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Identifying risk factors and protective factors for venous leg ulcer recurrence using a theoretical approach: A longitudinal study

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ABSTRACT

Background: The high recurrence rate of chronic venous leg ulcers has a significant impact on an individual's quality of life and healthcare costs.
Objectives: This study aimed to identify risk and protective factors for recurrence of venous leg ulcers using a theoretical approach by applying a framework of self and family management of chronic conditions to underpin the study.
Design: Secondary analysis of combined data collected from three previous prospective longitudinal studies.
Setting: The contributing studies' participants were recruited from two metropolitan hospital outpatient wound clinics and three community-based wound clinics.
Participants: Data were available on a sample of 250 adults, with a leg ulcer of primarily venous aetiology, who were followed after ulcer healing for a median follow-up time of 17 months after healing (range: 3–36 months).
Methods: Data from the three studies were combined. The original participant data were collected through medical records and self-reported questionnaires upon healing and every 3 months thereafter. A Cox proportion-hazards regression analysis was undertaken to determine the influential factors on leg ulcer recurrence based on the proposed conceptual framework.
Results: The median time to recurrence was 42 weeks (95% CI 31.9–52.0), with an incidence of 22% (54 of 250 participants) recurrence within three months of healing, 39% (91 of 235 participants) for those who were followed for six months, 57% (111 of 193) by 12 months, 73% (53 of 72) by two years and 78% (41 of 52) of those who were followed up for three years. A Cox proportional-hazards regression model revealed that the risk factors for recurrence included a history of deep vein thrombosis (HR 1.7, 95% CI 1.07–2.67, $p = 0.024$), history of multiple previous leg ulcers (HR 4.4, 95% CI 1.84–10.5, $p = 0.001$), and longer duration (in weeks) of previous ulcer (HR 1.01, 95% CI 1.003–1.01, $p < 0.001$); while the protective factors were elevating legs for at least 30 min per day (HR 0.33, 95% CI 0.19–0.56, $p < 0.001$), higher levels of self-efficacy (HR 0.95, 95% CI 0.92–0.99, $p = 0.016$), and walking around for at least 3 h/day (HR 0.66, 95% CI 0.44–0.98, $p = 0.040$).

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Conclusions: Results from this study provide a comprehensive examination of risk and protective factors associated with leg ulcer recurrence based on the chronic disease self and family management framework. These results in turn provide essential steps towards developing and testing interventions to promote optimal prevention strategies for venous leg ulcer recurrence.

What is already known about the topic?

- The most frequent aetiology of leg ulcers is chronic venous disease.
- Venous ulcers are characterised by a repeated pattern of long lasting and recurring wounds.
- Evidence-based guidelines for preventing venous leg ulcer recurrence focus on wearing compression hosiery, while evidence on additional conservative strategies is lacking.

What this paper adds

- A history of deep vein thrombosis, previous leg ulcers, and longer duration of the previous ulcer were identified as significant risk factors for venous leg ulcer recurrence.
- Protective factors identified to enhance the likelihood of preventing leg ulcer recurrence were leg elevation, higher levels of self-efficacy, and increased physical activity.
- Our work does not support the use of compression therapy as a protective factor against leg ulcer recurrence.

1. Introduction

Chronic venous insufficiency is responsible for about 70% of chronic leg ulcers, with an overall prevalence ranging from 1 to 2% (Briggs and Flemming, 2007; Gohel and Poskitt, 2010). This chronic condition has been shown to have negative physical, financial, and psychological implications, such as pain and disability (Persoon et al., 2004); depression (Jones et al., 2006; Moffatt et al., 2009); social isolation (Moffatt et al., 2006); and decreased quality of life (Gonźlez-Consuegra and Verdú, 2011). It accounts for approximately 2–3% of total healthcare expenditure in developed countries (Abbade and Lastória, 2005; Posnett and Franks, 2008). Often, venous leg ulcers are characterised by a repeating cycle of ulceration, a long healing process and recurrence over decades (Iwuji, 2008). The recurrence rate is reported to be as high as 78% of treated patients (Abbade and Lastória, 2005). The high recurrence rate remains a significant management challenge for patients and healthcare professionals.

Current evidence-based practices to prevent recurrence of venous leg ulcers are limited and focus on life-long compression therapy (Nelson et al., 2000, 2006) or surgical intervention (Obermayer et al., 2006; Gohel et al., 2007) as the primary strategies for prevention. Although the effectiveness of these two methods is clear, a number of limitations and challenges remain. For example, surgical intervention may primarily be beneficial to patients who suffer from superficial venous incompetence (Obermayer et al., 2006), and many patients are unsuitable for surgery due to their age and co-morbidities (Arcelus and Caprini, 2002). Davies et al. (2004) noted that of 759 patients with venous leg ulcers, only 75 were able to be randomised for surgery, due mainly to problems with either no superficial insufficiency, or the presence of co-morbidities restricting patients' suitability for surgery. For compression therapy, the issues of difficulties with application, discomfort, appearance and cost result in a significant low compliance issue (Flaherty, 2005; Raju et al., 2007; Van Hecke et al., 2011).

Other prevention strategies include leg elevation and leg exercises (O'Meara et al., 2009; Brown, 2012); however, little evidence is available for their effectiveness in preventing leg ulcer recurrence. Therefore, more focused investigation must be undertaken to develop and determine what alternative conservative strategies are effective for prevention. Identifying the risk and protective factors would facilitate the tailoring of intervention strategies.

Previously identified risk factors for recurrence are mostly related to the severity of the patients' venous disease; such as the size of the previous ulcer (Vowden and Vowden, 2006), prolonged ulcer duration (Gohel et al., 2005), and a history of deep vein thrombosis (McDaniel et al., 2002). Other risk factors found include co-morbidities e.g. cardiac disease (Finlayson et al., 2009); decreased ankle movement (Nelson et al., 2006); and advanced age (Labropoulos et al., 2012). However, it is crucial to comprehensively and systematically examine the risk and protective factors that influence self-management using a theoretical approach, as chronic venous insufficiency and prevention of recurrence requires lifelong self-management; and successful chronic disease self-management is influenced by a broad range of factors. Few studies have applied a theoretical framework of chronic disease management to examine both risk and protective factors for recurrence. Grey et al.'s (2006) self and family management of chronic condition examines risk and protective factors from four aspects, including health and disease specific factors, individual and psychological characteristics, family factors, and environmental context, see Fig. 1. Using a theoretical approach assists in understanding the complexity of the venous leg ulcer recurrence process and facilitates identification of interventions to target certain risk or protective factors. In this study, recurrence was defined as a breakdown of skin over the same lower leg of the previous venous ulcer.

2. Methods

2.1. Design and sample

Secondary analysis was undertaken in 2012 of combined data from three previous prospective longitudinal