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ORIGINAL ARTICLE

A cross-sectional evaluation of the current state of wound healing education in the United Kingdom's undergraduate medical curriculum

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Abstract

Between 2013 and 2018, there has been a 71% increase in the number of patients who have required wound care in the NHS and such large numbers has placed a significant burden on healthcare systems. However, there is currently no evidence as to whether medical students are equipped with the necessary skills to deal with an increasing number of wound care related issues that patients present with. A total of 323 medical students across 18 UK medical schools completed an anonymous questionnaire evaluating the wound education received at their medical school, encompassing the volume, content, format and efficacy of teaching. 68.4% (221/323) of respondents had received some form of wound education during their undergraduate studies. On average students received 2.25 h of structured, preclinical teaching and only 1 h of clinical based teaching in total. All students that received wound education reported undertaking teaching on the physiology of, and factors affecting wound healing, with only 32.2% ($n = 104$) of students receiving clinically based wound education. There was very weak correlation and no significant association in student's ability to assess wounds ($R^2 = 0.190$, $p = 0.013$), manage wounds ($R^2 = 0.060$, $p = 0.37$), and prescribe wound care products ($R^2 = 0.093$, $p = 0.18$) with their stage of training. Students strongly agreed that wound education is an important part of the undergraduate curriculum and post graduate practice, and do not feel their learning needs have been met. This is the first study to assess the provision of wound education in the United Kingdom, demonstrating a clear deficit in the provision of wound education compared to expectation of junior doctors. Wound education is largely overlooked in the medical curriculum, lacks a clinical focus and does not prepare junior doctors with the necessary clinical abilities to deal with wound related pathology. Expert opinion to direct changes to future curriculum and further evaluation of teaching methodology is required to address this deficit.

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and ensure students have the necessary clinical skills to excel as newly graduated doctors.

KEYWORDS

medical-education, medical-school, undergraduate, wound-care, wound-healing

Key Messages

- this study provides evidence that the length and quality of wound education is inadequate in the UK medical undergraduate curriculum
- a total of 323 medical students across 18 medical institutions across the United Kingdom were included in this study
- teaching is largely delivered in the preclinical years of the course and is predominately lecture based
- there is an agreement among students that wound education is an important aspect of the curriculum and future practice but these learning needs are not being met
- teaching was self-reported and therefore it is possible students may under- or over-report actual wound education received

1 | INTRODUCTION

Between 2017 and 2018 there was an estimated 3.8 million patients who required wound care through the NHS. This was a 71% increase in prevalence from 2013. The estimated annual cost to the healthcare service was £8.3 billion, with £2.7 billion associated with the management of healed wounds and £5.6 billion for unhealed wounds.¹ Individuals with wound related issues will be encountered by health care professionals across a range of specialties including but not limited to general practitioners, general surgical specialists, vascular surgeons, dermatologists and plastic surgeons. Consequently, there is a growing importance for the development of adequate knowledge of wound physiology, the mechanism of healing, and the high clinical aptitude of practical skills concerning wound management. This is regardless of the expertise of the individual and ideally, such education should begin at undergraduate level.

To address gaps in knowledge of wound healing, the European Wound Management Association developed a physician-aimed training requirement for specialisation in wound healing.² Currently, there is no governing body responsible for providing guidance for medical undergraduates with expectations regarding knowledge of wound healing and wound care practice. The General Medical Council, an independent regulator for doctors in the United Kingdom (who support medical education and practice delivered by medical schools) have outlined in their handbook 'practical skills and procedures' that medical students must show proficiency in taking wound swabs, carrying out wound care, wound closure and

application of dressings.³ However, there is no guidance as to how this could be achieved.

The issue of wound education in the medical curriculum was first raised in 1992 which found an average of 6 h of teaching time was dedicated to wound related topics with the majority of medical schools receiving no teaching at all.⁴ The last 30 years however have shown little attempt to rectify this. An American study of 50 medical schools, found that the average time spent on tissue injury physiology was 0.5 and 0.2 h in the first and second year of the medical degree respectively. The physiology of wound healing was taught for an average of 2.1 and 1.9 h in the first- and second-years.⁵ The only study which has evaluated the state of wound education in the United Kingdom was a comparison between the United Kingdom, United States and German medical education systems in 2008. This found that the dedicated learning time to wound education was 9.2, 4.9 and 9.0 h respectively.⁶ However, this study did not report on student perception of such teaching nor was there an assessment of learning. Over the last 10 years, attempts have been made to address the defects in wound related education including attendance at wound clinics and digital education tools to increase knowledge and self-perceived confidence of practical wound care procedures.^{7,8} However, there is little understanding of the current state of undergraduate wound education globally, particularly with the shift to a more clinically focused 'case-based' curriculum structure. Additionally, a lack of clarity still remains regarding the specific wound related topics provided by medical schools and whether or not they are delivered as part of the core curriculum or compulsory modules.

Therefore, the primary aim of this study is to assess medical students' experience of wound education, in order to understand its delivery in the undergraduate curriculum in the United Kingdom.

2 | MATERIALS AND METHODS

Patient and public involvement: medical students provided informal input as to what they believed were the most important learning outcomes from the study and the questionnaire sought to recognise these priority outcomes. Medical undergraduates from across the United Kingdom attending one of the 44 recognised medical schools were invited to complete the questionnaire. This provided a representative and varied mixture of both students and teaching settings.

Data collection: students were invited to fill out an anonymous questionnaire delivered through Google Forms (Google LLC USA). The CHERRIES checklist protocol was used to devise our questionnaire to avoid study bias.⁹ Responders consented to both data collection and their data being used for quality improvement purposes. Data were collected during the 2021–2022 and 2022–2023 academic year. Students were asked to answer whether they received wound education as part of the compulsory curriculum or as optional modules and during which years of training they received such teaching.

The curriculum was broken down into the following components: content, structure and delivery, and assessment, all of which were answered using multiple choice questions. The total structured teaching time and clinical time in hours was also reported. Questions assessing confidence of assessing and managing wounds in the clinical setting, prescribing wound care products, and the perceived importance of wound teaching as part of the undergraduate curriculum and as part of future clinical practice was assessed using a 5-point Likert scale. Students used free text boxes to describe their expectations of what wound education should encompass as part of the undergraduate curriculum.

Ethical approval and consent to participate: This study did not require ethical approval by the Cardiff University Medical School of Medicine Research Ethics Committee due to fulfilling the local health authority's policy for the quality improvement project. Furthermore, this study involved only the use of a non-sensitive, optional, completely anonymous educational survey. Those surveyed did so voluntarily and were medical students, considered non-vulnerable participants and participation did not induce any psychological stress or anxiety. By completing the survey, individuals gave consent for data to be used anonymously by the investigators of the study. This

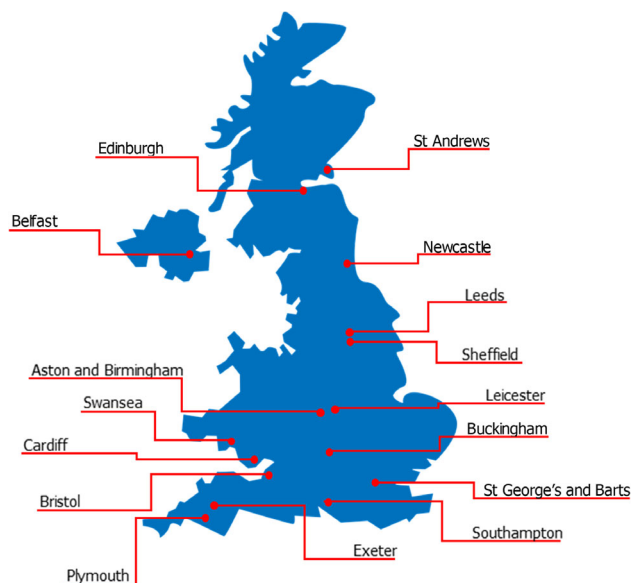


FIGURE 1 A geographical representation of the surveyed medical schools across the United Kingdom.

was stipulated in the writing at the start of the questionnaire.

All questionnaire items were included in the data analysis. Assessment of structured teaching time and clinical time dedicated to wound education on placement was tallied by the number of days and a mean was taken. Normally distributed continuous variables were compared using two-way paired T-tests. Categorical variables were evaluated for correlation using a Shapiro–Wilk test to assess for normality and Spearman's rank correlation coefficient, given the ordinal nature of the Likert scale. Statistical significance was defined as a *p* value of less than 0.05.

3 | RESULTS

A total of 323 medical students responded to the questionnaire across 18 medical institutions across the United Kingdom (Figure 1).

3.1 | Quantity of teaching

A total of 68.4% (221/323) of respondents had received some form of wound teaching during their undergraduate studies, however of these only 19.9% (44/221) had this teaching delivered as a clinical rotation as part of the core curriculum. Of the 221 students who received some form of teaching, students reported of mean of 2.25 h of structured, preclinical teaching and only 1.00 h of clinical based teaching.

3.2 | Content of teaching

All students that received wound education received teaching on the physiology of wound healing and factors affecting wound healing. This was followed by the identification of wound infection ($n = 175$, 79.2%), management of wound infection ($n = 173$, 78.2%), assessment of wounds ($n = 146$, 66.1%), management of the chronic wound ($n = 89$, 40.3%) and management of the acute wound ($n = 63$, 28.5%). Of note, students wanted additional teaching on wound treatment and assessment, specifically, the types of wound dressings to use and a large minority called for more education into the difference between treating acute and chronic wounds ($n = 120$, 37.2%).

3.3 | Delivery of teaching

83.3% ($n = 184$) received lecture-based teaching. 28.5% ($n = 63$) received wound education via small group teaching or problem/case-based learning and only 35 respondents (15.8%) received teaching as part of a dedicated clinical placement. The most popular method of examination was multiple choice questioning of basic science ($n = 129/323$, 39.9%) followed by multiple choice question of clinical scenarios (115/323, 35.6%). This was followed by clinical assessments ($n = 67/323$, 20.7%), written assignments ($n = 34/323$, 10.5%) and Viva assessments ($n = 10/323$, 3.1%). However, 36.5% ($n = 118/323$) of the students had no formal assessment of wound healing knowledge on their undergraduate course.

3.4 | Student evaluation of their teaching

There was no change in the confidence of students to assess, manage or prescribe over the course of their undergraduate medical training (Figure 2). There was a very weak to weak correlation and no significant association between the stage of undergraduate training and confidence in assessing wounds ($R^2 = 0.190$, $p = 0.013$), managing wounds ($R^2 = 0.060$, $p = 0.37$), and prescribing of wound care products ($R^2 = 0.093$, $p = 0.18$).

Despite this, students were still strongly in agreement across all stages of training, geographic regions and levels of wound healing education exposure, that wound education was an important part of the undergraduate curriculum (Likert mean: 3.9, 95%CI: 3.80–4.10) and were very strongly in agreement that wound healing would continue to be an important aspect of their future clinical practice (Likert mean: 4.32, 95%CI: 4.21–4.45) (Figure 3).

4 | DISCUSSION

Our study presents the current state of undergraduate wound education across numerous medical institutions in the United Kingdom. The length and quality of wound education has seen a decline over the last 30 years.⁶ This has predominantly been observed in the United States^{6,10} and within allied health professions,^{11–13} concluding that the length of time spent studying wound-related topics is inadequate. As a result, graduate healthcare professionals (should that be doctors rather than healthcare professionals?) lack the knowledge and proficiency in understanding and treating wound related pathologies. Our study has reinforced and built upon the results of pre-existing literature; wound education is largely overlooked, lacks a targeted clinical focus and medical students lack confidence in their clinical abilities to deal with wound related pathology.

In addition, we have presented a novel study; the first to provide a cross sectional evaluation of wound education provision in the undergraduate UK curriculum. Our study provides a breakdown of the components of wound education that students received. Teaching was largely delivered through didactic lectures and content was heavily focused on preclinical learning, in particular the physiology of wound healing. The neglect of the clinical aspects of wound education correlates with lack of confidence reported by students in assessing, managing and prescribing wound care products. Despite the considerable emphasis placed on having a sufficient clinical aptitude by the General Medical Council³ there remains a significant deficit of clinical wound education provided to students.

Our study is also the first to assess medical student opinion on the provision of wound teaching in their respective medical curriculum. Across all year groups and UK medical schools, there were no significant changes in confidence regarding the assessment, management and prescribing of wound products. This is disappointing given that students perceive wound education as an important part of the undergraduate curriculum and as part of future practice as a new graduate doctor. This conclusion suggests that the learning needs of students are not being met. This presents an area of concern, given the presence of an incoming workforce with little confidence in skills they will be likely to have to utilise early in their medical career.

Overall, we have established a need for a reform and standardisation of wound education in the UK medical school curriculum. We recommend therefore, that interventions should aim to improve provision of clinical training. This could be achieved through increasing clinical teaching allocated to wound education, the practising

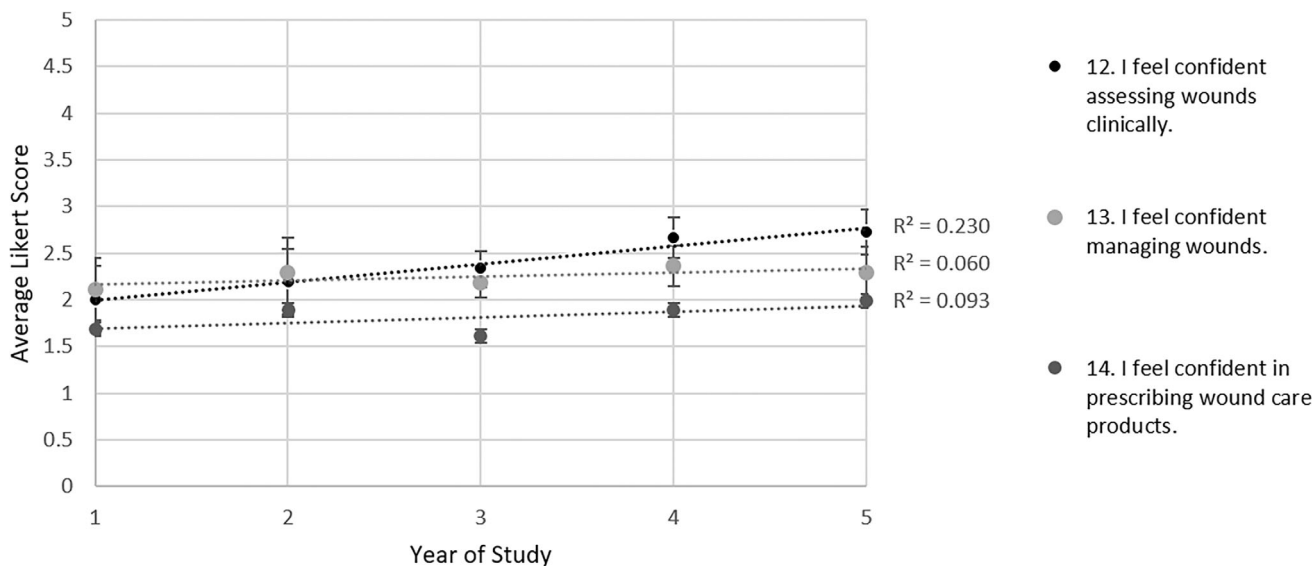


FIGURE 2 A scatter graph demonstrating the association between stage of undergraduate training and confidence in assessing wounds ($R^2 = 0.190$, $p = 0.013$), managing wounds ($R^2 = 0.060$, $p = 0.37$), and prescribing of wound care products ($R^2 = 0.093$, $p = 0.18$). Error bars demonstrate the 95% confidence intervals.

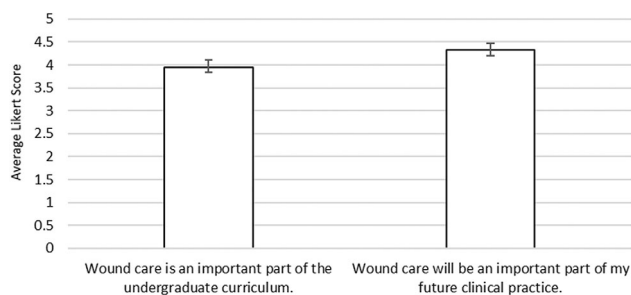


FIGURE 3 A bar graph demonstrating student agreement with the statements, wound care is an important part of the undergraduate curriculum and wound care will be an important part of my future clinical practice. Error bars demonstrate 95% confidence intervals.

of key skills involved in assessing and managing wounds, and evaluating methods of assessment to ensure competency in such skills.

This study is limited in its questionnaire-based design; however, the principles of unbiased data collection were observed through the use of the CHERRIES checklist protocol to devise our questionnaire.⁹ This was further validated and screened by the authors for bias, and again in a pilot study of students and professionals. To reduce selection bias, students were contacted via multiple different platforms, including email and social media. The authors believe that despite its limitations, this approach is the most effective at providing a cross-sectional understanding of current practice relating to the provision of undergraduate wound education.

In conclusion, there is a deficit in the quantity and quality of wound education for UK medical students. Our study demonstrates that teaching is largely delivered in the preclinical years of medical school (years 1 and 2) and is predominantly taught through didactic lectures and not in the clinical environment. However, these interventions appear to be ineffective, as there is no improvement in medical students reported ability to assess, manage and prescribe for wounds as they progress through their undergraduate studies. Furthermore, students agree that wound education is an important part of their undergraduate training and will play a significant role in their future clinical practice. Therefore, further evidence and evaluation is urgently required to develop guidance for educators in order to address the deficits of wound education provided to the UK's future doctors.

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CONFLICT OF INTEREST STATEMENT

The authors have no conflicting/competing interests to declare.

DATA AVAILABILITY STATEMENT

Anonymous data can be made available at request to the authors.

ETHICS STATEMENT

This study did not require ethical approval because of fulfilling the local health authority's policy for the quality improvement project. Furthermore, this study involved only the use of a non-sensitive, completely anonymous educational survey, those surveyed did so voluntarily and were medical students, considered non-vulnerable participants and participation did not induce any psychological stress or anxiety.

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