A review of the effectiveness of a nurse-led rural community wound clinic

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Abstract

A retrospective review of a nurse led rural community wound clinic in Bunbury, Western Australia, was conducted over a one-year period (1 April 2005 – 31 March 2006), Client documentation was examined to identify client demographics, the types, cause and duration of wounds managed, and healing outcomes. During the time of the review 53 clients (18 males and 35 females) attended the clinic, with 64 wounds and 409 episodes of care. The median age for males was 74.5 years (range 18–94) and for females 80 years (range 35–96). Wounds were classified as venous leg ulcers (53.1%), mixed aetiology leg ulcers (18.8%), arterial leg ulcers (10.9%), pressure ulcers (9.4%), neuroischaemic foot ulcers (3.1%), skin tears (3.2%), and vasculitic leg ulcers (1.6%). The overall rate of healing for all wound types was 50% at 12 weeks and 64.8% at 12 months. The review identified that the nurse led clinic provided comprehensive assessment, delivered appropriate interventions, advocated for other specialised medical and allied health services, and achieved effective clinical outcomes.

Background

Chronic wounds, in particular chronic leg ulcers, are a familiar healthcare problem in western societies. They are associated with a decline in individual quality of life and place a significant economic burden on the patient, their family and Australia's healthcare system [1,2]. Individuals with chronic wounds benefit from a comprehensive assessment and management plan. A literature review 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 [3,4].

Methodology

Description of the clinic

Silver Chain is the largest domiciliary care provider in Western Australia and operates the only two rural community nurse led wound clinics in the state. The Bunbury Wound Clinic was established in 1995. Nurses with advanced wound knowledge and skills conduct the clinic weekly and have an interdependent alliance with the domiciliary nursing service to provide continuity in wound care delivery. The clinic encourages a collaborative relationship with other health professionals to optimise client outcomes. Documentation (including care plans, guidelines and assessment forms) are standardised between the clinic and the domiciliary nursing service and are designed to cue assessments, direct management options and enhance consistency of care.

The opportunity to access specialised clinical wound services locally is an advantage for elderly clients who generally have a greater incidence of chronic leg ulcerations, reduced mobility and multiple health problems. Most elderly clients are reliant on family or carers for transportation and would otherwise have to access wound services in Perth (a distance of nearly 200km).

Data collection

A representative 12-month period was selected for the review (1 April 2005 – 31 March 2006). Relevant data extracted from the Silver Chain ComCare database identified 53 clients who attended the nurse led clinic during this period. A data collection form was devised to capture data from client records. Ethics approval for this study was obtained from both the Monash University Standing Committee on Ethics in Research Involving Humans and the Silver Chain Ethics Committee.

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Data analysis

The clinical course of clients was analysed by retrospectively reviewing client documentation pertaining to demographics, clinical history, assessment outcomes and care provided. Data were entered into an SPSS database for subsequent analysis [5]. Data sourced included demographic factors, comorbidities, aetiology, assessment details and provision of care. The outcome for seven clients with ten wounds was unknown as they were lost to follow-up. Accordingly, the review evaluated the healing outcome for 87% of clients (n=46) who attended the nurse led wound clinic.

Results

Client characteristics and assessment details

Age and gender

A total of 18 males and 35 females with a total of 64 wounds, attended the wound clinic on 409 occasions during the review period. The median age for males was 74.5 years (range 18–94) and for females 80 years (range 35–96). The age distribution showed that the largest proportion of clients (71.7%) was aged >70 years (Figure 1), with females accounting for 66% (CI 77.8–82.2) of all subjects.

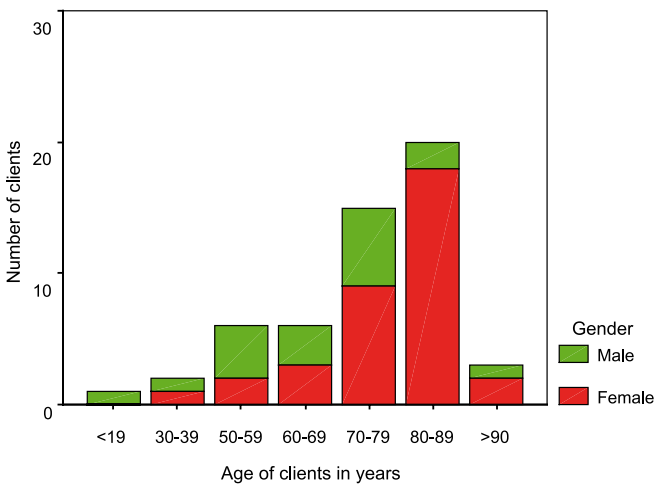

Figure 1. Age and gender of clients who attended the wound clinic

Medical history

The medical history of many clients potentially contributed to the presence of a chronic wound or impaired healing. Within the clinic population, the proportion of clients with various comorbidities and predisposing factors for leg ulceration included:

- 9.4% (n=5) clients were current cigarette smokers.
- 35.8% (n=19) had previously been cigarette smokers.
- 32.1% (n=17) had diabetes.
- 20.8% (n=11) had a history of deep vein thrombosis (DVT).
- 22.6% (n=12) presented with three or more comorbidities.
- 43.4% (n=23) had three or more predisposing factors.

Only 15.1% (n=8) of clients had no known comorbidities; 32% (n=17) had a single comorbidity, 30.2% (n=16) had two comorbidities and 22.6% (n=12) had three or more comorbidities, including diabetes, arthritis, hypertensive heart disease and respiratory disorders. Three or more predisposing factors were identified in 43.4% (n=23) of clients; 47.2% (n=25) had two predisposing factors and 9.4% (n=5) had a single predisposing factor. Predisposing factors included a history of DVT, stripping and ligation of varicose veins, obesity, reduced mobility and a history of lower leg fracture.

Some form of mobility restriction was reported in 49.1% (n=26) of clients and ranged from reduced ankle flexion, a shuffling gait, and use of a walking stick, walking frame or wheelchair. Additional factors that potentially contributed to impaired healing were found to be advanced age, lengthy duration of wound and a history of multiple prior leg ulcerations.

Number, duration and cause of wounds

The majority of clients, 86.8% (n=46), had a single wound; 9.4% (n=5) had two wounds; one client (1.9%) had three wounds, and one client (1.9%) had more that four wounds. Clients presented to the clinic with wounds of varying duration ranging from <1 month to >3 years. At the initial clinic visit 14.1% (n=9) of clients had a wound present for <1 month, 31.3% (n=20) <3 months, 20.3% (n=13) <6 months, 6.3% (n=4) for between 6 and 12 months, 6.3% (n=4) for between 1 and 3 years, and 4.7% (n=3) for >3 years. The principal cause of all wounds (n=64) was trauma 45.3% (n=29); pressure 12.5% (n=8); surgery 3.1% (n=2); unknown aetiology 29.7% (n=19); and other causes 9.4% (n=6).

Time since initial leg ulceration

There were 16 (30.2%) clients with no previous history of leg ulceration, 35 with a previous history of leg ulceration and 2 with an uncertain previous history of leg ulceration. Amongst clients who claimed to have had one or more previous episodes of ulceration, the time that had elapsed since their first leg ulcer ranged from 1 to 6 months to >20 years (Table 1).

Time since first ulcer	Frequency	Percentage
1-6 months	4	7.5
13-18 months	1	1.9
2-5 years	8	15.1
6-10 years	8	15.1
11-15 years	4	7.5
16-20 years	1	1.9
21-30 years	4	7.5
>30 years	5	9.4
Never had a previous ulcer	16	30.2
Unknown	2	3.8
Total	53	100.0

Table 1. Time elapsed since client's first ulcer

Services used by clients following initial clinic visit

Excluding the seven who were lost to follow-up, all clients were reviewed by their GP on a needs basis and wound care was provided by the GP; in addition 86.9% (n=40) received both domiciliary nursing care and attended the wound clinic weekly. The remaining 13.1% (n=6) of clients did not access domiciliary nursing care but visited their GP, specialist and the wound clinic.

Lower leg assessment

Ankle brachial pressure index (ABPI) pressure measurements were recorded for all clients with lower extremity wounds (n=52). A single client had a skin tear to the forearm and did not require an ABPI measurement. In 88.4% (n=46) of cases there was documented evidence of palpating for pedal pulses, but data had not been recorded for 11.5% (n=6) of clients. In 34.6% of clients pedal pulses were unable to be palpated.

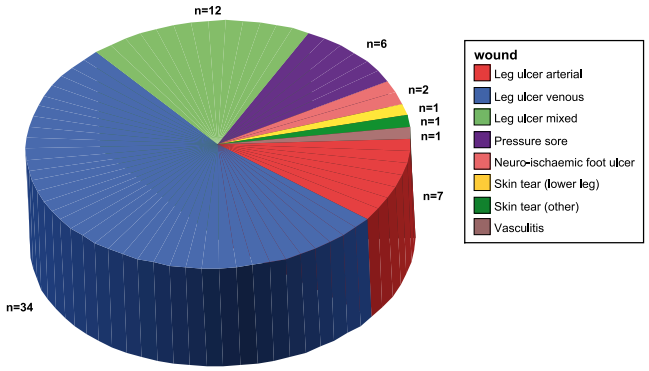

Figure 2. Types of wounds identified and treated in nurse led clinic

Wound aetiology

Wounds presented at the clinic comprised 53.1% (n=34) venous ulcers; 10.9% (n=7) arterial; 18.8% (n=12) mixed aetiology; 9.4% (n=6) pressure ulcers; 3.1% (n=2) neuro-ischaemic ulcers; 1.6% (n=1) skin tear lower limb; 1.6% (n=1) skin tear upper limb; 1.6% (n=1) vasculitic ulcer (Figure 2).

Healing rate for all wound aetiology

Excluding the seven individuals lost to follow-up, 64.8% (n=35) of all wounds healed during the review period and 35.2% (n=19) required ongoing management. Analysis of all wound aetiologies showed that 50% (n=27) of wounds healed within 12 weeks of the initial clinic assessment (Figure 3).

A breakdown of the various wound aetiologies indicated that

Medical and predisposing factors identified in clients	Percentage (total n varies with factor)
Medical history	
Diabetes	28.5
Hypertensive heart disease	57.1
Two or more comorbidities (including diabetes, arthritis, hypertensive heart disease or respiratory disorders)	42.9
Predisposing factors	
Allergies to various dressing products	35.7
History stripping varicose veins	35.7
Overweight	42.8
Past history of smoking	47.4
Multiple previous ulcers	50.0
Time of first ulcer (6 to >30 years)	50.0
Three or more predisposing factors	64.3
Mobility restriction	71.4
Aged >70 years	85.8

Table 2. Medical and predisposing factors identified in clients with unhealed wounds

67.7 % (n=21) of venous ulcers healed within the 12-month review period, followed by 63.6% (n=7) mixed-aetiology leg ulcers, 33.3% (n=6) arterial leg ulcers. All pressure ulcers, skin tears and the neuroischaemic foot ulcers healed.

Unhealed wounds

On 31 March 2006, at the end of the review period, 14 clients (9 females and 5 males) with 19 wounds remained unhealed. These comprised 4 (21.1%) arterial leg ulcers, 10 (52.6%) venous leg ulcers, 4 (21.1%) mixed aetiology leg ulcers, and 1 (5.3%) vasculitic leg ulcer.

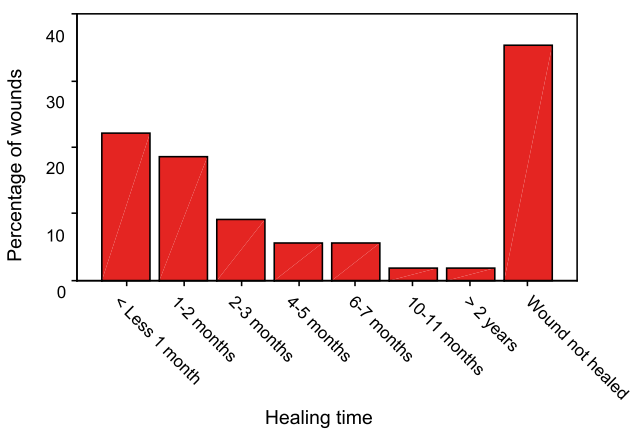

Figure 3. Healing time for all wound aetiologies following initial assessment

The comorbidities and predisposing factors of these clients with unhealed wounds varied and are outlined in Table 2.

Clients with unhealed wounds ranged in age from 60–89 years; 85.8% (n=12) were aged>70 years and 14.2 % (n=2) 60–69 years. Varying degrees of mobility restriction were identified in 71.4% (n=10) of clients with unhealed leg ulcers. For over one-third of these client, 35.7% (n=5), this was their first ulcer episode; one client had a previous history of a single leg ulcer and one a previous history of two leg ulcers. All individuals with unhealed wounds received a combination of wound clinic and domiciliary nursing services. In addition, 50% (n=7) were referred to either a vascular surgeon or other medical specialist as well as ongoing GP reviews. One person received podiatry and diabetic educator services.

The duration of unhealed wounds was 5 months for 26.3% (n=5) of clients; 4–12 months for 21.1% (n=4); 1–2 years for 15.8% (n=3); 3–4 years for 26.3% (n=5); and >5 years for 10.5% (n=2) .

Venous ulcers

There were 54.7% (n=29) of clients with 34 venous ulcers. The main causes of venous ulcers were trauma 44.1% (n=15);

unknown causes 38.2% (n=13); other causes 11.8% (n=4); surgery 5.9% (n=2). Just under half of all clients, 48.3% (n=14), with a venous ulcer had a previous history of multiple lower extremity leg ulcers. However, three clients were lost to follow-up and were not included in the following results. The review identified the outcomes for 26 clients with 31 venous leg ulcers. Following the initial assessment, 48.4% (n=15) of known venous leg ulcers healed within 3 months and 67.7% by 12 months (Figure 4).

All clients with venous ulcers received a combination of compression therapy, with 46.1% (n=12) wearing either compression hosiery or three to four layers of compression bandages that provided approximately 30–40mmHg of pressure. Another 26.9% (n=7) clients wore tubular stretch bandages, 11.5% (n=3) tolerated only light compression of approximately 20–30 mmHg, and 15.4% (n=4) of individuals tolerated no compression therapy.

At the end of the data collection period, 23.1% (n=6) clients with 10 venous ulcers remained unhealed. The duration of these ulcers was from <4 months to 3–4 years. Of the clients with unhealed venous ulcers, 66.7% (n=4) had three or more predisposing factors and 33.3% (n=2) had two predisposing factors comprising DVT, stripping and ligation varicose veins, obesity or mobility restrictions. Multiple previous leg ulcerations were identified in 83.3% (n=5) of clients with unhealed venous ulcers with the length of time since their initial ulcer ranging from 6 to >30 years. One client experienced their first episode of ulceration. All clients with unhealed venous ulcers received compression therapy and 33.3% (n=2) tolerated three to four layers of compression, and the remainder light compression only.

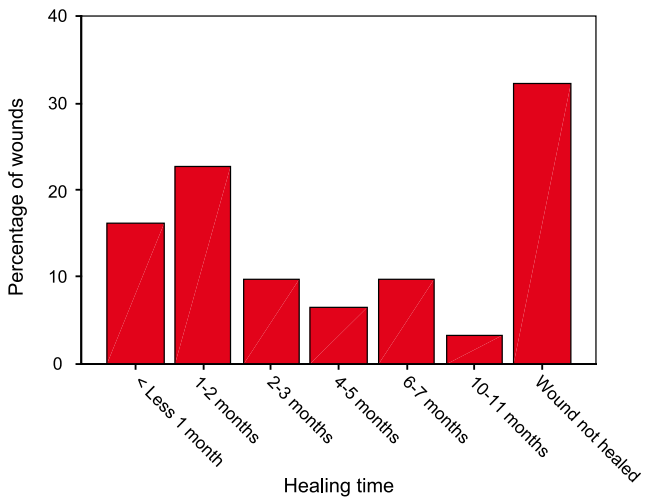

Figure 4. Heal time for venous ulcers following initial assessment

Discussion

A total of 53 clients attended the clinic on a weekly basis during the review period, but availability of the service was constrained by existing funding resources. Nevertheless, the results indicate that these clients were a complex population in terms of health problems and challenges to wound care. Impediments to wound healing included advanced age, presence of multiple comorbidities, extended duration of wounds, and prior history of leg ulcerations. This review found that 71.7% of the study population were aged >70 years. This supports the association between age, formation of leg ulcers and the development of chronic wounds reported in other studies [6-10]. The reduction in the number of clients aged >90 years is likely to be an artefact of a decline in the population figures for that age group, rather than a decrease in leg ulcer prevalence.

The relative proportion of persons aged >65 years continues to increase in Western Australia generally. In 2004, persons aged >65 years comprised 13.2% of Bunbury's population, compared to 12.8% in 2000 [11]. This relative growth reflects the increasing life expectancy of Australians, with women more than twice as likely to outlive males at age 85 years and over [12]. These statistics reinforce the importance of providing efficient, comprehensive and accessible services, especially for the management of elderly clients with chronic wounds, as they generally have multiple associated health problems and an increased incidence of leg ulcerations.

Studies demonstrate that patients with lower extremity wounds require a comprehensive assessment to obtain an accurate early diagnosis, identify prognostic factors, and optimise treatment and healing outcomes [13-16]. This review found that all clients who presented to the nurse led clinic with a lower extremity wound had a comprehensive lower leg assessment, which included an ABPI. Best practice recommends an ABPI measurement be obtained before treatment is commenced [14].

Excluding clients who were lost to follow-up, 50% (n=27) of all wounds healed at 12 weeks and 64.8% (n=35) at 12 months. These results are comparable to other studies [17,18]. The data for all wound types showed that 54.7% (n=29) of clients who attended the wound clinic were diagnosed with venous ulcerations. This frequency is within the range of 22-79% reported in studies in Australia and overseas [19-22]. The proportion of known healed venous ulcers in this study (48.4%) was comparable with statistics reported in other community leg-ulcer clinics at 3 months [9,23-25], and higher

than those reported by Castineira et al [26] and Morrell et al [27]. However, they were lower than another study, which reports a 69% rate of healing [21]. Franks & Moffatt [28] initially reported a 69% healing rate at 12 weeks, but after adjusting for known risk factors (ulcer size, ulcer duration, mobility, and ankle movement) a more modest healing rate of 56% was achieved. Carrington [29] reported a healing rate of 81% at 12 weeks, but did note report the number of clients treated, client demographics, ulcer history and comorbidities. An accurate comparison in healing outcomes between these various studies is difficult to make, due to differences in populations, client demographics and treatment practices.

Appropriate venous leg ulcer management is essential for improving healing rates. Numerous studies identify high compression therapy as preferred over low compression, and four-layer elastic compression bandages in preference to multilayer short stretch bandages [7,10,30-32]. Excluding clients who were lost to follow-up, this review found that over 53.8% (n=14) of all individuals diagnosed with a venous ulcer could not tolerate higher grades of compression therapy. Only 46.1% (n=12) of clients tolerated 30–40mmHg of compression bandaging or hosiery. A review of client documentation identified advancing age and associated degenerative knee and ankle conditions precluded many subjects from complying with higher forms of compression therapy. Conversely, client documentation noted that some individuals declined to consistently wear compression therapy, as it affected their social activity or was intolerable in hot weather. Studies have shown that where patient compliance with compression therapy is poor, healing rates are low and recurrence rates are high [33].

The overall healing rates achieved during the 12-month period for known clients (n=46) were 67.7% for venous ulcers, 63.6% for mixed aetiology, and 33.3% for arterial ulcers, while all pressure ulcers, skin tears and the neuroischaemic foot ulcers healed. This calculation excluded seven clients who were lost to follow-up. Therefore, the true percentage of healed ulcers may have differed. At the end of the data collection period 35.2% (n=19) of known wounds had not healed. However, the duration of these wounds varied considerably with 26.3% (n=5) present for 3–4 months and 36.8% (n=7) present from 3 to >5 years.

To assist with the identification of the aetiology of unhealed wounds, a duplex scan and/or biopsy had been requested and performed on 78.6% of clients. An analysis of those wounds that had not healed by the cut-off date identified 21.1% arterial (n=4), 52.5% venous (n=10), 21.1% mixed aetiology (n=4), and one vasculitic ulcer. An examination of unhealed wounds identified numerous factors that were associated with or potentially delayed and impaired healing, and contributed to the wounds chronicity.

In accordance with recommended standards designed to optimise healing outcomes, a multidisciplinary approach to client care had been adopted [34]. All clients (n=46) received a combination of wound clinic, domiciliary nursing and GP services, while 50% of clients with unhealed wounds were referred either to a podiatrist or to a GP (for subsequent referral to a vascular surgeon or specialist).

Nearly one-fifth of all clients (20.7%) presented to the clinic with a wound that had been present for between 6 months and 3 years. The majority of clients experienced leg ulcers for many months, while 41.5% (n=22) had a prior history that spanned >6 years. This may have affected the overall rate of healing reported for the clinic.

This study identified a number of important benefits aside from the healing rate. The comprehensive wound assessment, which included measuring the ABPI, identified a number of clients who subsequently benefited from a multidisciplinary approach to wound management. A number of clients (n=7, 13%) with varying aetiologies including mixed arterial leg ulcers (n=2), arterial-venous ulcers (n=2), venous leg ulcers (n=2), and vasculitic ulcers (n=1) were referred via the GP to a vascular surgeon. However, this result does not include another four clients who were lost to follow-up. Several other clients benefitted from a referral to a podiatrist (n=2) and medical specialist (n=3). Although the role of wound clinicians in improving client compliance was not assessed directly in this study, observations suggest that the informal environment of the clinic helped nurses establish a supportive and ongoing relationship with individuals, which facilitated numerous educational opportunities.

The results of this review are encouraging as the clinic demonstrated effective assessment practices and appropriate wound care, which ensured 50% of wounds healed within three months. The success of the nurse-led clinic is dependant on maintaining a collaborative relationship between all health practitioners and the ability to apply meaningful theory-practice links.

The retrospective nature of this review meant that quantitative evaluation of the size of the wounds, outcome of various treatment products and the cost of care could not be undertaken. A limitation of the review was the failure to assess the impact that medication (both prescription and non-prescription) had

on the overall rate of healing. In addition, a reliable assessment tool, such as the Charlson Comorbidity Index could have been utilised to help identify the individual comorbidity burden and its affect on the rate of wound healing [35]. It is the goal to incorporate such a tool in further reviews.

Conclusion

During the period 1 April 2005 to 31 March 2006 the Bunbury Wound Clinic managed a broad range of challenging wound types and achieved a standard of healing as good as, or better than, those reported in other studies. This suggests that the nurse led Bunbury Wound Clinic offers an invaluable adjuvant service to domiciliary nursing, general practice and hospital care for the provision of wound management. This study provides evidence that a nurse led clinic is a clinically effective service for managing clients with chronic wounds, especially in rural areas where limited health care services exist.

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