TITLE

Factors associated with recurrence of venous leg ulcers: A survey and retrospective chart review.

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ABSTRACT

Background: Chronic venous leg ulcers have a significant impact on older individuals' well-being and health care resources. Unfortunately after healing, up to 70% recur.

Objective: To examine the relationships between leg ulcer recurrence and physical activity, compression, nutrition, health, psychosocial indicators and self-care activities in order to provide information for preventive strategies.

Design: Survey and retrospective chart review

Settings: Two metropolitan hospital and three community-based leg ulcer clinics

Subjects: A sample of 122 community living patients with leg ulcer of venous aetiology which had healed between 12 and 36 months prior to the survey.

Methods: Data were collected from medical records on demographics, medical history and previous ulcer history and treatments; and from self-report questionnaires on physical activity, nutrition, psychosocial measures, ulcer recurrences and history, compression and other self-care activities. All variables significantly associated with recurrence at the bivariate level were entered into a logistic regression model to determine their independent influences on recurrence.

Results: Median follow-up time was 24 months (range 12–40 months). Sixty-eight percent of participants had recurred. Bivariate analysis found recurrence was positively associated with ulcer duration, cardiac disease, a Body Mass Index ≤20, scoring as at-risk of malnutrition and depression; and negatively associated with increased physical activity, leg elevation, wearing Class 2 (20–25mmHg) or Class 3 (30–40mmHg) compression hosiery, and higher self-efficacy scores. After adjusting for all variables, an hour/day of leg elevation (OR=0.04, 95% CI=0.01–

0.17), days/week in Class 2 or 3 compression hosiery (OR=0.53, 95% CI=0.34–0.81), Yale Physical Activity Survey score (OR=0.95, 95% CI=0.92–0.98), cardiac disease (OR=5.03, 95% CI=1.01–24.93) and General Self-Efficacy scores (OR=0.83, 95% CI=0.72–0.94) remained significantly associated ($p<0.05$) with recurrence.

Conclusions: Results indicate a history of cardiac disease is a risk factor for recurrence; while leg elevation, physical activity, compression hosiery and strategies to improve self-efficacy are likely to prevent recurrence.

Keywords

chronic disease, leg ulcer, prevention, recurrence

What is already known about the topic?

- Chronic venous leg ulcers are difficult and costly to heal, and up to 60–70% recur after healing
- Prolonged ulcer duration, duration of venous ulcer disease and superficial venous reflux not treated with surgery are risk factors for recurrence
- Although wearing compression hosiery is known to prevent recurrence, in practice, the use of compression hosiery is associated with multiple difficulties and poor rates of concordance with treatment
- There is little evidence available on alternative conservative strategies to prevent recurrence.

What this paper adds

- In a sample of 122 patients with a previous venous leg ulcer, leg elevation, wearing Class 2 or 3 compression hosiery, physical activity, self efficacy and a history of cardiac disease were significantly associated with recurrence
- Leg elevation, physical activity, compression hosiery and strategies to improve self efficacy are likely to prevent recurrence.

INTRODUCTION

Chronic leg ulcers are associated with restricted mobility, pain (Persoon et al., 2004); poor psychological health (Jones et al., 2006); and decreased quality of life (Persoon et al., 2004). The condition affects approximately 1–2% of the population aged over 65 years in the U.S., U.K., Europe and Australia (Briggs and Closs, 2003; Margolis et al., 2002) and prevalence increases with age (Margolis et al., 2002). Significant amounts of time and resources are invested in healing chronic leg ulcers, with developed countries spending approximately 1–2.5% of total health costs on the condition (Ruckley, 1997).

Unfortunately, once healed, up to 60–67% of venous leg ulcers recur (Abbade et al., 2005; McDaniel et al., 2002; Vowden and Vowden, 2005), many within the first three months of healing (Moffatt and Dorman, 1995; Vowden and Vowden, 2005). There is little information available on the effectiveness of strategies to prevent recurrence. Prolonged ulcer duration (Barwell et al., 2000; Gohel et al., 2005), the presence of deep venous insufficiency (McDaniel et al., 2002) and duration of venous ulcer disease (Magnusson et al., 2006; Nelson et al., 2006) have been identified as risk factors for recurrence. Venous surgery has been shown to be effective in preventing recurrence, particularly for patients with superficial venous incompetence (Gohel et al., 2007); however, many patients with this condition are unsuitable or unwilling to undergo surgery (Warwick et al., 2007). A systematic review on compression for preventing venous leg ulcers found evidence to support the use of life-long compression therapy (Nelson et al., 2000), which is the primary conservative strategy currently recommended. However, the authors noted there was limited information available and further research was needed in the area (Nelson et al., 2000). In practice, the use of compression hosiery is associated

with multiple difficulties and poor rates of compliance (Flaherty, 2005), yet there is little known on the effectiveness of alternative strategies.

Wound healing and breakdown is known to be a complex process involving many factors, including not only circulation, but age (Gosain, 2004), nutrition (Patel, 2005), psychological factors (Robles et al., 2005) and social influences (Moffatt et al., 2006). It has been suggested that psychosocial characteristics such as depression and social support may affect self care behaviours and therefore recurrence rates, as self management of other chronic diseases has been shown to be influenced by these factors (Brody et al., 2006; Sousa et al., 2004). Besides compression, patients are often advised to undertake activities such as leg exercises, leg elevation and maintenance of a healthy diet and weight. However, there is little evidence supporting these suggestions and recommendations. People with recurrent leg ulcers frequently suffer years or decades of chronic ill-health and costly treatments. Gaining information on factors contributing to recurrence is therefore vital to facilitate improved management of this chronic disease.

Aim

The aim of this study was to identify factors associated with recurrence of chronic leg ulcers in order to provide information for development of effective preventive strategies.

METHODS

Sample

Participants were recruited from leg ulcer clinics based either in one of two metropolitan hospitals or one of three community-based clinics run by a district nursing service. All clients who had attended one of these leg ulcer services from 2004–2007 had been assessed for their eligibility for inclusion in previous studies conducted by this research team on interventions to promote healing for venous leg ulcers. Participants were diagnosed with a venous leg ulcer by the attending physician in charge of the hospital outpatient clinics or by the physician who referred the patients to the community nursing service for care. All clients who were potentially eligible for the studies (i.e. diagnosed with a venous leg ulcer) had an Ankle Brachial Pressure Index measured at baseline by one of a team of wound care nurses at each site who had been trained in research protocols and procedures. Clients who had been admitted to these clinics with a lower leg ulcer and fitted the inclusion and exclusion criteria for this study were sent an information and consent package and invited to participate via a postal survey. The option for a telephone interview was provided if preferred or the participant had difficulties completing a written questionnaire. Data were collected from November 2006 – December 2007.

Inclusion Criteria

- Clients with a previous leg ulcer of venous aetiology
- Ankle Brachial Pressure Index >0.8 and <1.3
- Ulcer completely healed (as defined by full epithelialisation maintained for at least two weeks) between 12 and 36 months prior to the survey

Exclusion Criteria

- Clients unable to mobilise at all i.e. completely bed bound
- Clients who were unable to understand English
- Clients with a cognitive impairment

Ethical approval for the study was obtained from the university, hospital and community health service organisations' Human Research Ethics Committees and all participants gave signed informed consent.

Data Collection and Measures

Data were collected from medical records on demographic information (age, gender, marital status, income); health and medical history (height and weight, mobility, medications, comorbidities including diabetes, cardiac disease, hypertension, cerebrovascular disease, respiratory disease, osteoarthritis, rheumatoid arthritis and other autoimmune diseases). Patients were defined as having cardiac disease if there was a history of myocardial infarction, angina, or congestive heart failure in their medical records; or if the patient identified they had 'heart disease' in their self-report questionnaire. In addition, data were collected from medical records on venous history and previous ulcer characteristics (size, duration and healing date of the most recent venous ulcer, previous deep vein thrombosis (DVT), venous surgery, time since first ulcer, number of previous ulcers); and follow-up care and treatment (including prescribed compression hosiery details) provided after healing.

A self-report survey included the following instruments measuring:

- level of physical activity and exercise, utilising the Yale Physical Activity Survey (YPAS) (Dipietro et al., 1993). This survey consists of 36 items designed to assess physical activity levels in older adults during a typical week in the month prior to the survey. Validity and reliability have been established in a number of studies (Harada et al., 2001; Kolbe-Alexander et al., 2006; Washburn, 2000);
- nutrition, as measured with the Short-Form Mini-Nutritional Assessment tool (MNA-SF) (Rubenstein et al., 2001), a 6 item tool to screen for nutritional status in the geriatric population which asks questions on factors indicating nutritional status over the previous three months. The Short-Form MNA has been tested in the community dwelling older population and reported good validity and reliability (Rubenstein et al., 2001); and
- psychosocial factors, as measured with the Geriatric Depression Scale (Short Form) (GDS) (Sheikh and Yesavage, 1986), Medical Outcomes Study (MOS) Social Support Scale (Sherbourne and Stewart, 1991), and General Self-Efficacy Scale (GSE) (Schwarzer and Jerusalem, 1993). These scales asked participants to record how they were feeling during the past week or at the time of completing the survey. The GDS was designed to be easily completed by the elderly in an outpatient setting. The short form 15-item scale avoids problems of fatigue and studies have shown good reliability and high sensitivity and specificity (Brink and Yesavage, 1982; McDowell and Newell, 1996). The MOS Social Support Survey (Sherbourne, 1992) was designed for chronically ill patients and good evidence exists for its reliability and validity (McDowell and Newell, 1996). The revised GSE scale consists of 10 items to determine confidence in

ability to cope with challenging situations. Good reliability, stability, validity has been reported in a number of studies (Luszczynska et al., 2005; Luszczynska et al., 2005).

In addition the survey included questions on:

- current demographic details, current weight and nutrition details (as part of the MNA-SF), any additional medical history, and questions on previous ulcer history and details
- ulcer recurrences and time to recurrence (where recurrence was defined as a breakdown of skin over the same lower leg of the previous venous ulcer);
- level, type and length of time in compression (i.e. how many days/week do they wear their compression hosiery);
- frequency and length of time of leg elevation above the level of the heart (i.e. how many days/week do they normally spend time with legs elevated and for how many minutes/day do they undertake this activity); and
- frequency and length of time ankle exercises were undertaken (i.e. how many days/week would they undertake ankle exercises and for how many minutes/day do they undertake this activity).

The questions on recurrence and self-care activities were assessed for content validity by experts in the field and the survey was pilot tested with patients attending one of the clinics prior to the mail out of surveys.

Data Analysis

Data were analysed with SPSSv15 (SPSS Inc., Chicago Il). Descriptive analyses were undertaken for all variables. Chi-squares, Fisher's exact tests, *t*-tests and

Mann-Whitney *U* tests were used to examine bivariate relationships between recurrence and demographic, medical, venous, compression, physical activity, psychosocial and self-care activity variables. Collinearity checks were undertaken using a correlation matrix and examining Pearson or Spearman coefficients. All variables significantly associated with recurrence ($p<0.05$ level) or previously identified in the literature as influencing recurrence were simultaneously entered into a multivariable logistic regression model to determine their independent influences on recurrence. Goodness of fit tests were used to eliminate unnecessary variables and determine the final parsimonious regression model that retained strong prediction, as recommened by Tabachnick and Fidell (2007).

RESULTS

One hundred and forty-seven clients attending the leg ulcer clinics between 2004 and 2006 fitted the inclusion criteria and were thus eligible and were invited to participate in the study. Of these, 15 clients were no longer able to be contacted on their previous address or phone details, four clients had died, three clients were too unwell or cognitively impaired to participate, three clients did not wish to participate and 122 gave consent to participate, a response rate of 83%. Seven participants (6%) chose to answer the questionnaire via the telephone rather than filling out the form and posting back, because of vision disabilities (n=5), or physical disability limiting their access to a post-box (n=2). No participants required a home visit.

Median follow-up time was 24 months (range 12–40 months). Demographic, health, venous history and previous ulcer characteristics are shown in Table 1.

(Insert Table 1 around here)

The summary indices calculated from the YPAS indicated fairly low levels of physical activity (displayed in Table 2). Mean Geriatric Depression Scale, MOS Social Support and General Self-Efficacy scores are shown in Table 2.

Although 90% of participants had been prescribed compression hosiery, only 56% reported regularly wearing hosiery for 5 or more days/week, while 30% reported wearing compression hosiery one day/week or less. Nearly a third (29%) wore Class 1 (14–19mmHg) hosiery, 64% wore Class 2 (20–25mmHg) hosiery and 7% wore Class 3 hosiery (30–40mmHg). Forty-four percent of participants elevated their legs above the level of the heart for 30 minutes at least 5 days/week, and 35% reported undertaking daily ankle exercises.

Recurrence

In this sample 68% (n=83) had recurred since healing, 36% (n=44) within the first three months and an additional 20% (n=22), totalling 56% (n=68), within 12 months from healing. Bivariate analysis found no differences in prevalence of recurrence according to age, gender or marital status. In addition, no differences were found in socio-economic status according to the Australian Bureau of Statistics Socio-Economic Indexes for Areas (Australian Bureau of Statistics (ABS), 2008), however a significant trend was associated with source of income (χ^2_3=10.8, p=0.013, Table 1), although only small numbers were present in some levels of this variable.

Sixty percent (n=73) of participants had a BMI >25, 24% (n=29) between 21 – 25, and 16% (n=19) had a BMI ≤20. There was little difference in recurrence rates between participants with a BMI >25 (of whom 66% recurred) and participants with a BMI ≤25 (of whom 70% recurred). However, 90% (n=17) of participants with a BMI ≤20 recurred, compared to 64% (n=66) of participants with a BMI >20 (Fisher's exact test, p=0.021). Recurrence was also significantly higher in those rated 'at risk' of nutritional deficiencies by the MNA-SF (78%), in comparison to 61% of those not at risk (Fisher's exact test, p=0.036). Examination of comorbidities found 82% of participants with cardiac disease recurred compared to 62% of those without cardiac disease (Fisher's exact test, p=0.027); while 80% of participants who required aid to mobilise recurred, compared to 58% of those who mobilised freely (Fisher's exact test, p=0.009).

Higher scores on all YPAS summary indices were significantly associated with lower rates of recurrence (see Table 2). Participants who remained healed reported an average of 12.9 more hours/week of activity than participants who recurred (95% CI 4.6–21.2, t_{120}=2.64, p=0.011), and an average increase of 2419 kcal/week (95% CI 527–4312, t_{120}=2.53, p=0.013). The mean difference in Total Activity Index scores was 13.2 (95% CI 5.7–20.7, t_{120}=3.48, p=0.001). Participants who recurred also had a significantly longer ulcer duration (Table 1, Mann-Whitney U=1120, p=0.026). There were no significant associations between recurrence and previous ulcer area, DVT or venous surgery.

General Self-Efficacy scores from participants who did not recur were on average 4.3 points higher than participants who recurred (95% CI 2.0–6.5, t_{120}=3.75, p<0.001); and Geriatric Depression Scale scores were on average 2.0 points higher for participants who recurred (95% CI 3.3–0.8, t_{120}=-3.16, p=0.002), (Table 2). No significant difference was found between mean MOS Social Support Scale scores (Table 2).

(Insert Table 2 around here)

The small number of participants wearing Class 3 hosiery (n=8) did not allow comparisons between Class 2 and Class 3, therefore comparisons were made between participants not wearing any compression hosiery, participants wearing Class 1 hosiery, and participants wearing either Class 2 or Class 3 hosiery. Lower rates of recurrence were significantly associated with increased time wearing Class 2 or 3 compression hosiery and time spent elevating legs above the level of the heart. Compression hosiery (Class 2 or 3) was worn for an average of 5.3 days/week by participants who did not recur, compared to 2.9 days/week by participants who recurred (t_{120}=4.45, p<0.001). Participants who did not recur elevated their legs on average for 33 minutes/day, in comparison to 14 minutes/day for participants who recurred (t_{120}=4.49, p<0.001).

Logistic regression model

As the YPAS summary indices and mobility variable were significantly correlated and there was a risk of collinearity, only the YPAS Total Activity Index variable was entered in the model. All remaining variables associated with recurrence (p<0.05) were entered simultaneously into a multivariable logistic regression model. After

mutual adjustment for all variables, leg elevation, wearing Class 2 or 3 compression hosiery, the YPAS Total Activity Index and higher General Self-efficacy scale scores remained significantly associated with lower rates of recurrence, while a history of cardiac disease remained significantly associated with higher recurrence rates.

A second model retaining variables that were significant ($p<0.05$) or approaching significance in the initial model is presented in Table 3 for more precise estimates. This model found participants who elevated their legs for an hour/day were 25 times (95% CI 6–100) less likely to recur (inverse of OR 0.04, 95% CI 0.01–0.17), in comparison to those who did not elevate their legs. In addition, for every added day/week participants wore Class 2 or 3 compression hosiery, they were almost half as likely to recur (OR 0.53, 95% CI 0.34–0.81). Both the General Self-Efficacy scores and YPAS scores were inversely associated with recurrence. For every point increase on the General Self-Efficacy scale (range 10-40), participants were 21% (95% CI 6–39) less likely to recur, while for every point increase in the YPAS Total Activity Index (range 0–137), participants were 5% (95% CI 2–9) less likely to recur. The odds of recurrence in participants with cardiac disease were 5 times higher (95% CI 1.01–24.9) than participants without cardiac disease.

(Insert Table 3 around here)

DISCUSSION

The prevalence of recurrence in this sample was high (68%), although similar to other long term follow-up reports of 57–67% in patients not receiving active interventions (Abbade et al., 2005; Barwell et al., 2004; McDaniel et al., 2002).

High recurrence rates within the first three months from healing have been noted previously (Moffatt and Dorman, 1995; Vowden and Vowden, 2005), a finding which was repeated in this study. This time period is one which needs to be flagged as requiring intensive monitoring and follow-up care.

Leg elevation, wearing compression hosiery, higher General Self-efficacy scores and physical activity were found to be significantly associated with lower rates of recurrence and a history of cardiac disease was significantly associated with higher rates of recurrence in this study. The finding that participants who spent an hour/day with legs elevated were 25 times less likely to recur provides valuable information for health care professionals and patients looking for alternative or additional strategies to prevent recurrence. There is little evidence available on the effect of leg elevation, although Brooks et al. (2004) also found reduced recurrence rates in participants who spent greater time with legs elevated. Further research in this area with a larger sample size is indicated.

Compression hosiery is a primary strategy for prevention of recurrence. This study found for every additional day/week participants wore Class 2 or 3 compression hosiery, the odds of recurrence were almost halved, although the confidence interval was moderately large. No effect was found for participants wearing Class 1 hosiery. These results are consistent with Nelson et al.'s systematic review and more recent studies (Abbade et al., 2005; Barwell et al., 2004; Nelson et al., 2000) and support the recommendation for life-long compression therapy, particularly for patients who are unsuitable for surgery (Warwick et al., 2007). Regular walking and exercise are also frequently recommended to prevent recurrence, based on

expected benefits from improved venous return from exercise. However, the impact of increased physical activity on recurrence is uncertain as the level of physical activity is rarely measured in studies of recurrence. A large study by Barwell et al. (2000) found no association between patient mobility and either healing or recurrence, as also noted by Franks et al. (1995). In contrast, we found increased levels of activity were inversely associated with recurrence, similarly to Brooks et al. (2004) and Vowden (2005), who found decreased mobility significantly related to recurrence.

The remaining strong association in this model was with higher General Self-Efficacy scores and lower rates of recurrence. As no specific self-efficacy scale has yet been developed for patients with chronic venous disease, the General Self-Efficacy Scale was used to measure perceived ability to problem solve. To our knowledge, previous studies have not examined relationships between self-efficacy and leg ulcer recurrence, although close relationships between self-efficacy and performance of health promoting activities have been reported on other chronic conditions (Sousa et al., 2004). The strong relationship found in this study suggests that further exploration with a disease specific self-efficacy tool is warranted. An initial bivariate association was found between higher levels of depression and increased recurrence rates, although the association did not retain significance in the regression model. However, studies on other chronic conditions report close relationships between depression, self efficacy and self management (Brody et al., 2006; Sousa et al., 2004), and findings from this sample suggest these interrelationships may also exist in patients with chronic leg ulcers.

This study found a history of cardiac disease increased the odds of recurrence five times, however, the confidence interval was large. Although other comorbidities such as diabetes, rheumatoid arthritis and a previous DVT have been associated with recurrence in earlier studies (Barwell et al., 2000; Franks et al., 1995; Ghauri et al., 2000), along with larger ulcer size (Franks et al., 1995; Vowden and Vowden, 2005); no significant relationships with diabetes, rheumatoid arthritis, ulcer size, DVT or previous venous surgery were found, which may reflect the small numbers of participants with these conditions in this sample. In agreement with Barwell et al. (2000) and Gohel et al. (2005), prolonged ulcer duration was significantly associated with recurrence, although not reaching significance in the final model. Similarly, the bivariate associations between recurrence and nutrition variables lost significance after adjusting for other variables in the model.

In conclusion, the high rate of recurrence found in this study suggests there is a need for more effective strategies for prevention. Results indicate the first three months from healing is a vulnerable time and that leg elevation, physical activity, compression hosiery and strategies to improve self efficacy are likely to prevent recurrence; while patients with cardiac disease may be at higher risk of recurrence.

Limitations

Due to research funding and health system constraints, not all patients attending these clinics had a full duplex scan and data were unavailable on the type or degree of venous insufficiency, which may also influence recurrence. Small numbers in some variable categories (i.e. source of income, BMI <20, some

comorbidities) limit the reliability of results for those variables. Measures of physical activity, psychosocial scales and self-care activities were obtained from self-report questionnaires, with the possibility of response bias. Limitations due the retrospective design of this study and possible recall bias are also acknowledged. While prospective studies with larger sample sizes are required, this study provides valuable information on a broader range of strategies to help prevent recurrence.

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Table 1.

Demographic characteristics, comorbidities, nutrition, venous history, previous ulcer characteristics and adherence with compression hosiery

		Recurred (n = 83) n (%)	No recurrence (n = 39) n (%)	Total sample (n = 122) n (%)
Gender				
	Male	40 (48%)	20 (51%)	60 (49%)
	Female	43 (52%)	19 (49%)	62 (51%)
Marital status	Married	26 (31%)	18 (46%)	44 (36%)
	Single	17 (21%)	4 (10%)	21 (17%)
	Widowed	38 (46%)	16 (41%)	54 (44%)
Income*				
	Aged pension	63 (76%)	25 (64%)	88 (72%)
	Disability pension	10 (12%)	1 (3%)	11 (9%)
	Employed	8 (10%)	6 (15%)	14 (12%)
	Self-funded retired	2 (2%)	6 (15%)	8 (7%)
Lived alone		44 (53%)	19 (49%)	63 (52%)
Osteoarthritis		35 (42%)	15 (38%)	50 (41%)
Rheumatoid arthritis		9 (11%)	2 (5%)	11 (9%)
Hypertension		36 (43%)	13 (33%)	49 (40%)
Diabetes		13 (16%)	5 (13%)	18 (15%)
Cardiac disease*		27 (33%)	6 (15%)	33 (27%)
Required aid to mobilise*		40 (48%)	10 (26%)	50 (41%)

At risk of nutritional deficiency on			
MNA-SF† scale*	40 (48%)	11 (28%)	51 (42%)
Body Mass Index ≤ 20*	17 (21%)	2 (5%)	19 (16%)
Varicose veins	51 (62%)	27 (69%)	78 (64%)
Past DVT‡	18 (22%)	10 (26%)	28 (23%)
Past venous surgery	16 (19%)	9 (23%)	25 (21%)
Time since first ulcer*: 1–2 years	17 (21%)	17 (44%)	34 (28%)
3–5 years	25 (30%)	8 (21%)	33 (27%)
6–10 years	28 (34%)	6 (15%)	34 (28%)
>10 years	13 (16%)	8 (21%)	21 (17%)
Wore compression hosiery for 5			
or more days/week *	39 (47%)	29 (74%)	68 (56%)
		Median (range)	
Ulcer duration (weeks)*	48 (4-436)	36 (8-137)	44 (4–436)
Ulcer area (cm^2)	4.5 (1-105)	4.0 (1-62)	4.2 (1–105)
Age	79 (26–96)	77 (46–95)	79 (26–96)
Body Mass Index	27 (17–65)	27 (20–52)	27(17–65)

*P < 0.05 difference between those who recurred and those who did not recur

† Mini-Nutritional Assessment – Short Form

‡ Deep Vein Thrombosis

Table 2. Means and Standard Deviations (SD) of the Yale Physical Activity Survey (YPAS), Geriatric Depression Scale (GDS), MOS Social Support Scale and General Self-Efficacy Scale (GSE) scores.

	Recurred Mean (SD)	No recurrence Mean (SD)	All subjects Mean (SD)
YPAS			
†Total Time Index*	18.2 (17.9)	31.1 (27.5)	22.3 (22.1)
††Energy Expenditure Index*	3780 (4638)	6199 (5340)	4546 (4978)
†††Total Activity Index**	26.6 (19.7)	39.8 (18.6)	30.8 (20.3)
‡Geriatric Depression Scale**	5.2 (3.4)	3.2 (3.1)	4.6 (3.3)
‡‡MOS Social Support Scale	64.8 (21.5)	73.5 (22.0)	67.6 (21.8)
§General Self-Efficacy**	28.7 (5.9)	33.0 (5.8)	30.1 (6.1)

*$P < 0.05$ difference between those who recurred and those who didn't recur.

**$P < 0.005$ difference between those who recurred and those who didn't recur.

† Total Time index = sum of hours for all physical activities per week

†† Energy Expenditure index = sum of time of each activity x intensity [kcal/min]

††† Total Activity Index = frequency x duration x weighting factor for activities (possible range 0–137)

‡GDS - Scale from 0–15, where higher scores indicate greater levels of depression;

‡‡ MOS Social Support Index - scale from 0–100, where higher scores indicate more support;

§GSE - scale from 10–40, where higher scores indicate greater levels of perceived self-efficacy.

Table 3.

Odds ratios (OR) and 95% Confidence Intervals (CI) of associations between predictor variables and ulcer recurrence for the initial model (Model 1) and parsimonious model (Model 2).

	Model 1				Model 2		
	Crude OR	Adjusted OR	95% CI	p	Adjusted OR	95% CI	p
Leg elevation (hour/day)	0.03	0.04	0.01–0.19	0.001	0.04	0.01– 0.17	<0.001
Compression (Class 2/3)	0.57	0.65	0.51–0.85	0.004	0.53	0.34–0.81	0.004
General Self-efficacy Scale	0.88	0.82	0.72–0.95	0.006	0.83	0.72–0.94	0.006
YPAS Total Activity Index	0.95	0.95	0.02–0.99	0.013	0.95	0.92–0.98	0.010
Cardiac disease	4.39	4.56	0.78–15.4	0.08	5.03	1.01–24.93	0.048
Ulcer duration (weeks)	1.01	1.01	1.00–1.03	0.054	1.01	1.00–1.03	0.054
Age	1.01	0.99	0.95–1.04	0.68			
BMI ≤20	4.85	3.59	0.14– 93.5	0.44			
MNA At-risk score	1.36	0.51	0.10–2.66	0.43			
Geriatric Depression Scale	1.24	1.12	0.86–1.47	0.41			