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Managing chronic oedema and wet legs in the community: a service evaluation

Thomas M, Morgan K, Humphreys I et al (2017) Managing chronic oedema and wet legs in the community: a service evaluation. Nursing Standard.

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Conflict of interest

[Q do you have any conflicts of interest to declare?]

Peer review

Online

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Abstract

[Q abstract restructured in accordance with our house style for research articles – please check this is ok]

The number of patients with chronic oedema seen in the community setting [Q in the UK?] is increasing, with research indicating that more than half of the workload of community nurses is patients with chronic oedema and ‘wet legs’. However, a lack of nurse education and standardised care pathways for this condition has been identified. In June 2016, the Welsh Government supported the development of the ‘On the Ground Education Project’ (OGEP), which aimed to raise staff awareness and recognition of chronic oedema and wet legs, to improve the management of this condition and to support the efficient use of community nurses’ time and resources.

Aim The aim of this pilot service evaluation was to investigate the economic effects of the OGEP and its effects on patients’ quality of life.

Method The OGEP was implemented between June 2016 and March 2017. During this time, 725 patients were assessed and chronic oedema was diagnosed in 56% of them. Of these, 100 patients were purposively recruited and 97 completed the pilot service evaluation. Data were collected observationally before and after the OGEP was implemented. Baseline measurements of resources, costs and outcomes were captured at the time the patients were initially identified and at a follow-up review three months later. The EQ-5D-5L tool was used to measure patients’ health-related quality of life. Data were analysed in Microsoft Excel and SPSS Version 22.

Results There was a significant decrease in the number of district nurse home visits post-OGEP ($P < 0.001$), GP surgery appointments ($P = 0.003$) and number of episodes of cellulitis ($P < 0.001$). The EQ-5D-5L utility scores showed that patients’ quality of life improved, from a baseline of 0.401 (SD 0.254) to 0.537 (SD 0.231) at the three-month follow-up review.

Conclusion The OGEP may support the efficient use of community nurses’ time and resources, reduce costs to the NHS, and improve the quality of life of patients with chronic oedema and wet legs.

Keywords

cellulitis, chronic oedema, community care, lymphoedema, management of lymphoedema, oedema, research, wet legs

CHRONIC OEDEMA IS a term used to describe the presence of swelling that has been present for at least three months (Williams and Craig 2007). This swelling can occur in any part of the body (Moffatt et al 2003), but is most frequently seen in the lower limbs because of the effect of gravity. Figure 1 shows an example of a patient with chronic oedema. Much confusion exists between the definitions of chronic oedema, oedema and lymphoedema. Mortimer and Rockson (2014) asserted that all chronic oedema is caused by failure of the lymphatic system.

Figure 1. Patient with chronic oedema



[Q What is the source of the images in Figure 1 and 2 – are they your own? Who holds the copyright?]

The lymphatic system has three main functions: it preserves fluid balance within the body; it has an important role in the body's defence mechanism; and the intestinal lymphatics are responsible for fat absorption (Mortimer and Rockson 2014). The lymphatic system can fail as a result of an overload of [Q interstitial?] fluid, caused by microvascular filtration or a transport capacity alteration such as surgical removal of the lymph nodes. **Previously, absorption of 90% of the interstitial fluid was thought to exist [Q occur?] at the venous capillary end; however, this is now known to be directly linked to lymphatic drainage [Q is further explanation of this necessary here - would most nurses know what interstitial fluid is referring to here and its relevance to the lymphatic system? Also please add a reference for this sentence].** Mortimer and Rockson (2014) recommended that the presence of chronic oedema should be considered as synonymous with the presence of lymphedema, since all oedema represents relative lymph drainage failure.

[Q could a definition of 'wet legs' be added here, and how it relates to chronic oedema – is it a complication of chronic oedema or a separate condition? And could the more formal name 'lymphorrhoea' be used?]

Background

Chronic oedema and wet legs are frequently encountered in the community setting (For-Szabo and Ralph 2017), as a result of factors such as an ageing population, obesity, inactivity and people living with multiple comorbidities. Research has indicated that **up to 68% of community nurses' caseloads are patients with chronic oedema [Q please confirm this figure is correct – is this 68% all community nurses? If so, this seems very high!]** (Moffatt 2017). Chronic oedema and **leaking legs [Q is this the same as wet legs? If so, suggest changing to wet legs for consistency]** can have a significant and long-term effects on patients and can affect a range of outcomes, with potential physical, psychological and social effects on their health (Sneddon 2008, Watts and Davies 2016). Managing chronic oedema can be a considerable financial burden to the NHS as a result of repeated hospital admissions, inappropriate use of dressings and nursing time (Moffatt et al 2003). There is limited national guidance on the management of chronic oedema and wet legs in the community. While best practice guidance is available on compression therapy, they are **not unique to [Q not specific to ?]** managing wet legs in chronic oedema (Lymphoedema Framework 2006, International Lymphoedema Framework 2012, Wounds UK 2015) and they do not provide practical guidance for community nurses.

As a result of the lack of knowledge and understanding of chronic oedema, it is frequently unrecognised, resulting in diagnostic delays and, in some cases, inappropriate treatment (Thomas and Morgan 2017). In the combined UK

community nursing **LIMPRINT study** [Q what is the reference for the LIMPRINT study – have its finding been published anywhere in addition to being reported at the conference?] from Nottingham City, Nottingham West and Leicester the overall presence of chronic oedema was **56.7%** [Q what is the number of patients for this percentage – XXXX out of 2,541?] of a population of 2,541 patients. The presence of a wound, heart disease and being obese were potential risk factors for chronic oedema (Moffatt 2017). Further research from Derby of a sample of 32 patients with chronic oedema found that **50%** had leg ulceration, with **31%** [Q what are the numbers of patients for these percentages?] having an ulcer for more than five years (Moffatt and Pinnington 2012). Secondary complications of chronic oedema include repeated cellulitis, requiring hospital admissions and referrals to additional services including vascular, tissue viability and dermatology services (Lewis and Morgan 2008). Conservative estimates indicate that chronic wound expenditure is around **£2.3-3.1 billion per year** (Posnett and Franks 2007) [Q are there any more up-to-date figures that could be provided for this?]. Furthermore, Guest et al (2017) stated that the annual NHS cost of wounds management and associated comorbidities is an estimated £5.3 billion, and found that there were around 10.9 million community nurse visits for wound management. They further suggested that there would be clinical and economic benefits of improved systems of care and education. Relevant nurse education, proactive care and effective management of chronic oedema would significantly improve the quality of care and reduce costs to the NHS (NHS RightCare 2017).

Throughout Wales, **lymphoedema services** [Q which include the care of chronic oedema?] are managed under Lymphoedema Network Wales. Although a chronic oedema course for community nurses in Wales has been developed [Q by Lymphoedema Network Wales?], this had a low attendance because of the nurses’ work demands. However, Lymphoedema Network Wales considered that implementing care centred on patients’ needs could improve outcomes and the patient experience, as well as reducing waste, harm, and **variations** [Q are these variations between individual nurses/staff, or between community services?] in prescribing dressings and compression bandages or garments (Lewis and Morgan 2008).

Developing an innovative solution for the management of patients with chronic oedema has the potential to provide cost-effective and high-quality care. In June 2016, the Welsh Government supported the development of the ‘On the Ground Education Project’ (OGEP) through their Health Technologies and Telehealth Fund. The aim of the OGEP was to raise staff awareness and recognition of chronic oedema and wet legs, to improve the management of this condition and to support the efficient use of community nurses time and resources. **The OGEP consisted of** [Q a lymphoedema clinical educator?] **working daily with each community nurse** for at least three days, identifying patients with chronic oedema **and at risk** [Q does this mean identifying those at risk of developing chronic oedema? If so does this mean that not all of the patients recruited had a diagnosis of chronic oedema?] **and discussing** [Q best practice for its?] **evidence-based management**, as shown in Table 1. Support and time for [Q facilitated?] reflection was a vital part of the OGEP in enabling discussion and exploring challenges related to current practice. **Competencies in compression management were achieved** [Q by the community nurses?] within the nine-month programme.

Table 1. Assessment and management [Q assessment is not mentioned here – suggest changing the table title to ‘Management interventions implemented in the OGEP’ ?]	
Skin care	Daily washing drying and application of emollients advised for all patients with or without [Q chronic?] oedema
Movement and exercise	All patients were given simple exercises to complete on a daily basis this included toe tapping, knee extension

	and flexion. This was supported by written leaflets and being prescribed a video film
General advice on sleeping arrangements	All patients were advised on the importance of going to bed for a minimum of 6-8 hours every day. If patients were unable to go to bed, the cause was investigated and the patient was signposted for support. If the patient continued to decline to go to bed then advice was given to elevate the legs as well as increasing the frequency of exercises
Compression	<ul style="list-style-type: none"> • All patients with [Q chronic?] oedema and intact skin were assessed for their suitability [Q for compression?] and fitted with Class 1 compression garments • Patients with wet legs and chronic oedema were managed using The Chronic Oedema 'Wet Leg' (Lymphorrhoea) Pathway (Lymphoedema Network Wales 2017) • Patients with chronic oedema and chronic wounds were managed through referral and collaboration with the tissue viability service team
Cellulitis	All patients with chronic oedema and cellulitis were treated promptly as per cellulitis consensus guidance (British Lymphology Society and The Lymphoedema Support Network 2016) Patients who had recurrent episodes of cellulitis and chronic oedema were referred to the GP to commence prophylactic antibiotics as per consensus guidance (British Lymphology Society and The Lymphoedema Support Network 2016)
Fungal infections	All patients with fungal infections were treated promptly as per consensus guidance (British Lymphology Society and The Lymphoedema Support Network 2016)

This article discusses the results of a pilot service evaluation exploring the use of the OGEP to improve education and support proactive service delivery for patients with chronic oedema and wet legs.

Aim

The aim of the pilot service evaluation was to investigate the economic effects of the OGEP and its effects on patients' quality of life.

Method

The pilot service evaluation commenced in June 2016 in Cardiff and Vale University Health Board, where two lymphoedema clinical educators **were employed to work directly with community nurses [Q where were the community nurses based - which service(s), and how many were involved in the OGEP?]** for a nine-month period. An observational study design was used. Baseline measurements of the use of resources, costs and outcomes for these patients were captured at the time they were initially identified, before the OGEP, and at a follow-up review

three months later. All patients were purposively selected and recruited by **the OGEP team [Q who were the OGEP team – how many people and what were their professional roles/job titles?]**, based on their assessment to needing chronic oedema management.

Data collection was undertaken by the two lymphoedema clinical educators as part of their role. Assessment and management of chronic oedema were captured using the **modified Lymphoedema Network Wales assessment tool [Q is there a reference that could be provided for this tool?]**. This enable in depth examination of the potential effects of the OGEP without manipulating the service conditions, thus ensuring the evaluation remained grounded in a real-world context from the outset.

The Cardiff and Vale University Health Board research and development department deemed the pilot to be a service evaluation. The College of Human and Health Sciences, Swansea University obtained ethical approval to obtain and analyse anonymised data from the OGEP team. All data forms were transferred into a Microsoft Excel spreadsheet by the OGEP team and given to the university for analysis. The OGEP team administered the EQ-5D 5L (EUROQOL 2017) at baseline and at the three-month follow-up review. The EQ-5D 5L is a health-related quality of life tool used to capture patient-reported outcomes. Initially, patients are asked to report on their general health state concerning their mobility, self-care, usual activities, pain/discomfort and anxiety/depression on a scale of five levels from ‘no problems’ to ‘extreme problems’. Each of these scores converts into an individual utility score that represents a patient’s quality of life, and can be used for health economic evaluation to estimate quality-adjusted life years (QALYs). A Visual Analogue Scale distress thermometer **[Q was the EQ VAS included as part of the EQ-5D 5L?]** was also used, in which patients are asked to give a self-rated score of their health today on a scale of 0 (the worst health you can imagine) to 100 (the best health you can imagine).

[Q was consent required from patients to participate in the study?]

All data were fully anonymised and entered into a Microsoft Excel spreadsheet. The OGEP team were responsible for data cleaning checks. To determine costings, the district nurse home visit was averaged at 30 minutes based on time spent with the patients. For all other healthcare expenditures, published sources were used (Department of Health 2015, British National Formulary 2017). The data analysis was undertaken in Microsoft Excel and SPSS Version 22.

All patients identified were assessed using a **standardised form [Q was this the modified Lymphoedema Network Wales assessment tool mentioned earlier?]**, and their management was based on four cornerstones of lymphoedema treatment: skin care, movement and exercise, compression therapy, and massage (International Lymphoedema Framework 2012). Table 1 shows the assessment and management interventions provided for all patients **[Q with chronic oedema who received the OGEP ?]**, depending on their needs.

Results

The OGEP commenced in June 2016 and was completed in March 2017. A total of **725 patients** were assessed **[Q by whom? The community nurses or the clinical educators?]** during the nine-month study **[Q were these all in the first six months of the study, to enable time for the 3-month follow up to be completed?]**. Chronic oedema was diagnosed in **426 (56%) [Q please check these figures are correct - 426/725=58.7% ?]** of these patients. Of the 426 patients with chronic oedema, 100 were recruited into the pilot service evaluation. Three participants died during the study, thus the three-month follow-up review was not completed. Therefore, 97 participants were included in the data analysis. Of these, **65% were female and 35% were male [Q please add the number of patients for each of these percentages]**, and their ages ranged from 41 to 99 years, with a mean age of 83 years. The agreed intervention costs covered the staff resources associated with the delivery of the OGEP. The two band seven clinical

educators (1.6 whole time equivalent) spent 40% of their time on [Q implementing?] the OGEP, thus the costs were calculated at £35,812 or £358 per patient (Personal Social Services Research Unit 2016).

As can be seen in Table 2, there was a significant decrease in the number of district nurse home visits post-OGEP as well as GP surgery appointments, number of episodes of cellulitis and hospital admissions for cellulitis. Although the *P* values recorded are statistically significant at $P < 0.005$, caution should be taken given the small numbers in some of the categories. Nevertheless, there was an observed trend in reduced use of resources between the baseline and the three-month follow-up review.

Healthcare resource	Baseline		Three-month follow-up review		95% Confidence Interval of the difference	<i>P</i> value
	Sum	Mean (SD)	Sum	Mean (SD)		
Number of district nurse home visits	4506	46.5 (37.6)	2111	21.8 (21.7)	24.7 (18.4, 31.0)	<0.001*
Number of GP surgery appointments	23	0.2 (0.6)	4	0.0 (0.2)	0.2 (0.1, 0.3)	0.003*
Number of episodes of cellulitis	62	0.6 (0.9)	11	0.1 (0.3)	0.5 (0.3, 0.7)	<0.001*
Number of hospital admissions for cellulitis	9	0.1 (0.4)	1	0.0 (0.1)	0.1 (-0.0, 0.2)	<0.001*

*Statistically significant
 [Q please check the highlighted figures are correct - unsure why there are two figures in these boxes?]

When reviewing the direct costs associated with the OGEP, it was identified that the largest differences between the outcomes at the baseline and the three-month follow-up review were in district nurse home visits; mean patient cost £1207.8 (SD £976.9) compared to £565.8 (SD £563.3); a difference of -£641.9; 95% CI (-£478.5; -£805.4) at the three-month follow-up review. Furthermore, there was a large difference in the costs of dressings, which were £52,419 at baseline compared to £19,667 post-OGEP [Q I'm not sure how these figures were determined - were these the dressing costs/district nurse visit costs over a particular time period before the OGEP, compared to another time period after the OGEP?]. Thus, there was a reduction in costs by 47% and 38% [Q please check these - I think the percentages for the reduction would be 53% and 62% ?] respectively. Since there was no randomised comparator, the authors cannot firmly indicate whether the cost reductions were a direct result of the OGEP; however, the authors propose that this initial pilot service evaluation may offer some evidence to support the benefits of the OGEP in contributing to potential cost reductions.

There was also an improvement noted in the EQ-5D-5L utility scores from 0.401 (SD 0.254) to 0.537 (SD 0.231) at the three-month follow-up review. The mean difference of 0.136 (95% CI -0.098-0.174) was statistically significant with a *P* value of <0.001. The results of the Visual Analogue Scale also showed an increase from 47.07 (SD 15.17) to 61.76 (SD 18.41) at the three-month follow-up review. The mean difference of 14.69 (CIs 10.75, 18.63) was also shown to be statistically significant (*P* value=<0.001).

Discussion

Many patients [Q would it be possible to indicate how many? Or give an approximation?] seen during the OGEP experienced wet legs, requiring numerous district nurse home visits. These patients were commonly treated with a stockinette liner and a dressing pad (Figure 2). This care resulted in multiple visits because the lymph fluid had already saturated the dressings within a few hours of its application. **Wet legs can cause considerable problems [Q such as?] (Todd 2013) and may result in patients remaining on a caseload needlessly [Q why would this be needlessly?].**

[Q I'm not sure why this information about wet legs is in discussion section – it is not mentioned previously? And were there effects of the OGEP on patients with chronic oedema and wet legs specifically?]

Figure 2. [Q please add a title for this figure]



Similar to other studies (Todd 2013, Moffat 2017), the results of this pilot service evaluation indicate that there are shortcomings in chronic oedema and lymphoedema awareness and management within the community. This could be because of a lack of understanding of oedema management, compression and the doppler assessment (Sneddon 2008, Davies et al 2012, Barlow et al 2014, Stephen-Haynes and Callaghan 2016).

Lymphoedema Network Wales has worked with Agored Cymru in accrediting **work-based learning units [Q on chronic oedema?]** (Agored Cymru 2017). Agored Cymru is a charitable organisation offering **work-based credits** in flexible formats **from level two to level six [Q of the Credit and Qualifications Framework for Wales ?]** (Welsh Government 2016). However, although these **education units [Q suggest using one term for clarity – which would you prefer?]** were available, because of nurses' work demands exceeding community services' capacity, community nurses were not being released to attend **lymphoedema training [Q is this the same as the chronic oedema course mentioned earlier?]**. Thus, the OGEP model of **[Q a lymphoedema clinical educator?]** spending time working, teaching and **[Q facilitating?]** reflection on the job provided an in-depth examination of the effects of the **old clinical/practice educator role [Q why is this role old?]**. The economic analysis provided rich information that can enable further development and the provision of best practice in managing chronic oedema in the community. **However, the evidence is from a pilot service evaluation and is at 'grass roots level' [Q thus further research is necessary?]**. In addition to the possible overall cost savings to the NHS that the OGEP may provide for this patient

group, there is a potential wider benefit in that patients with chronic oedema experienced significant quality of life improvements after receiving the OGEP.

The findings indicated there were changes in the use of resources and costs when comparing the baseline and three months after the OGEP was implemented. There were clear reductions in district nurse home visits, number of episodes of cellulitis and dressing costs. This pilot service evaluation also indicated there were small but important patient health gains seen at the three-month follow-up review, compared to the baseline.

The OGEP model delivers education directly to the community nurses, challenges their practice, and enables time for **facilitated reflection** [Q it's not mentioned previously that the reflection was facilitated – was this facilitated by the lymphoedema clinical educators, and was it on an individual or group basis?]. Discussing the benefits and consequences of appropriate prescribing and chronic oedema management can enable nurses to reflect, which is particularly useful for **validation** [Q meaning unclear – is this referring to revalidation with the NMC?]. The OGEP could be regarded not only as an educational intervention, but also as a means of challenging and changing [Q community nurses' ?] existing behaviours and attitudes, enabling them to effectively manage and support patients with chronic oedema.

The changes in patients' EQ-5D 5L scores before and after they received the OGEP requires consideration. While these effect sizes are small, they indicate improvements were made in patients' health-related quality of life, which requires further study. **The major caveat** [Q is this referring to the lack of a comparator group?] to any interpretation in the context of this pilot service evaluation precluded any rigorous comparative analysis of the cost-effectiveness of the OGEP. This pilot service evaluation is the first step in determining the effects of the OGEP model and offers valuable information about its potential benefits.

Limitations

Since the pilot evaluation was based on a service innovation delivered within routine clinical practice, the project design was limited in several areas, particularly the lack of comparator, for example a matched control site or cohort of patients who did not receive the OGEP.

It is important to note that not all of the benefits may be directly linked to the OGEP. In the pilot service evaluation, the costs at the start (before the OGEP) may have been escalated because of the complex nature of chronic oedema [Q I'm not sure why this would've changed? The nature of chronic oedema would still be complex – are you saying its more complex when it is initially identified/diagnosed than when treatment has commenced?]. In addition, only six months of activity were captured in this pilot service evaluation.

Economic analysis ultimately relies on the strength of the evaluation design and quality of data received, and the pilot service evaluation was undertaken in full acknowledgement of these constraints.

Conclusion

The prevalence of chronic oedema is increasing, and is frequently unrecognised and treated inappropriately, compounded by the lack of standardised care pathways for managing chronic oedema and wet legs. Demands on the community nursing services are also escalating; therefore, new ways of providing nurse education should be investigated. Potential benefits to patients' quality of life and reductions in NHS costs and could be achieved through improved education and training for community nurses in the management of chronic oedema. This pilot service evaluation provided an in-depth examination of the effects that the OGEP could have in providing an innovative solution to delivering best practice care for these patients. While the findings suggest an observed trend for reductions in costs and patient benefits, further research over a longer period is required.

Implications for practice

- Improvements to the quality of life for patients with chronic oedema have been identified.
- Policymakers and commissioners should be made aware of the potential reductions and improvements to patients' quality of life that could be made by the implementing the OGEP.
- Education providers should consider the importance of chronic oedema management in pre and post-registration courses for general and specialist nursing.
- Lymphoedema Network Wales is investigating the expansion of the OGEP across other health boards.

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