

# Chronic leg ulcers among the Icelandic population

## ABSTRACT

**Background:** Chronic leg and foot ulcers are a major health care concern, especially among the elderly population. To date little is known about the extent of the problem of chronic leg ulcers in Iceland.

**Aim:** To identify the number of chronic leg ulcer patients in Iceland and determine their aetiology in order to create an empirical background for further research, health care policy making and evaluation of service.

**Methods:** Descriptive, retrospective study. Chronic leg ulcers were defined as all ulcers below knee, open  $\geq 6$  weeks. Patients were identified by health care professionals. Data were collected in every health care institution in Iceland, 166 units altogether. Twenty cases were selected for further validation.

**Results:** Leg ulcer prevalence was 0.072% ( $n=226$ ), rising up to 0.61% among population  $\geq 70$  years. Male/female ratio was 1.2/1. Estimated aetiology was venous in 34% cases, other or unknown in 25% cases. Diagnosis based on clinical observation alone was in 57% cases.

**Conclusion:** Prevalence is low compared to other studies. Male/female ratio differs from most studies. Diagnostic methods need to improve. Evidence based leg ulcer practice needs to be implemented. Empirical background on chronic leg ulcers in Iceland has been established.

## INTRODUCTION

Chronic leg and foot ulcers are a major health care concern, especially among the elderly population. Prevalence rates of open leg ulcers range from 0.045% to 1.69% depending on the population studied<sup>1-2</sup>. The condition can persist for months and even years and recurrence rate is high. Underlying aetiology in most leg ulcers is related to defects in the vascular system of the legs, such as venous or arterial insufficiency, but many contributing factors can influence healing and development of the ulcer. These factors can be physical factors, psychological and social factors as well

as environmental and economic factors. Major developments have been seen in the management of chronic leg ulcers in the world in the last decade or two<sup>3</sup>. In Canada as well as in Europe, clinical practice guidelines on management of chronic leg ulcers have been developed<sup>4-6</sup> and evidence-based practice has been implemented in various forms.

The Icelandic healthcare system is based on public health insurance where all citizens have equal access to healthcare. The management of chronic wounds, including leg ulcers, has been poorly defined within the Icelandic health care system and procedure policy for the management of chronic leg ulcers is rare. Little is known about the extent of the problem of chronic leg ulcers in Iceland and, to date, the prevalence has been unknown.

The aim of this study was to determine the prevalence of leg ulcers and their estimated aetiology among the Icelandic population. Another purpose was to create an empirical background for health care policy making and evaluation of leg ulcer service.

## METHODS

A descriptive, retrospective study with a cross-sectional design was done, where leg ulcer patients were studied over a period of two weeks in May 2008. Chronic leg ulcers were defined as all ulcers below knee, open  $\geq 6$  weeks. The population in this study consisted of all individuals registered in Iceland during the study period. The sample consisted of all leg ulcer cases identified by health care providers in all health care institutions likely to treat leg ulcer patients in Iceland. There were 53, one to 17 units each, adding up to 166 units all together and included all primary health care clinics and related services in Iceland, all centres of home nursing, all nursing homes and geriatric/long term hospital wards as well as all hospital outpatient clinics in Iceland. Excluded from the study were acute hospital wards as it was expected that individuals incidentally hospitalised during the study period would be identified elsewhere, ►



**Guðbjörg Pálsdóttir,**  
RN, MS.  
Specialist practice in  
wound management in  
Landspítali University  
Hospital in Reykjavík,  
Iceland.

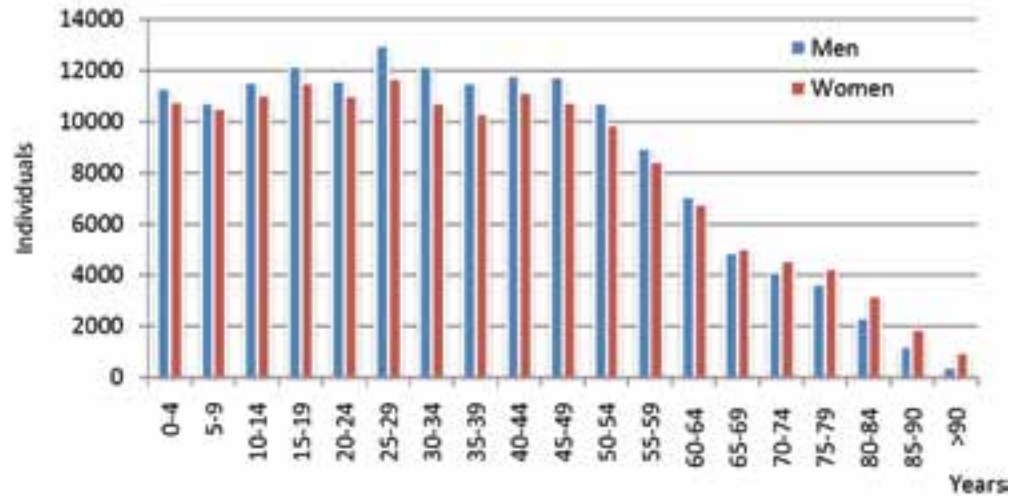
**Ásta Thoroddsen,**  
RN, PhD cand.  
Associate Professor at  
University of Iceland,  
Faculty of Nursing  
Landspítali University  
Hospital, Reykjavík, Iceland

Correspondence to:  
Guðbjörg Pálsdóttir  
Grettisgata 48  
101 Reykjavík  
Iceland

[gpsara@landspitali.is](mailto:gpsara@landspitali.is)

Conflict of interest: none

Figure 1. Icelandic population, age and gender



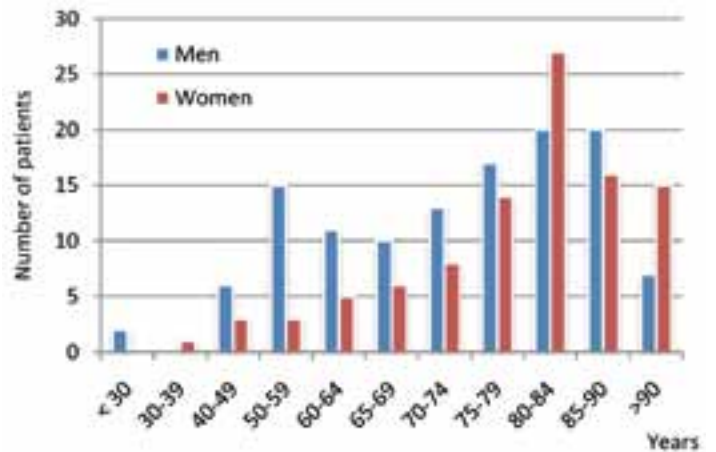
provided they had been treated for leg ulceration within the health care system prior to hospitalisation. One private detoxification clinic and two rehabilitation centres were not included in the study.

A questionnaire used for data collection was developed by the first author with reference to two existing questionnaires with permission from their authors, Christina Lindholm and Peter Franks and his team. The questionnaire was divided into background questions, ulcer history, diagnosis and management. A letter to introduce the study was sent to the 166 units. Each unit was then contacted by telephone to ask them to participate and establish contact. Health care providers were asked to fill out one questionnaire for every leg ulcer patient they had treated or knew of during the study period. Personal identification numbers were used to prevent double counting and then eliminated from the data before analysis.

Validation of cases was done in 20 patients randomly selected from the whole sample. The purpose of this was to evaluate the reliability of the data on the underlying aetiology of the leg ulceration of patients identified. Patients selected were identified through the list of numbers connected to the personal identification numbers, and contacted through the health care institutions where they were being treated. With patients' consent they were seen either in connection with their planned ulcer treatment or, if the patient preferred, at a separate appointment. Assessment was non-invasive and included ulcer history, clinical observation and measurement of ankle brachial pressure index (ABPI) with the use of Doppler.

Descriptive statistics were used to describe frequencies and proportions. Most variables were measured by nominal measurements. Chi-square non parametric procedure was used for testing differences between groups. SPSS, version 15.0 and Excel were used for data analysis.

Figure 2. Chronic leg ulcers in Iceland, distribution by age and gender

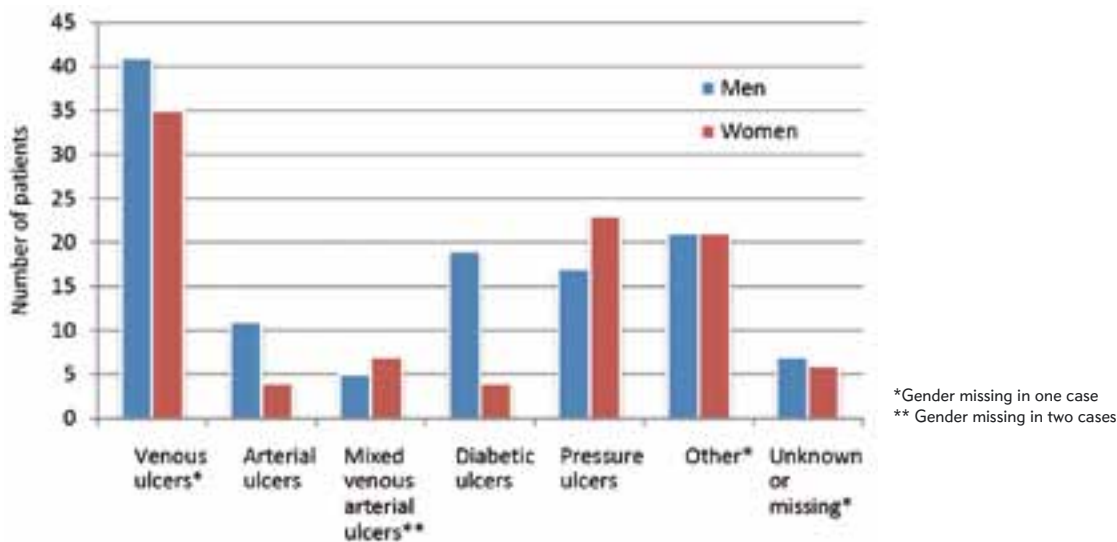


Significance level was set at  $p < 0.05$ . Study procedure was approved by the National Bioethics Committee (#08-076) in Iceland.

## RESULTS

The registered population of Iceland in January 2008 was 313,376 individuals. Men were 159,488 (50.9%) and women 153,888 (49.1%) (fig. 1)<sup>7</sup>. All 166 health care units contacted for data collection were willing to participate in the study, giving a 100% response rate. Of those, 67 units had seen no leg ulcer patients during the study period. The remaining 99 units reported from one to 30 cases each. All in all, 233 questionnaires were collected, each presenting one leg ulcer patient. One case did not meet the inclusion criteria as a chronic leg ulcer and six cases were double counted, leaving a total number of 226 cases identified. This represents a prevalence of 0.072% (0.72/1000 population) during the two weeks study period. Mean age was 75.2 years ( $SD=1.93$ , range 25-99). Age was reported in 224 cases and gender in 221 cases. Both age and gender were reported in 219 cases. As expected the prevalence rates were highly age dependent,

Figure 3. Chronic leg ulcers in Iceland, aetiology and gender



rising from 0.072% to 0.61% in the population 70 years and older. Eighty-six percent of cases were 60 years or older (fig. 2).

Unexpectedly the total count of men was higher than total count of women ( $n=121/100$ ). The difference was most obvious in population under 70 years of age where the number of men with leg ulcers were more than twice as many as women ( $\chi^2 = 8.86, df=1, p<0.01$ ) (table 1). In the population 70 years and older, the difference was very small, with total count of 77 men and 80 women. Among patients with diabetic ulcers men were five times as many as women ( $n=19/5$ ) (fig. 3).

Ulcers were divided equally between left and right leg, 131 patients had ulcers on each leg and 36 had bilateral ulcers. All in all, 367 ulcers were reported on the 226 patients identified. Of all ulcers 52.5% were located on the legs and 47.5% on the feet, 11% on the heels and 14% on the toes. Twenty-two percent of patients had had their ulcers longer than one year and 11% longer than two years. Patients had recurrent ulcers in 47.8% of cases.

Aetiology of ulcers was given in 212 cases. Venous leg ulcers were reported in 34% of cases, 7% were arterial ulcers, 6% mixed venous/arterial, 10% diabetic foot ulcers and 18% pressure ulcers (fig.3). Only in 6% cases ( $n=14$ ) was there either unknown aetiology or missing data. In 19% cases ( $n=43$ ) the aetiology was scored as "other". In most of those cases further explanations were reported in

free text. Those were explanations such as trauma, which was the most prominent issue, immunological ulcers and infections. Some of the explanations written in free text were descriptions of symptoms rather than aetiological factors.

When asked about how ulcer aetiology was determined, four possible scores were available on the questionnaire. After the data collection, the scores were ranked by accuracy of the diagnostic method by the researcher. If two possibilities were scored, such as clinical observation and ABPI as well, ABPI was considered the answer as it is more accurate than clinical observation alone. Examination by vascular surgeons, dermatologists, plastic surgeons and other specialist consultants was ranked as the most accurate diagnostic method. In 57% of cases ulcer aetiology was determined by clinical observation alone and ABPI was reported in only 8% for that purpose (table 2).

Nineteen of the 20 patients (one could not be traced) selected for further validation of the underlying aetiology participated. In 12 of the 19 cases (63%) complete consistency was found in aetiology estimated by the researcher and by the practitioners answering the questionnaires. Three of the seven patients with mismatching aetiology had insufficient arterial blood supply not previously diagnosed. Cases with mismatching aetiology had all been assessed with clinical observation alone according to the questionnaires. ►

Table 1. Age and gender among the Icelandic leg ulcer population

Age	Men		Women		Total	
	n	(%)	n	(%)	n	(%)
0-69 years	44	(71)	18	(29)	62	(100)
70 years and over	77	(49)	80	(51)	157	(100)
Total	121	(55.3)	98	(44.7)	219	(100)

Table 2. Diagnostic methods reported in leg ulcer management

	N	(%)
Clinical observation	129	(57,1)
ABPI (ankle brachial pressure index)	19	(8,4)
Referral to a physician with special function	76	(33,6)
Not known	2	(0,9)
Total	226	(100)

## DISCUSSION

The purpose of this study was to establish knowledge on the extent of chronic leg ulcers in Iceland and the provision of care of patients with leg ulcers within the Icelandic health care system. Until now, the scope of the health care problem of chronic leg ulcers in Iceland has not been addressed and estimates of the situation in this society have been based mainly on speculation. The population under focus in this study was the population of the whole country, 313,000, which is unique, but in size it is comparable to many similar studies focusing on defined districts. Data collection for this study is considered thorough as all institutions in Iceland, likely to treat patients with leg ulcers, were included. Achieving a 100% response rate is more than was expected but can be explained by the fact that the researcher made a personal contact with a key person in every health care unit before data collection and up to three times following the study period to remind and encourage health care providers to respond. In terms of the thoroughness of the data collection and the excellent response rate, the results should give a fair picture of the situation in Iceland.

Total prevalence of 0.072% and 0.61% in the elderly population ( $\geq 70$  years) is among the lowest prevalence rates known. Due to methodological differences, however, it can be difficult to compare prevalence rates in various studies. In a review of 22 studies on leg ulcer prevalence, rates from 0.1% to 0.3% were found in studies with methods similar to present study<sup>8-14</sup>. Lower prevalence (0.045%) rates were found in only one study, conducted by Moffatt and colleagues in a defined London popula-

tion<sup>3</sup> but her team, for example, excluded all patients with isolated foot ulcers from their study. It has been suggested that up to 40% of the leg ulcer population in Sweden is unknown to the health care system<sup>15</sup>. Presuming that it is the same in Iceland, this raises the total prevalence up to 0.1% and 1% among the elderly population but this needs to be studied further.

Generally it is accepted that chronic leg ulcers are more prominent among women than men but in this study it was found to be the other way around with the male/female ratio 1.2/1. Only one recent study was found with ratio similar to this<sup>16</sup>. The difference, though, is only seen among the age group under 70 years, where men with leg ulcers are more than twice as many as women. This would be of interest in further studies. Women with leg ulcers in Iceland are older than the men as is seen in other studies and is proportional to Icelandic demography.

Aetiological distribution is comparable to other studies, with venous leg ulcers being the dominant ulcer type<sup>2,8,10,11,14,15,17,20-22</sup>. It has to be pointed out that as many as 25% of cases had aetiology reported as other or unknown and in 57% of cases, aetiology is determined by clinical observation alone. Therefore, the accuracy of the aetiological determination among this population can be questioned. The validation of cases confirms inaccuracy of diagnostic methods in some cases, although in 63% of the validated cases consistency was found between aetiology estimated by practitioners and researcher. In all the mismatching cases, aetiology had been determined by clinical observation alone on behalf of the practitioners collecting the data.

## References

- Margolis DJ, Bilker W, Santanna J, Baumgarten M. Venous leg ulcers: Incidence and prevalence in the elderly. *Journal of the American Academy of Dermatology*. 2002; 46: 381-386.
- Moffatt CJ, Franks PJ, Doherty DC, Martin R, Blewett R, Ross F. Prevalence of leg ulceration in a London population. *QMJ: monthly journal of the Association of Physicians*. 2004; 97: 431-437.
- Moffatt C, Morison MJ, Pina E. Wound bed preparation for venous leg ulcers. European Wound Management Association (EWMA). *Position Document: wound bed preparation in practice*. London: MEP Ltd; 2004.
- Clinical practice guidelines: *The nursing management of patients with venous leg ulcers. Recommendations*. In: Royal College of Nursing (RCN). 2006; [http://www.rcn.org.uk/development/practice/clinicalguidelines/venous\\_leg\\_ulcers](http://www.rcn.org.uk/development/practice/clinicalguidelines/venous_leg_ulcers) (5 August, 2008)
- Nursing best practice guideline: *Assessment and management of venous leg ulcers*. In: Registered Nurses Association of Ontario (RNAO). 2004; <http://www.mao.org/Page.asp?PageID=924&ContentID=722> (5 August, 2008)
- Nursing best practice guideline: *Assessment and management of foot ulcers for people with diabetes*. In: Registered Nurses Association of Ontario (RNAO). 2005; <http://www.mao.org/Page.asp?PageID=924&ContentID=719> (23 Oct. 2008)
- Hagstólur. In: Hagstofa Íslands. 2008; <http://hagstofa.is/Hagtolur/Mannfjoldi> (20 August, 2008)
- Ebbeskog B, Lindholm C, Öhman S. Leg and foot ulcer patients. *Scandinavian Journal of Primary Health Care*. 1996; 14: 238-243.
- Franks PJ, Morton N, Campbell A, Moffatt CJ. Leg ulceration and ethnicity: a study in west London. *Public Health*. 1997; 111: 327-239.
- Lindholm C, Bjellerup M, Christensen OB, Zederfeldt B. A demographic survey of leg and foot ulcer patients in a defined population. *Acta Dermato-Venereologica*. 1992; 72: 227-230.
- Lindholm C, Bergsten A, Berglund E. Chronic wounds and nursing care. *Journal of Wound Care*. 1999; 8: 5-10.
- Marklund B, Sülau T, Lindholm C. Prevalence of non-healed and healed chronic leg ulcers in an elderly rural population. *Scandinavian Journal of Primary Health Care*. 2000; 18: 58-60.
- Nelzén O, Bergqvist D, Lindhagen A, Hallböök T. Chronic leg ulcers: an underestimated problem in primary health care among elderly patients. *Journal of Epidemiology and Community Health*. 1991; 45: 184-187.
- O'Brien JF, Grace PA, Perry IJ, Burke PE. Prevalence and aetiology of leg ulcers in Ireland. *Irish Journal of Medical Science*. 2000; 169: 110-112.
- Nelzén O, Bergqvist D, Lindhagen A. The prevalence of chronic lower-limb ulceration has been underestimated: results of a validated population questionnaire. *British Journal of Surgery*. 1996; 83: 255-258.
- Forssgren A, Fransson I, Nelzén O. Leg ulcer point prevalence can be decreased by broad-scale intervention: A follow-up cross-sectional study of a defined geographical population. *Acta Dermato-Venereologica*. 2008; 88: 252-256.
- Andersson E, Hansson C, Swanbeck G. Leg and foot ulcer prevalence and investigation of the peripheral arterial and venous circulation in a randomised elderly population. *Acta Dermato Venereologica*. 1993; 73: 57-61.
- Baker SR, Stacey MC, Singh G, Hoskin SE, Thompson PJ. Aetiology of chronic leg ulcers. *European Journal of Vascular Surgery*. 1992; 6: 245-251.
- Clarke-Moloney M, Keane N, Kavanagh E. Changes in leg ulcer management practice following training in an Irish community setting. *Journal of Wound Care*. 2008; 17: 116-121.
- Lorimer KR, Harrison MB, Graham ID, Friedberg E, Davies B. Assessing venous ulcer population characteristics and practices in a home care community. *Ostomy/Wound Management*. 2003; 49: 32-43.
- Soldevilla J, Torra JE, Verdu J, Rueda J, Martinez F, Roche E. Epidemiology of chronic wounds in Spain: results of the first national studies on pressure and leg ulcer prevalence. *Wounds*. 2006; 18(8): 213-226.
- Öien RF, Håkansson A, Ovhd I, Hansen BU. Wound management for 287 patients with chronic leg ulcers demand 12 full-time nurses. *Scandinavian Journal of Primary Health Care*. 2000; 18: 220-225.

Identifying an underlying cause is a fundamental factor in the management of chronic leg ulcers. This requires a thorough and holistic assessment, including ABPI measurement, to rule out arterial insufficiency. Clinical observation and palpable pulses alone cannot be relied on for that purpose<sup>4-6</sup>. It is a matter of concern that in majority of cases, the diagnostic methods used in practice relied on clinical observation alone and ABPI was rarely used as such. The clinical importance of this, considering the fact that almost 50% of patients had recurrent ulcers and over 20% had ulcer duration of more than one year, is of more concern than that of getting the exact demographic picture. ■

#### **Implications for practice**

- Empirical background on chronic leg ulcers in Iceland has been established
- Results will serve as foundation for
  - Health care policy making
  - Evaluation of service
  - Further research
- Diagnostic methods need to be improved
- Evidence-based practices with continuous education and training programs for practitioners need to be implemented
  - where interdisciplinary focuses, within and between care settings, are emphasised.

#### **Further research**

- It is important to involve a bigger sample in clinical validation in order to give more detailed information on management and aetiological factors.
- Leg ulcer population practicing self treatment is still unknown in Iceland.
- Evaluation following implementation of clinical practice guidelines.

#### **Acknowledgement**

The study was a part of a thesis for a Master of Science Degree in Nursing at the University of Iceland. Acknowledgements to members of the masters committee; Dr. Arun Sigurdardottir and Dr. Baldur T. Baldursson. The study was supported by the Icelandic Nurses Association and the Icelandic Wound Healing Society.