at compression bandages and compression stockings in more detail in the coming sessions.
The arteries, which you can see in red, take blood containing oxygen and nutrients all over the body.

Once the oxygen and nutrients have been delivered to the tissues of the body, including the skin, veins (which you can see in blue) take the used blood back to the heart, lungs and other organs.

The blood is then cleaned and oxygen and nutrients are added to it again.

The blood then goes out to the rest of the body via the arteries again.

Arteries and veins work at the same time circulating the blood around the body.
Here you can see the inside of a vein.

When a vein works well, the blood travels towards the heart and does not flow backwards because the valves close properly.

Problems with blood flow through the veins are often because the valves in the veins do not work properly. The valves do not come together which allows the blood to seep backwards sometimes, instead of always returning toward the heart.

When this happens, fluid and waste products can leak out of the veins causing inflammation and swelling in the leg. This can also cause brown staining on the skin. This process causes damage to the skin which can result in an ulcer. If there is a cut or scratch there already, it can become an ulcer more easily.
Summary – Session 1

In this session, we looked at the type of leg ulcer you have, the reason it has occurred, the need to improve the blood flow in the veins in your leg and the importance of compression therapy to encourage healing and to prevent your ulcer coming back.

In the next session, we will look in detail at how to best treat your leg ulcer.

Take a few moments to review the summary sheet for this session with your nurse.

**REMEMBER:** Your participation is very important because the wound is your wound.

In order to heal it and prevent it from returning it is very important for you to actively take part in the program.

**ACTIVITY:** Your nurse will now review the Case Study (which you can find and remove at the end of this booklet).
Session 2

Leg ulcer treatment.

In the previous session we looked at the type of leg ulcer you have, the reason it has occurred and the need to improve blood flow in the veins of your leg.

In this session we will look at:

- The equipment you need to care for your leg ulcer at home
- The dressing products to be applied to your ulcer
- The compression bandaging you will need to wear on top of the dressing to support your veins.

Treating your ulcer correctly will speed up healing and reduce the chance of your ulcer coming back.
Caring for your ulcer at home

The way your RDNS nurse cares for your ulcer at home is a bit different from a hospital or from your local doctor.

For example, your leg ulcer may not need washing and cleansing. Your nurse will decide if your ulcer needs washing and cleansing at each visit.

If your ulcer does need washing, your nurse will use tap water or water from the shower. This may also be a good time to have your whole leg washed. Using tap water is safe.

If cleansing is required, your nurse will decide what cleansing fluid to use.

Your nurse will have given you a brochure which explains the equipment needed to care for your ulcer.

[Diagram of wound care equipment for clients]
Dressings

Let’s look at what dressings are needed to properly care for your leg ulcer.

Dressings are special materials which are placed directly onto your ulcer underneath the compression bandaging.

Your nurse has chosen a dressing for your ulcer which will help keep your leg ulcer moist but not too wet. Ulcers heal better and faster with a dressing that keeps the wound moist.

Your dressing will protect your ulcer and keep your ulcer warm, which will help it to heal.

Mostly, venous leg ulcer dressings are changed weekly, along with your compression bandages.

Please keep your dressing on at all times in between visits by your nurse. If your dressing leaks or doesn’t stay in place, please contact your nurse straight away.
Compression bandaging

The best treatment for healing venous leg ulcers is compression bandaging.

If a venous leg ulcer is not treated with compression bandaging, it may get worse and cause more discomfort and inconvenience.

Most people who wear compression bandaging find that the swelling of their leg goes down and they have less pain. This helps the healing of the ulcer.

There are many types of compression bandages. In the past, single bandage layers were used to treat venous ulcers. Some were stretchy and some were not. You may have previously worn these types of bandages.

More recently the most effective compression bandaging you can apply is called a ‘multi-layer bandage system’.

Venous leg ulcers like the one you have heal faster when treated with this type of compression therapy. The most important thing is that you wear some compression bandaging. Please discuss any concerns you may have about your treatment with your nurse.

It is important that once the bandages have been put on your leg, you do not try to loosen or remove them. Your bandages will be put on in a way that best helps your ulcer to heal.

The bandages will cover your leg from your toes to just below your knee. They should feel firm, but you should still be able to move your ankle.
Some people feel a little discomfort when their compression bandages are first put on. This is normal and usually goes away by itself. Resting your leg in an elevated position or taking prescribed pain relief medicine can help.

If you experience ongoing discomfort, pain, tingling, or numbness once your bandages are applied, please contact your RDNS nurse. You can also contact your doctor for advice.

Your nurse can also help you obtain shoes that have room for your bandages, if this is an issue.

How long you will need to wear the compression bandages will depend on how quickly your leg ulcer heals.

Most people need to wear compression bandages for at least 12 weeks or longer until their ulcer heals. However, the earlier compression bandages are applied, the faster your ulcer will heal.

Whether you have worn compression bandages before or not, please discuss any concerns you have with your nurse. It is very important to address all of your concerns so that proper healing of your leg ulcer can occur.
How important is compression bandaging?

You may be wondering, “Is compression bandaging really that important?”

It is important to understand that compression bandaging is the most important part of treating your leg ulcer.

In an earlier session we talked about how problems with the veins in your legs are the real cause of leg ulcers.

Compression bandages help heal the leg ulcer by supporting your veins, however compression does not fix the problem with your veins.

If you stop wearing compression therapy after your ulcer heals it is quite possible it will return.

It is usually recommended that a compression stocking be worn during the day - every day - once your ulcer is healed. This will mean better blood flow through your legs and less chance of another leg ulcer occurring.

We will discuss compression stockings more in a later session.
Summary – Session 2

In this session, we looked at the treatment of your leg ulcer at home.

In the next session, we will look at ‘getting active’ and how this helps to heal your ulcer and prevent it from coming back.

Take a few moments to review the summary sheet for this session with your nurse.

**REMEMBER:** Treating your ulcer correctly will speed up healing and reduce the chance of your ulcer coming back.

**ACTIVITY:** Please check that you have the equipment required for treating your leg ulcer.
Session 3

Getting active

In the last session we looked at how to treat leg ulcers.

In this session we will consider how to get more physically active. This doesn’t mean starting a stressful exercise program. Instead, we will consider activities you can do to assist healing of your leg ulcer and which will improve the condition of your skin overall.

Physical activity is important in general for good health and is even more important when trying to heal a leg ulcer. Being more physically active is a way to overall better health and well being.

For you, getting active is about:

- doing some walking
- doing certain leg exercises
- and leg elevation.

By doing these activities regularly, you will improve the circulation of blood in your veins and improve the condition of your legs. Your whole body will feel better and you will notice you have more energy.

Becoming more active can also help manage other health concerns you may have.

Feel free to talk about your ‘activity plan’ with your doctor if what we suggest here is too big a change for you. At the end of this session your nurse will explain the ‘LUPP activity diary’ which you can use to record your progress.
Your activity plan

Let’s now look at your activity plan.

Your activity plan includes three components – regular walking, frequent leg exercises and elevating your legs from time to time.

Monitor the progress of your activity plan by using the activity diary your nurse will discuss with you at the end of this session.

First, let’s look at walking.

For older people, it is recommended that you try to walk 30 minutes each day. However this can seem too much for some people.

If you don’t walk a lot, the best thing to do is to start with short walks, gradually increasing the length of your walks.

Walking does not have to be too fast, but it does need to be regular. Walking gets the blood in your legs moving, improves your fitness and strengthens your bones. It can help you lose weight and strengthen your muscles.

When you go walking, make sure you are wearing comfortable clothes and shoes. Drink plenty of water so that you don’t get dehydrated. If you normally use a mobility aid, you can also use this when walking.
Leg Exercises

Leg exercises are another important part of your activity plan.

Leg exercises, especially ‘heel raises’ and ‘squats’ are the most important exercises you can do. These are even more important if you are unable to walk regularly.

These exercises are important because they move the leg joints and work the muscles. This will help you to do other activities, such as walking. These exercises will also help your compression bandages work more effectively.

Heel raises and squats can be done by standing in front of a chair or couch, with another chair placed in front of you to hold on to.

HEEL RAISES

Lift up onto your toes (with your heels off the ground) then lower your heels back down.

Do this 10 to 15 times.

You should feel your calf muscles stretch.

Only stretch as far as is comfortable and stop if you feel pain or discomfort.
Following this, it is time to do some ‘squats’.

SQUATS

Slowly squat down, bending your knees to bring your buttocks down towards the heels of your feet and back up again, returning to a standing position.

Do this 10 to 15 times.

Again, stretch as far as is comfortable and stop if pain or discomfort occurs.

These leg exercises need to be repeated 3 - 5 times in each session and you need to do 3 - 5 sessions a day. If this seems a lot, start off slowly and work your way up to this amount.

If you are unable to stand or you are unsteady on your feet, you can do exercises when sitting. Do so by pointing your toes towards the floor then up towards the sky. Make sure you do the same number of exercises as explained earlier.

While doing the exercises this way is not as effective as doing them standing, it will still help the blood flow in your legs.
Now let’s look at ‘elevating’ your legs. This can assist with healing your leg ulcer and may be useful after your ulcer has healed.

It is very important to remember that elevation should not replace regular walking and leg exercises.

You should try to elevate your legs 3 - 4 times a day for around 30 minutes each time. Elevating your legs helps to reduce swelling. For the rest of the day you should try to stay as active as you can.

Elevating your legs requires you to rest your legs higher than your hips when you are sitting and higher than your heart when lying down.

When sitting, elevate your legs on a footstool and when lying down (for example on the couch) elevate your legs with pillows.

At night, place a pillow or pillows under your legs. Do so in a way that is comfortable, but try to make sure your legs are elevated. This is very important while you still have a leg ulcer.

However, even when your ulcer is healed, elevating your legs during the day and after physical activity will be helpful.

Try not to sit for long periods of time with your legs in a down position, such as when you are sitting at a table.

Also, do not sit with your legs crossed at the knee or ankle.

Changing these habits will be good for your veins and your circulation in general.
Tips for getting active

Let’s have a close look at tips for getting active.

Firstly, develop and use your activity plan. Having goals and keeping a record of your activity can help to show progress and where help might be needed.

Making changes to your level of activity is not always easy. However, it is important that you do your very best. You are in control of what you do and you can make a difference to your health and well-being.

Make a decision to improve your activity. It can take time to change habits, but give it a go! Do a few warm up activities and stretches before any exercise.

Remember, there are three activities you need to do every day:

- walking
- leg exercises
- leg elevation.

Being physically active should be part of your life, not just something you do until your ulcer has healed.

Think about a referral to a physiotherapist, an expert who can assist you to become more active. You can refer yourself or your nurse or GP can refer you to a physiotherapist.
Summary – Session 3

In this session, we looked at the reasons why you need to get active.

In the next session, we will talk about ‘healthy eating’ and how this can help your skin, your healing and your general health.

Take a few moments to review the summary sheet for this session with your nurse.

**REMEMBER:** Walking, heel raises and squats are the most important parts of your activity plan.

Your nurse can help you learn how to do the leg exercises properly and

**ACTIVITY:** Your nurse will now take a measurement of the movement in your ankle and assist you to commence your activity plan (which you can find and remove at the end of this booklet).
Session 4

Nutrition and hydration

In the last session we talked about ‘getting active’.

In this session we will look at how what you eat and drink affects your health in general and also how well your ulcer heals.

Of course, eating well is always important but it is even more important when you have a wound such as a venous leg ulcer.

Healthy food helps your body heal and will also keep your skin in good condition once your leg ulcer has healed.

Today, we will consider nutrition and hydration – the food and fluids that your body needs.

We will also look at how any medicines you take could affect the healing process.

Finally, we will consider how certain dietary supplements might help healing and your general health.
Nutrition

Good nutrition means eating the right amount of food from what is known as the ‘five food groups’.

Your body needs good nutrition (good food) and good hydration (plenty of fluids) to keep you healthy.

When you have a leg ulcer it is even more important to eat and drink properly because your body is working harder as it heals.

There are good guidelines for healthy eating which will help you to choose foods from the five different food groups.

The first group includes bread, cereals, rice, pasta and noodles.

Foods from this group give you fibre, vitamins, minerals, carbohydrates and some protein. These are all important for energy and growth and help to repair your body. Make sure you eat from a range of wholegrain breads, high fibre cereals, brown rice and wholemeal pasta.

The second group is vegetables.

Foods in this group are a good source of vitamins, minerals, fibre and carbohydrates. Make sure you eat a wide variety of vegetables which are in season. When you can't do this, it is okay to eat frozen or canned vegetables as an alternative. Legumes include lentils and baked beans.
The third food group is fruit.

Fruit is a rich source of vitamins, carbohydrates and fibre. Eat fruit with the skin on when possible as this provides extra fibre. Choose fresh fruit instead of fruit juice as much as you can, as it is higher in fibre too.

Dried and canned fruit are a good alternative to fresh fruit, but do try to choose canned fruit in natural juice and with no added sugar.

The fourth group is dairy.

Foods in this group include milk, yoghurt, cheese and custard - all are excellent sources of calcium. These foods also provide protein and vitamin B12. Try and eat reduced fat varieties of milk, cheese, and yoghurt unless recommended otherwise by your nurse, doctor or dietician.

The fifth group is protein.

This final food group includes meat, fish, poultry, eggs, nuts and legumes. This food group provides a good source of protein, good fats, and important minerals such as iron and zinc. Iron helps your blood carry oxygen and zinc is an important mineral that assists the healing of wounds such as leg ulcers.

Try to eat a variety of meats and fish. Legumes are also a good source of protein. If you are vegetarian, choose legumes, nuts and seeds and eat wholegrain or wholemeal breads and cereals. You can also drink fruit juice or eat fruit with your meal to increase iron absorption.

To ensure good nutrition and hydration, you should:

- Make sure you eat enough food: at least three meals every day
- or you can eat smaller, more frequent meals during the day.

Good nutrition is not complete without plenty of fluids.

Let's now look more closely at drinking fluids.
Hydration

It is very important that you drink enough fluid each day to remain ‘hydrated’.

For some people, drinking enough fluid is not easy. However it is important that you try because it will help keep you healthy and assist your leg ulcer to heal.

Water is a great fluid for hydration, but there are alternatives if you feel you can’t quite drink enough water.

To keep well-hydrated, you need eight glasses of fluid a day.

These eight glasses can include: water, milk, juice and flavoured water.

Alcohol and drinks containing caffeine should be avoided as these can dehydrate you. They do not count towards your eight glasses of fluid a day.

To help keep you hydrated, fill a jug with water or flavoured water at the start of every day. This will help you to keep track of how much you drink. Keep it in a place where you will see it often – this will help remind you to drink.

For various reasons, some people may have limits on how much they can drink. Even if you have to limit the fluids you drink, it is still important to try and drink the right amount.

Sometimes, more fluids are required than usual, such as during physical activity and in hot weather. This is because dehydration is more likely at these times.

Please discuss any concerns about your fluid intake with your nurse or doctor.
Nutrition and Healing

Let’s look a little more at how eating well can help heal your leg ulcer.

Protein is the most important nutrient in helping your ulcer to heal.

Try to include a protein source at each meal, such as meat, eggs, fish, dairy and legumes.

Eat these foods first, before you fill up, to ensure you get the nutrients you need most.

Make sure you eat carbohydrates such as pasta, rice, bread and cereals, which help give you the energy and vitamins required for healing your ulcer.
Tips to improve your nutrition

Let’s consider some general tips for nutrition.

Firstly, complete and review your ‘nutrition diary’. Having goals and keeping a record of your food and fluid intake can help to show where you are eating well and where changes might be needed.

Making changes to your nutrition is not always easy. However, it is important that you do your very best. Remember, you are in control of what you eat and you can make a difference to your health and well-being.

Make a decision to improve your nutrition. It can take time to change eating habits, but give it a go!

Get to know the foods in each of the five food groups. Eat a variety of foods that you like from each group and try foods you haven’t eaten before.

If you have barriers to eating, for example difficulty chewing or swallowing, a lack of appetite or concerns with your weight, discuss these with your nurse or doctor.

Seek help if obtaining or organising food is difficult for you. Consider storing prepared meals in the freezer, having your shopping delivered to your home or having prepared meals delivered.

Think about a referral to a dietician, an expert who can help you improve your nutrition. You can refer yourself or your nurse or GP can refer you to a dietician.
Let’s now consider certain things that can affect nutrition.

**Medicines**
Many medicines are known to slow wound healing.

Make sure that your nurse has a list of your current medicines as you may need to discuss this with your nurse at the end of this session.

**Supplementation**
Taking nutritional supplement drinks may help meet your energy and protein requirements if you are not getting adequate nutrition from food.

Supplements such as Sustagen or Proform can be taken at morning tea and supper and are widely available.

**Multivitamins**
These may be useful if your diet does not meet your vitamin needs.

Make sure you make changes to improve your diet before considering taking a supplement and please feel free to discuss with your nurse, dietician or doctor whether supplementation and vitamins are right for you.
Summary – Session 4

In this session, we looked at healthy eating and how it can help heal your leg ulcer and improve your general health.

In the next session, we will consider how to properly look after your skin.

Take a few moments to review the summary sheet for this session with your nurse.

**REMEMBER:** Good nutrition assists wound healing and promotes better health and well-being in general. Healthy eating is for life.

**ACTIVITY:** Your nurse will now assist you to commence your nutrition diary (which you can find and remove at the end of this booklet).
Session 5

Looking after your skin

In the previous session we looked at healthy eating and how it affects your general health, as well as helps to heal your leg ulcer.

In this session we will look at how to care for your skin while your leg ulcer heals. We will also look at how to care for your skin once your ulcer has healed. We will consider:

- Common skin conditions
- Caring for your skin
- ‘Allergens’ and ‘sensitivities’.

We will also look at monitoring your skin and reporting any changes.

Looking after your skin is important. To date, your nurse has looked after your skin when changing your dressing and bandaging. When your ulcer has healed, it will be your job to care for your skin.
Firstly, let’s look at some skin conditions that can affect the health of your skin in general.

Problems with veins can cause skin conditions that put you at risk of further ulcers in the future. But if you look after your skin the risk is less. We will now consider some common skin conditions.

Varicose eczema or dry, inflamed, irritated skin around your ankles or shins is very common in people who have venous leg ulcers or problems with their veins.

This condition means a greater risk of getting a leg ulcer. It needs constant care to prevent more leg ulcers occurring.

Compression bandaging will assist in managing this condition but there are things you can do to look after your skin which will reduce the risk of this type of eczema. We will look at what you can do shortly.

Lipodermatosclerosis is a long word that means a hardening or thickening, of the skin. Skin may appear like waxy scales and your skin may feel hard in parts.

If these hardened areas are not looked after there is a risk of more leg ulcers.

If you have this condition already, there are some products which can help manage it. Good skin care in general will help reduce the chance of getting this condition.

Atrophe Blanche is patchy, white skin areas with speckled dots. It often occurs where there has been a leg ulcer before. It can be tender and the area is at risk of ulceration. Looking after your skin will reduce the risk of further ulcers in this area.

Dry skin is at greater risk of getting an ulcer than skin that is moisturised. Shortly, we will look at how you can prevent your skin from drying out.

Your nurse can discuss these conditions with you further at the end of this session.
Looking after your skin should be a life long commitment. As you get older, your skin is more at risk of damage and harm.

Regular, proper skin care can help stop bumps, knocks, cuts and scrapes turning into a leg ulcer. Good skin care can also help prevent an existing ulcer from getting worse. Let’s now look at ways for you to properly care for your skin.

**Examine your legs every day.** Try and choose the same time each day to inspect your legs. Perhaps after you have had a shower or wash and applied moisturiser. If you cannot see parts of your legs, ask your carer to help you or use a mirror.

**Look for signs of damage or any changes to your skin.** Is your leg swollen? There are some common signs that indicate that a leg ulcer may develop. These include swollen ankles, pain, itchy legs or discoloured skin.

**Keep your skin clean and dry.** Regular bathing or showering should be part of your skin care plan. However be mindful that regular soaps can dry the skin.

It is recommended that you use warm water and soap-free cleansers when bathing. There are many to choose from and most are available at supermarkets and chemists. Make sure you fully dry your skin after bathing or showering.

**Moisturise your skin every day.** Moisturise from the top of your leg downward. A simple, unscented moisturising cream from the supermarket is usually fine. If you need advice about what cream to use, ask your nurse.

While you have a leg ulcer it might not be possible to moisturise every day due to having compression bandaging on your leg. Your nurse will observe your skin closely during this time.
Allergens and sensitivities

Let’s now look at allergens and sensitivities.

An allergen is a substance that you might have an allergic reaction to, such as dust or a certain medicine.

A sensitivity is the reaction you have to an allergen which may or may not be serious.

Allergens and sensitivities are not uncommon issues for people who have problems with their veins.

It is important that things that you know irritate your skin are avoided. This will help prevent leg ulcers and improve the condition of your skin.

Some common things that people are allergic to are lanolin, which is found in some moisturisers. Other things are preservatives in some skin creams, the glue in some wound dressings, and perfume. Some people are allergic or sensitive to certain foods.

Make sure you discuss any allergies and sensitivities you may have with your nurse at the end of this session.

Avoid extreme temperatures. This will help your circulation and protect your skin. Don’t overheat your legs by sitting too close to the heater and do not use a hot water bottle. Avoid the cold by wearing warm clothing and using heating wisely.

Limit your exposure to the sun. Some sunlight is good for you, but too much will cause damage to your skin. Exposing your ulcer to the sun is not advised.

Sometimes, people with venous ulcers or people who have problems with their veins may experience skin irritation which does not go away easily.

Compression can help but special cream from a doctor may be needed to ease the problem.
One of the important things you can do to help your skin is keep a close eye on its condition and report any changes.

The general rule is monitor closely and report early.

The sooner you get treatment for any changes to your skin, the sooner it will get better and there is less risk it will become a leg ulcer.

The best advice is to report any injuries or breakdown in the skin to your nurse or doctor immediately.

If you notice changes in your skin, and especially if you have a break in your skin, contact RDNS. You can call at any time of the day or night. Your nurse will talk with your doctor about your skin, if needed.
Summary – Session 6

In this session, we looked at why you need to look after your skin and how looking after your skin is good for healing your ulcer and for your general health.

In the next session, you will learn how to care for your stockings.

Take a few moments to review the summary sheet for this session with your nurse.

**REMEMBER:** Look after your skin and check your legs every day.

Report any concerns early.

**ACTIVITY:** Your nurse will now explain the types of skin care products you can use to help your skin.
Session 6

Compression stockings and keeping your ulcer healed

This is the last session of the Leg Ulcer Prevention Program.

In previous sessions we examined what a venous leg ulcer is and why you have one.

We looked at treating leg ulcers, the importance of you becoming more active and also healthy eating.

We also considered how you should look after your skin and legs.

In this session, we will look at compression stockings and how to keep your ulcer healed.

You will learn how to keep your skin in good shape after your ulcer heals so that further leg ulcers are less likely to occur.

It may be that your leg ulcer has healed since we commenced the program or it may still be healing.

In either case, your nurse can review this session with you again at a later date if needed.

In an earlier session, you learned that the underlying problem with your veins does not go away just because your ulcer heals.

Your veins will now need constant support to prevent more leg ulcers developing. Wearing compression stockings is the best way to keep your leg in good shape and stop your ulcer coming back.

In this final session we will look at:

- What compression stockings are and why you need to wear them
- How to put them on and take them off
- How to care for, and replace your stockings.
Compression stockings – what are they and why you need to wear them.

Compression stockings support your veins, just like your bandages did when you had an ulcer.

They are made from a range of materials. Sometimes they are called a ‘maintenance stocking’. These days some compression stockings look and feel likes men’s socks.

Compression stockings provide the best on-going care for people with healed leg ulcers because as discussed earlier in the program, the problem with your veins has not gone away and therefore your veins require ongoing support.

If you don’t wear compression stockings, your veins will be unsupported and you could develop more leg ulcers.

Compression stockings look and feel better than the compression bandages you wore while your ulcer was healing. They can prevent your leg swelling.

Wearing compression stockings after your leg ulcer has healed is the best way for you to stop another ulcer developing.
Compression stockings – what are they and why you need to wear them cont.

Compression stockings are most often worn on the lower leg only. They go from your toes to just below your knee. There is a range of colors to choose from.

They are quite sheer for ladies. Men can wear compression stockings which look like normal socks.

There are also different strengths of compression stockings. You need to wear compression stockings that feel quite firm. If they are not firm, they will not work properly.

Compression stockings can also have open or closed toes.

They are normally put on first thing in the morning.

Avoid moisturising your leg before applying the stocking as this will make the process more difficult. To avoid swelling of the leg, you should put them on straight after getting out of bed.

They should be removed just before you go to bed at night. This is a good time to moisturise your leg. In some cases, compression stockings may be left on for several days at a time. Your nurse can discuss this with you if this is indicated in your case.
Compression stocking application

Let’s now look at how to put on and remove a compression stocking.

It is very important that your stocking fits properly and that you can put it on and take it off easily, without stress and without damaging your skin or any other part of your body.

Applying and removing a compression stocking is fairly simple. However, it does take some getting used to.

1. Applying compression stocking

   ![Images of applying compression stocking]

2. Removing compression stocking

   ![Images of removing compression stocking]
You will need to practise putting your stockings on and taking them off. You will notice it does get easier with time. If you need it, there is also equipment that can help.

A stocking donner can help you put on and take off a compression stocking. Different donners suit different people.

1. Using a plastic bag or a silk slip to apply a stocking

2. Using a metal frame donner to apply a stocking
3. Using a material device to apply a stocking

,...and remove a stocking

Everybody is different and you will have your own preferred equipment.
Care of your stockings

Let's now look at how to properly care for your stockings. If your stockings are not cared for correctly, they will not work as well or last as long as they should.

Start by hand washing your compression stockings in warm water.

Washing at high temperatures or in the washing machine can damage your stockings.

Dry your compression stockings away from direct sunlight and do not use a tumble dryer. If you need to, you can place them on a towel or hand-rail near a heater but don’t put them too close.

You will need to replace your compression stockings regularly according to the manufacturer's instructions. This is usually about every 3 months.

If you need a compression stocking on only one leg, you can rotate the stockings and wear one while the other is in the wash.

If compression stockings are needed on both legs, two pairs of stockings will be required in order to do this. If your stockings wear out early or are damaged, new compression stockings will be required straight away.

When you need to replace your stockings, you need to consider the following:

If your leg has not changed in size and you don’t have any new concerns, simply order the same type of compression stockings as before.

If your leg has changed in size or you have any concerns, your RDNS nurse can visit and check your leg and then advise what stockings to order. You can also consult with your doctor regarding your ongoing use of compression stockings.
Summary – Session 6

In this session, we looked at the reason why you need to wear compression stockings, and how to stop other ulcers from forming.

Take a few moments to review the summary sheet for this session with your nurse.

REMEMBER: Compression stockings support your legs and veins and are the best treatment to prevent a leg ulcer from coming back.

ACTIVITY: Your nurse will now show you the equipment you have just seen and you are also able to trial them, either now or later, with your own compression stockings.
CONCLUSION

Congratulations on reaching the end of the Leg Ulcer Prevention Program.

Thank you very much for participating in this program which has been designed to assist you to heal your ulcer and prevent it coming back.

Remember:

- Look after your veins
- Get physically active
- Eat healthy food
- Look after your skin
- Wear your compression stockings

We hope the Leg Ulcer Prevention Program helps you to look after your legs and prevents your ulcer from returning.

Please make sure that you continue to refer to the information in this booklet to help you make any changes needed. You can also refer to the summary sheets and any other resources we have given you.

The changes you have made, and continue to make, will help your overall health and wellbeing, both now and in the future.

And remember, you can contact Royal District Nursing Service at any time if you have any questions about your ulcer, your leg or your health in general.

Simply call 1300 33 44 55.

Good luck and take care.
Venous Leg Ulcer Client Case Study

This is a venous leg ulcer which has increased in size over a 4 week period.
The fluid coming from the wound smells and the wound is painful.
This wound is the size of the bottom of a soft drink can.

Best practice treatment is compression bandaging.
A 4 layer compression bandage system has now been applied.

6 weeks later........
The ulcer has reduced in size by 80% and is now the size of a ten cent piece.
The fluid coming from the wound has reduced and the client has no pain.

Another 6 weeks later........
The ulcer is the size of a pea.
Bandaging applied in 4 layers is the most effective treatment for venous leg ulcers.

Talk to your nurse if you have any concerns about 4 layer bandaging.
Commence effective treatment for your venous ulcer now.
Session 1:

Introduction to the Leg Ulcer Prevention Program

The RDNS Leg Ulcer Prevention Program (LUPP) is an education program to help you care for your leg ulcer.

Healing your leg ulcer requires a joint effort between yourself and your care providers such as your nurse and doctor.

You have a venous leg ulcer because of an underlying problem with your veins.

Venous leg ulcers are treated with compression bandaging.

Once your venous leg ulcer is healed your veins will need to be supported with compression stockings.

Your participation in LUPP is very important because this venous ulcer is your wound and to heal it and prevent it from returning we need you to participate actively.

RDNS Customer Service Centre ☏ 1300 33 44 55
Session 2

Leg ulcer treatment.

Source and set up the equipment needed for wound care at home.

Venous leg ulcers are best dressed with moist wound dressings.

Less frequent dressing changes are suitable for your venous ulcer.

Compression bandaging is the most effective treatment for your venous ulcer. If your wound is not treated with compression bandages it may get worse and take longer to heal.

Compression bandages do not fix the problem with your veins, they only manage it. Compression stockings will need to be worn once your venous leg ulcer has healed.

Be prepared to wear compression bandages now and compression stockings when you heal.

Speak to your nurse if you have any concerns with your wound dressing or compression bandaging.

RDNS Customer Service Centre ☎ 1300 33 44 55
Session 3

Getting active

‘Getting active’ means doing the activities you need to do to promote healing and good skin condition after your ulcer has healed.

Getting active is a life-long commitment to better health and well being.

- Walk regularly – aim for 30 minutes every day
- Leg exercise often – aim for 3 sets of 15 squats and 15 heal raises, 3 times a day
- Elevate occasionally – aim for 30 minutes, 4 times a day.

Complete and follow your activity plan.

Discuss your activity plan with your nurse and doctor.

Consider seeing a physiotherapist for further advice.

Getting active is for life not just until your venous ulcer has healed.

RDNS Customer Service Centre ☎ 1300 33 44 55
<table>
<thead>
<tr>
<th>What</th>
<th>Why</th>
<th>How</th>
<th>Example</th>
<th>Date:</th>
<th>Date:</th>
<th>Date:</th>
<th>Date:</th>
<th>Date:</th>
<th>Date:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEEL RAISES &amp; SQUATS:</td>
<td>These exercises move the leg joints and work the muscles. This will help you to do other activities, such as walking. These exercises will also help your compression bandages to be more effective and are even more important if you are unable to walk regularly.</td>
<td>Work towards doing: 3-5 sets of 15 heel raises and 5 squats at a time. Repeat 3-5 times each day.</td>
<td>5 sets of 15 Missed at lunch 5 sets of 15 3 sets of 15 (too tired) 5 sets of 15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WALKING:</td>
<td>Gets the blood in your legs moving and helps your bandages work more effectively. Walking improves your fitness and strengthens your muscles and bones.</td>
<td>Work towards walking for 30 minutes a day. This can be broken in to shorter sessions each day or done all at once. Build up your distance gradually.</td>
<td>To letterbox, 2 mins 10 mins round garden 15 mins to bus stop</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELEVATING YOUR LEGS:</td>
<td>Can assist with healing your ulcer. It helps to reduce swelling but should not replace regular walking.</td>
<td>Work towards elevating your legs 3-4 times a day for about 30 minutes. Elevate higher than your hips when seated and higher than your heart when lying down.</td>
<td>10 mins after shower 30 minutes after lunch 1 hour watching evening news</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other activities:
<table>
<thead>
<tr>
<th>What</th>
<th>Why</th>
<th>How</th>
<th>Other activities:</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEELED RAISES &amp; SQUATS</td>
<td>These exercises have the muscle and tendons of the ankles and legs.</td>
<td>Work towards doing 3-5 sets of 15 $ sets of 15</td>
<td>5 sets of 15</td>
</tr>
<tr>
<td></td>
<td>These exercises help to strengthen the muscles and tendons of the ankles and legs.</td>
<td>Work towards walking for 30 minutes a day.</td>
<td>5 mins to wash, 2 mins.</td>
</tr>
<tr>
<td></td>
<td>These exercises will also help to improve your balance, which is more important if you are unable to walk regularly.</td>
<td>Work towards elevating your legs 3-4 times a day.</td>
<td>5 mins after shower.</td>
</tr>
<tr>
<td></td>
<td>WALKING: Helps to increase circulation and helps to maintain your muscle and bone health.</td>
<td>Walking improves your fitness and strengthens your muscles and bones.</td>
<td>Elevate your legs higher than your heart while lying down.</td>
</tr>
<tr>
<td></td>
<td>ELEVATING YOUR LEGS: Can assist with healing your stump, but should not be done while regular walking.</td>
<td>Build up your distance gradually.</td>
<td>Example: knee up, turn your legs higher than your heart while lying down.</td>
</tr>
</tbody>
</table>

Example: 01/02/2010
Session 4

Healthy Eating

'Healthy eating' means having adequate food intake from a wide variety of foods from the 5 food groups.

Healthy eating is a life-long commitment to better health and well being.

Try to include a protein source at each meal, such as meat, fish, eggs or dairy.

- Drink 8 glasses of fluid every day
  - Water, milk, juice or flavoured water
  - Alcohol or caffeine beverages.

Complete and review your nutrition diary.

Discuss a healthy eating plan with your nurse and doctor.

Consider seeing a dietician for further advice.

*Healthy eating is for life not just until your venous ulcer has healed.*

RDNS Customer Service Centre ☏ 1300 33 44 55
Client — please record the fluid and food you consume each day in the tables below. There are three tables to cover Day 1, Day 2 and Day 3.

Please show the completed diary to your nurse.

### DAY 1

<table>
<thead>
<tr>
<th>Date:</th>
<th>Fluid (type and amount)</th>
<th>Food</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breakfast</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morning tea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lunch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Afternoon tea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dinner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supper</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Attach client label if available

Name: ____________________________

UR: ____________________________
<table>
<thead>
<tr>
<th>Date:</th>
<th>Fluid (type and amount)</th>
<th>Food</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DAY 3**

<table>
<thead>
<tr>
<th>Date:</th>
<th>Fluid (type and amount)</th>
<th>Food</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Session 5

Looking after your skin

Skin conditions are common among people who have problems with their veins.

Looking after your skin is a lifelong commitment to better health and well being.

Good skin care can stop bumps, knocks, cuts and scrapes turning into an ulcer and prevent an existing ulcer getting worse.

- Inspect your legs everyday
- Look for signs of injury or any changes to your skin or leg swelling
- Keep your skin clean and dry
- Use a soap free cleanser when bathing
- Moisturise your legs daily.

*Speak to your nurse if you notice any changes and most certainly if you see a break in your skin.*

RDNS Customer Service Centre 📞 1300 33 44 55
Session 6

Compression stockings and keeping your ulcer healed

The problem with your veins does not go away once your ulcer heals, so your veins will still need support with compression.

After healing you need to wear compression stockings to keep your leg in good shape and stop your ulcer from coming back.

Wear your compression stockings:

✓ Every day – first thing in the morning to last thing at night.

Use equipment to:

✓ Assist yourself or a carer to apply and remove your compression stocking safely.

Look after compression stockings:

✓ Hand wash in warm soapy water, dry in open air and not in direct sunlight. Do not tumble dry your stockings

✓ Replace your stockings every three months (if you are using two stockings for the one leg).

*Compression stockings support your veins and are the best treatment to prevent your ulcer coming back.*

RDNS Customer Service Centre ☎ 1300 33 44 55
APPENDIX A:
APPENDIX B:

![Histogram showing percentage distribution of Post-LUPP Test Scores for Control and Intervention Groups. The x-axis represents test scores ranging from 40.00 to 18.00, while the y-axis shows the percentage from 0.0% to 50.0%. The bars indicate the proportion of participants in the Control and Intervention groups within each score range.](image-url)