

Getting lower leg ulcer evidence into primary health care nursing practice: a case study

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ABSTRACT

Venous leg ulcers (VLUs) are open lesions on the lower leg caused by venous disease, which are associated with high morbidity and pose a challenge to manage effectively (Scottish Intercollegiate Guidelines Network, 2010). Gold standard treatment for VLUs is graduated compression therapy to aid venous return. This paper presents an approach to the challenging management of VLUs that is based on a problem, and subsequent local audit. We use a case study that illustrates a collaborative approach to determine gaps in evidence-based practice (EBP), and a nurse-led initiative in consultation with executive managers and doctors. In our sample, 40% of patients had not consulted a vascular specialist. They did not have a formal diagnosis of leg ulcer aetiology and therefore had not received optimum treatment. Access and cost were main factors impacting on leg ulcer care. Nurses providing evidence-based management of VLUs should ensure collaboration with key stakeholders. This assists in implementing diagnosis of ulcer aetiology for best practice measures. At this local health district, a change in policy to reflect EBP for VLU management in primary health care has been achieved.

What is already known

1. Evidence-based wound practice is an approach to patient care that integrates current information from research and local data, the expertise of clinicians and patient factors.
2. VLUs are a common wound in primary health care that pose significant issues for the patient, caregivers, nurses and specialists.
3. Graduated compression therapy is the 'gold standard' treatment for VLUs.

What this manuscript contributes

1. Best practice VLU care in primary health care is impeded by a number of factors, including cost, access to specialist medical consultation and primary health care resources.

2. A collaborative project by primary health care wound specialist nurses, an academic and a summer scholar, with time and expertise to undertake a project to investigate and address a problem, ultimately improved the quality of patient care.
3. A hand-held Doppler should be available to wound specialist nurses in primary health care to aid assessment and management of venous leg ulcers.

INTRODUCTION

Venous leg ulcers (VLUs) are defined as an open lesion between the knee and ankle joint, that remains unhealed and occurs in the presence of venous disease^{1,p.1}. VLUs are chronic and reoccurring wounds caused by venous valve incompetence². VLUs are the most common ulcer presentation in primary health care³.

The incidence of VLUs increases with age, between 1.5 and 3/1000 people aged 65 and below and increasing to 20/1000 people over age 85³. With an ageing population, the prevalence of VLUs has the potential to be greater⁴⁻⁶. Such an increase presents challenges to both patients and clinicians.

Chronic wounds cause considerable financial impact on health services, with costs crudely estimated as A\$2 billion in Australia⁷ and between £168 and 600 million in the United Kingdom⁸. Specifically, for chronic lower leg ulcers, estimated management costs are 6.5–7 million euros/year in Ireland alone⁹.

Assessment of any ulcer and accurate diagnosis of aetiology is critical to developing a management plan that achieves optimum outcomes for patients. Efforts should focus on developing strategies to identify, assess and ensure nursing practice and treatment is underpinned by evidence¹⁰ in order to provide better value care.

VLUs impact considerably on patients and cause a substantial health burden. The impact on patients include symptoms for the patient, described as 'pain-fatigue cluster', comprising fatigue, sleep disturbance, depression and pain in the legs; and secondly, 'inflammation cluster', comprising fatigue, swelling, inflammation of the legs and exudate from ulcers¹¹. Together these symptoms cause reduced quality of life (QoL)¹⁴. Individuals experience pain¹² and have restricted mobility¹³. They may become socially isolated, with a high incidence of anxiety and depression^{13,14}. Personal financial costs are also described¹⁵. Recurrence of VLUs presents a significant challenge. VLU recurrence in one study in Australia involving 67 participants was 44% at 12 months with median breakdown at 27 weeks¹⁴. Recurrence from 52% to as high as 70% in international studies have been reported^{12,16,17}.

The care of patients with VLUs presents a challenge for clinicians, creating a substantial workload for nurses that is physically demanding. For example, two nurses are often required to provide wound care: one nurse to hold the

patient's leg whilst the other nurse undertakes the dressing. Often this is because the patient's legs are too heavy for them, or the nurses to lift, commonly due to oedema. As well as physical demands, Posnett *et al.*⁸ state that a considerable emotional burden falls on nurses, particularly when wounds such as VLUs are slow or fail to heal. Nurses who provide wound management for patients with VLUs may feel a sense of hopelessness due to slow healing, despite wound management strategies. They may also feel less optimistic and less confident in their approach to leg ulcer care^{18,19}.

VLUs can be assessed and managed by nurses in a variety of primary health care (PHC) settings, in specialist wound, vascular or leg clinics and leg clubs (evidence-based community clinics treating patients with leg ulcers)^{20,21}. In a recent systematic review of 17 studies, the impact of Leg Clubs on patients, despite variable study quality, noted positive outcomes on the individual's mood, sleep and quality of life. Faster healing and less recurrence of leg ulcers were also described²².

Ankle brachial pressure index (ABPI) measurement and graduated compression therapy are two key evidence-based measures in VLU care. ABPI is a non-invasive vascular screening test that can be carried out with a hand-held Doppler to exclude peripheral arterial disease (PAD) (a vascular condition due to narrowed arteries and associated with high morbidity and mortality) by comparing systolic blood pressures in the ankle to the higher of the brachial systolic blood pressures²³. The ABPI value determines the severity of PAD, which guides best assessment, and management of VLUs. For example, an ABPI of between 0.8 and 1.2 means that therapeutic graduated compression therapy of the legs is needed, whereas an ABPI of less than 0.5 indicates that graduated compression therapy should be avoided and urgent specialist review is required. For ABPI between 0.5 and 0.8 caution is required and specialist review should be recommended²⁴. If PAD has been excluded and venous aetiology is confirmed, then graduated compression therapy is the gold standard treatment for VLUs known to improve healing rates^{12,25}.

VLU guidelines clearly state that appropriately trained clinicians can undertake ABPI measurements and apply graduated compression therapy^{1,25-28}. The ABPI has high sensitivity and specificity and its accuracy in establishing the diagnosis of PAD has been well supported²⁹. However, the implementation of this as part of best practice of VLU management can be challenged by shortage of resources, both a lack of knowledge of best practice and how to identify and address a gap in practice³⁰⁻³². Implementing evidence into practice has been reported to take between eight and 30 years³³. This time lag can result in gaps in clinical care.

In this paper, we use a case study approach to describe a collaborative of PHC nurses specialising in wounds, an academic and a summer scholar (a pre-registration nursing student on a scholarship to gain research experience) in one

Australian local health district (LHD). They combined time and expertise to undertake a project which confirmed a gap in evidence-based practice (EBP). This paper also describes the robust response to the findings by managers in the LHD.

SETTING

The LHD is in a high-density, inner-city district that contains three acute public hospitals, one sub-acute public hospital, and five PHC centres, with a large, diverse population of almost 700,000 people³⁴. The PHC nursing team, which is spread across five geographically located PHC centres, had one consultant nurse and two nurses with specific interest and expertise in wound management. In this paper, they are communally referred to as wound specialist nurses (WSNs). In February 2017, this PHC nursing team had 596 existing patients. During the study period, an additional 418 new registrations resulted in a caseload of 1014 patients. Of these, 248 existing patients had chronic leg ulceration and a further 36 new admissions with lower leg ulcers (LLU) comprising 26% of the whole PHC nursing caseload³⁵.

Of the audited patients (n=96) seen by the LHD WSNs, 62 patients had a leg ulcer that has either been recurrent or that lasted for multiple years. Visits made to the audited cohort of patients ranged from 1 to 328 visits, with average length of visit by nurses ranging from 5 to 80 minutes. All patients in the LHD were required to have a vascular specialist doctor review to confirm diagnosis of VLU and to confirm suitability for graduated compression therapy²⁹. The LHD policy did not include WSNs to perform an ABPI, nor initiate graduated compression therapy³⁶. The WSNs believed this was not in line with best evidence. Before reviewing the LHD policy, the WSNs wanted evidence that included current literature and local data on management of patients with VLU.

CASE STUDY

Claudia is a 69-year-old female with bilateral chronic leg ulcers of undiagnosed aetiology (Figure 1) and unmanaged exudate. Claudia is on the pension (a regular nominal payment made by the Australian Government to people of retirement age), has no family support and had reduced mobility due to her leg ulcers, further compounded by several steps to the entrance of her house, which she was unable to navigate. She had good pedal pulses and bilateral leg oedema that was suspected to be due to venous insufficiency.

Claudia required two registered nurses for each visit to provide treatment. She had two visits per week of approximately 30 minutes per visit. These visits were over a period of eight months, with the PHC nursing team maintaining, but not actively treating her ulcers. Although venous insufficiency was the likely cause of her ulcers, she had been unable to access the vascular specialist, and the aetiology of her ulcer had not been confirmed. Hence an inability to commence graduated compression therapy under the current LHD policy. Her leg ulcers often required expensive antimicrobial dressings due to recurrent ulcer infections. Her ulcers could



Figure 1: Claudia's venous leg ulcers

have healed in a shorter period of time should she have been able to have ABPI assessment and commence graduated compression therapy. In Australia, the cost of a vascular specialist appointment is A\$150–300, depending on required investigations and ongoing treatment. For Claudia, this was an impossible cost being on the pension. In this LHD, there is no cost to the patient for either nursing visits or dressings.

In addition to the cost, immobility and other factors significantly impeded Claudia's ability to attend her other appointments, such as physiotherapy and occupational therapy. Other factors included the oedema in Claudia's legs and the exudate from her ulcers, known as "heavy legs". The nursing team would often arrange community transport for her to attend appointments, but without reducing the exudate, Claudia could not attend any appointments. Claudia was faced with multiple barriers to best practice: immobility, the cost of vascular specialist and social isolation. Claudia's QoL was reduced, and her ulcers remained unhealed.

COLLABORATION WITH WOUND SPECIALIST NURSES AND ACADEMICS

Concern was expressed by the WSNs about Claudia's unconfirmed diagnosis and sub-optimal treatment, so the collaborative undertook a project. The aim was to establish the evidence base and "a clear picture" of the current state of VLU practice in the LHD. The stages of the project included: 1) preparing for an audit; 2) literature review of best available evidence; 3) audit data to determine the evidence–practice gap; 4) making improvements; and 5) sustaining the change.

Stage 1: Conducting a case note audit

Stage 1 consisted of an audit. The audit had received research ethics approval (AU/6/6B6C25) and was carried out in accordance with the Declaration of Helsinki requirements³⁷. In stage 1, it was important to identify the problem. In this example, Claudia's current challenge included multiple barriers to best practice VLU management, such as immobility, no confirmed diagnosis, her inability to attend physiotherapy and occupational therapy, and social isolation, all leading to poor QoL.

Stage 2: Literature review of best available evidence

In stage 2, we determined what would be measured and what VLU “gold standards” were available to inform EBP and to add clarity and transferability. A search and review of the literature on VLU guidelines was undertaken. The databases searched were CINAHL, PubMed, Medline and Cochrane Library, and grey literature such as professional association websites. Search terms included nursing assessment, Doppler, ABPI and venous leg ulcer. This enabled the collaborative to ascertain best practice. To enable an overview of developing best practice leg ulcer care, no date limits were applied. Some VLU guidelines were found in the search; others were found through specialist nurse knowledge or through professional association websites (Table 1).

Stage 3: Determining the evidence–practice gap

In order to determine the evidence–practice gap in the LHD we collected data from a simple case note audit and compared LHD performance with the VLU guidelines and best practice literature from stage 2. Data were collected from the electronic medical records (eMR). The audit tool had questions relating to demographics such as age and sex; VLU history, recurrence, and time on caseload; wound

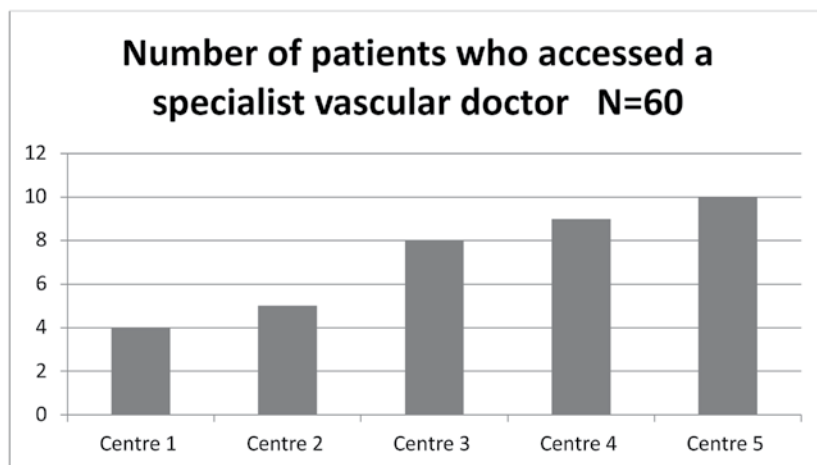
details; total nursing time in minutes; ulcer type, nicotine history, diet, history of deep vein thrombosis (as a pre-disposing factor); co-morbidities; English as first language (which has the potential to impact on understanding medical terminology); pensioner or health care card holder; whether seen by a vascular specialist; living alone or housebound; pre-disposing risk factors; and social factors. This tool was developed by the WSN and pilot-tested on the records of five patients to see if the required information could be extracted from the eMR. Information that could not be found in the eMR was removed from the tool. These variables were selected because they provided context to the clinical picture of patients with LLUs as well as direct information to help address the practice gap. The authors wanted to ensure a standardised approach to auditing to increase rigour³⁸. Therefore, every fourth set of case notes was audited. The ‘snapshot’ audit took place in July 2017, examining patient records who were on the caseload in February 2017. Data were entered into SPSS 20 and descriptive statistical analysis was undertaken.

Findings from the audit: An audit on patients with a lower leg ulcers was undertaken. Undertaking the audit in a PHC setting offered a profile of these patients in the LHD that

Table 1: Published guidelines for assessment and management of chronic leg ulcers (2010–2017)

Guideline	Country	Date	Assessing/Diagnosing
Scottish Intercollegiate Guidelines Network <i>Management of chronic venous leg ulcers: A national clinical guideline</i> ²⁸	Scotland	2010	Measurement of ankle brachial pressure (ABP) should be performed by appropriately trained practitioners who should endeavour to maintain their skills, p. 12
<i>Australian and New Zealand Clinical Practice Guidelines for Prevention and Management of Venous Leg Ulcers</i> ²⁷	Australia and New Zealand	2011	A health professional trained in the assessment and management of VLU should conduct a comprehensive assessment of all patients with a leg ulcer. A comprehensive assessment should include: <ul style="list-style-type: none"> • Clinical, pain and leg ulcer history • Examination of the leg and ulcer • Investigations to support diagnosis, p. 7
Association for the Advancement of Wound care (AAWC) <i>Venous Ulcer Guidelines</i> ²⁹	USA	2013	Trained professional can provide differential diagnosis: <ul style="list-style-type: none"> • Ankle brachial index pressure (ABPI)
Wound, Ostomy and Continence Nurses Society <i>A quick reference guide for lower extremity wounds: venous, arterial and neuropathic</i> ³⁰	USA	2013	Assessment: non-invasive vascular tests (ABPI), p. 7
Wounds UK <i>Best Practice Statement: Holistic Management of Venous Leg Ulceration</i> ¹³	UK	2017	All patients require a thorough, holistic assessment — this is the responsibility of the nurse Checklist for leg assessment: ABPI, p. 8

Figure 2



undertake ABPI, nor initiate graduated compression therapy³⁶.

The data demonstrated a gap in evidence-based care. Of the 96 cases audited, 36 patients were new admissions so were removed from the audit, as they may not have had time to access a vascular specialist. Of the remaining, 60 patients, 40% (24/60) had not accessed a vascular specialist (Figure 2). These patients did not have a formal diagnosis of leg ulcer aetiology and hence did not receive the gold standard VLU treatment, that is, graduated compression therapy^{27,40}. Of patients with LLUs who had not accessed a vascular specialist, 66% (40/60) were on a pension. This was

included prevalence. Ninety-six sets of notes were audited. This represented a quarter of eligible case notes. Of the PHC caseload in February 2017, 28% comprised patients with LLUs and in line with existing literature, the majority (86%) of those with a diagnosis had venous ulcers³⁹.

statistically significant ($p < 0.001$) and highlighted reduced equity and access. Analysing this data further, centres with patients of lower socio-economic status accessed specialist review least.

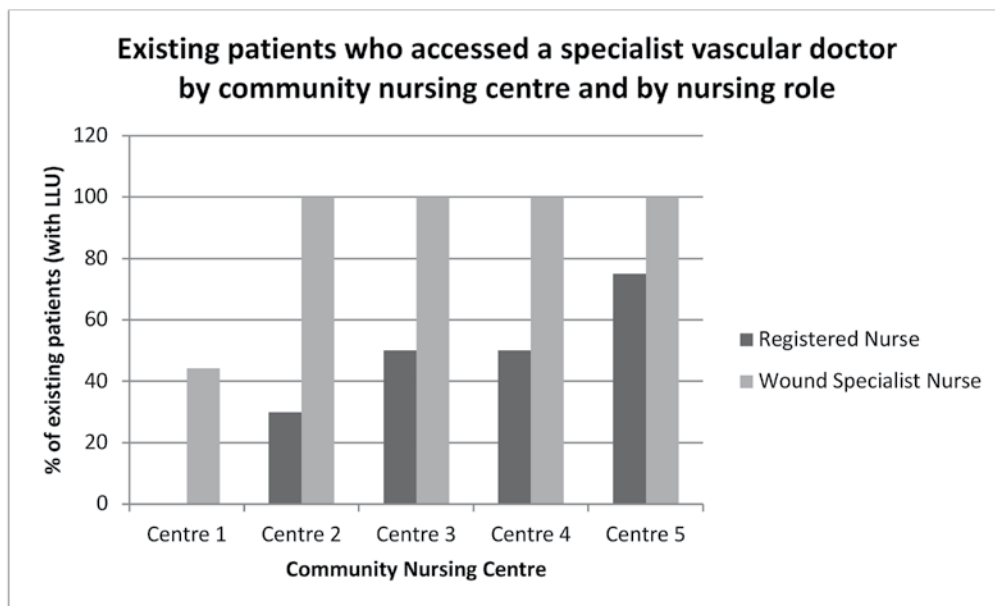
Pre-audit, the process for diagnosis of VLU aetiology in this LHD was through a doctor, nurse practitioner (NP) or a vascular specialist. For patients living in their own homes, a vascular specialist review was conducted in private consulting rooms. The cost for this review could vary in excess of A\$200 which meant that for people like Claudia, many patients were unable to pay. Like Claudia, several patients (36/96) were also housebound or had limited means of transport, making access difficult. Our LHD policy did not cover WSNs to

The audit highlighted further influences on care. The number of existing patients who had accessed a vascular specialist was influenced by the primary health care nurse role. Patients were more likely to have accessed a vascular specialist if they had been reviewed by a WSN rather than a registered nurse ($p = 0.008$) (Figure 3).

Stage 4: Making improvements

The fourth stage of this project explored making improvements by implementing EBP. Results from the audit highlighted a

Figure 3



gap in evidence-based care due to lack of access to vascular specialist. The findings were presented at a quality and research conference. This conference had approximately 100 nurse and executive delegates. A report of the findings³⁵, which compared this LHD results and best practice national and international guidelines, was subsequently disseminated to the management team of PHC services. The WSNs prepared a submission to executive managers to secure funding for three Dopplers to aid assessment of housebound clients such as Claudia. For management of VLUs and improvements in service delivery, changes were made to the LHD policy on "Graduated Therapy Compression in Venous Disease", to allow WSNs to assess and authorise graduated compression therapy⁴¹.

The WSNs collaborated with the local vascular specialist doctor to discuss ways to improve the service for patients with VLUs in the community. A free LLU clinic in one PHC centre with bulk-billing services is planned. Bulk billing means that patients do not have to pay a fee for consultation as the payment is met through Medicare (publicly funded by the Australian Government).

Stage 5: Sustaining change

Stage 5 ensured the improvements we made in the LHD were going to be sustained. An annual audit will be conducted by the WSNs. A repeat audit is planned for February 2020. This audit and ongoing audits will be conducted by the collaborative to assess the impact of changes on practice and outcomes for people like Claudia who had been receiving sub-optimal treatment.

DISCUSSION

This paper presented a staged approach to establishing best available evidence and treatment options for patients with VLUs. Findings from our approach confirm that challenges of translating best evidence into practice can be overcome by auditing, exploring current research and working in collaboration. Establishing evidence, prior to implementing strategies is key to maximising outcomes for patients. Further, our team used a collaborative approach with nurses, student nurses and academics to identify and address the evidence–practice gap.

An audit provided data, which led to greater understanding of a problem and provided opportunities to resolve a gap in practice with the potential to improve the quality of care, in part by applying the PHC principles of equity and access^{41–44}. Results highlighted a lack of diagnosis of leg ulcer aetiology, resulting in sub-optimal treatment of patients with VLUs. Across all five centres, there was an inequity for patients who were receiving a pension, as they were less likely to have accessed a vascular specialist, due to financial constraints. This led to sub-optimal treatment when measured against national and international guidelines.

This study was presented by the WSNs to the LHD executive team, which led to discussions with management and

vascular doctors about the ability of WSNs to diagnose ulcer aetiology. In line with the VLU guidelines^{1,25–28}, WSNs have the skills and knowledge to assess and manage VLUs. This would potentially improve the standard of care for patients with VLUs in the PHC and bring the issues of both equity and access in line with the World Health Organization principles of PHC^{42–44}.

PHC focuses on integrated care that is accessible to all patients, is socially acceptable, evidence-based, and provided by a suitably qualified workforce⁴⁵. PHC promotes independence at a personal and community level, striving to address and minimise issues regarding inequality while supporting those with the greatest need. This is achieved through collaboration across health sectors⁴⁵. Undertaking this study has facilitated a greater collaboration between services, underpinned by guiding principles of equity, access, empowerment, self-determinism and inter-sectoral collaboration, improving outcomes for patients with VLUs. Collaboration between hospital, PHC and the university is seen as improving both patient experience and treatment for VLUs⁴⁶.

Furthermore, in this study we found that patients were much more likely to have consulted a vascular specialist if they had been seen by a WSN. In this LHD, there is currently no direct referral process for a patient in primary health care to see a vascular specialist. The positive impact on patient outcomes from the combination of expertise of a vascular specialist and advanced nurse, such as the WSN involvement is safe, acceptable, cost-neutral and contributes to improving the patient and family experience⁴⁷. Tsiachristas *et al.*⁴⁸ report that advanced NP roles such as WSNs improve access to care, provide patient information, increase satisfaction of patients and relatives, all leading to positive clinical outcomes, improved quality of care and health care utilisation. However, advanced nursing roles, such as WSNs may be impeded by a lack of clarity in boundaries and levels of practice which are, at times, individually and contextually constructed⁴⁹, and as such, are an untapped health care resource⁵⁰. Under-diagnosis, as noted in this audit, could be rectified by a protocol based on national and international guidelines. EBP results in both a reduction in health care costs and better patient outcomes⁵¹.

Staff engagement and organisational factors such as budget and stakeholder buy-in, could impact on implementation and should be addressed to recommend a strategy to overcome such factors. Undertaking an audit provided clear and concise local data⁵². Clinician-led improvement projects are associated with stronger efficacy and larger effect sizes than those that are manager-driven⁵³. This highlights the importance of nurses and other health care professionals initiating and being involved in projects similar to this.

This audit was initiated following nurses' identification of a problem with Claudia to improve care provided to patients like Claudia. The findings from this audit provided data

which confirmed evidence that there were substantial issues with equity and access for patients living in this LHD with LLUs. This impacted on VLU outcomes such as the case demonstrated by Claudia. Response from the district has been the supply of portable Doppler for WSNs to perform ABPI and to identify aetiology and commence graduated compression therapy. For Claudia this meant she was able to have a formal assessment of her legs undertaken by the WSNs. She commenced on graduated compression therapy and, as a result, her VLU healed within five months.

LIMITATIONS

The audit examined a small number of patients with an LLU. The small sample sizes meant reduced power and effectiveness of statistical tests.

CONCLUSION

This paper describes a case study, which led to a collaborative of WSNs, an academic and a summer scholar to undertake a study comprising five stages which addressed an identified problem with VLU care in PHC. The findings from this study highlighted gaps in EBP that affected quality care. This was addressed by implementing VLU best practice evidence into PHC in one LHD. The audit offered an opportunity to address practice gaps and allow the LHD to re-align itself with EBP. This process has changed policy to ensure patients living with VLUs have access to appropriate diagnostic services and the best available treatment.

IMPLICATIONS

It is a timely reminder that, despite the availability of clinical guidelines, EBP may not be followed. An audit provided evidence of which elements of care are effective and where there are gaps in practice, identifying where quality improvements can be made. Our study confirmed that an audit provided data and, combined with current EBP, literature can empower clinicians to seek and sustain change.

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CONFLICT OF INTEREST

There are no conflicts of interest for any of the authors.

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