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Improving Clinical Competency and Multidisciplinary Awareness In Dermatology Through Online Case-Based Learning For Medical Students

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ABSTRACT

A short duration of clinical dermatology sessions is typical in medical education. In addition, a shortage of materials for clerkship students focuses on how several fields work together when treating dermatological conditions. After making case-based learning resources to increase clinical experience and understanding of managing dermatology problems together with other specialists, the study looked at how effective the intervention was and collected comments to improve the materials further. A set of ten online dermatology case modules, drawing from content in fourteen areas of health science, was developed. Eighty-nine students from dermatology programs at two locations completed a survey about the dermatology curriculum. Among those students, 46 students filled out the surveys, rating their knowledge and better understanding of multidisciplinary care on a scale of one to five. Only 17.1% of the students in the survey found their dermatology education reliable before clerkships and just 10.2% believed they could manage patients with skin diseases when on clinical rotations. Ninety-five percent of the participants who completed the modules felt that the approaches in the modules matched their learning preferences (mean Likert score 4.17 ± 0.73). Besides, nearly all participants agreed (91.3%) that the modules increased their knowledge of dermatology (4.26 ± 0.61) and nearly three quarters responded positively (79.6%) that the modules improved their understanding of how dermatology often requires input from more than one medical field (3.98 ± 0.81). After completing the modules, student doctors were 78.3% comfortable with managing skin conditions which is a 7.7-fold rise compared to before. There was a lack of clear knowledge about dermatologic diseases among students on the clerkship. These case-based modules aided to reduce these gaps and allowed participants to value the multidisciplinary aspect of practicing dermatology.

Key words: Dermatology education, Case-based learning, Multidisciplinary care, Clinical exposure Medical students

INTRODUCTION

Skin disorders cause a great deal of disease in many places and are a major contributor to global suffering [1]. Many branches of medicine encounter skin problems known as dermatologic manifestations. Patients with skin and dermatology symptoms that suggest a systemic disease are regularly seen by both general practitioners and doctors from various specialties [2–4]. Because skin disease is common, all medical graduates must have basic dermatology knowledge. Even so, at this time, the National Dermatology Core Curriculum and Competencies do not highlight educating general medical students who are not in dermatology about the importance of dermatology to their own fields [5]. In addition, numerous studies stretching over several years have underlined that dermatology training focuses less than expected given the high numbers of skin disorders treated in routine clinical practice [6, 7]. In 2018, a survey of dermatology programs found that most directors thought dermatology education offered at their institutions was lacking [6]. The majority of schools offered dermatology instruction for only a short time, with a few stating they had just three hours [6]. Most dermatology is taught before the clinical years and just a handful of institutions include dermatology rotations in their clinical schedules. We have a low number of dermatology instructors and not many resources or classes dedicated to dermatology [6]. The clinical clerkship provides a way for medical students to gain dermatology knowledge and exposure in a multidisciplinary health care setting. A major problem in teaching dermatology at the undergraduate level is the shortage of clinical activities. During clerkship, not every student must complete a clinical dermatology rotation [6]. Not only one area but several around the world are affected by this shortage in dermatology training. As an example, a recent review of medical schools found that just a small number included dedicated dermatology classes in the preclinical years and only a small number required medical students to train in dermatology later [7]. Problems included not having enough dermatology departments, difficulties adding major dermatology modules to existing material and inflexible class times [7]. There are similar recommendations for improving both teaching methods and evaluation in dermatology in other medical schools [8]. Some primary dermatological topics are included in studies, yet information on subjects such as fungal infections, adverse drug reactions and emergency situations is lacking [8]. Despite the fact that primary care doctors routinely see many skin problems, mandatory teaching in dermatology is rare in most educational institutions [9]. According to the authors, there are not many

materials for medical students that highlight how dermatology brings together different branches of medicine. Because they do not see many patients in clinical settings, students may not see the importance of dermatology in other specialties or its clinical use. It is rare to observe how dermatology, psychodermatology, hematology-dermatology or rheumatology-dermatology are connected in practice. Improving students' clinical training in clerkship is vital for forming physicians who know how to recognize and care for a wide variety of skin illnesses and value the benefits of cooperation among doctors. Using existing teaching plans, we created a resource for medical students in clerkship to help them overcome these flaws in their exposure to different dermatology fields. Researchers set out to review the success of this intervention and gather comments for future modifications [10].

MATERIALS AND METHODS

Guiding framework

Thomas and Kern's six-step framework for developing medical education was applied when building the educational intervention. The method is used by many medical educators as a helpful structure for designing programs to fill identified gaps in knowledge [10].

Study setting

Two dermatology training weeks are offered in the preclinical years for students at both of our affiliated institutions, the University of Alberta and University of British Columbia.

Targeted needs assessment

A needs assessment survey was developed by us to clearly understand the problems of limited clinical exposure and multidisciplinary learning in dermatology at our institution. Demographic data, used educational resources, thoughts on the preclinical dermatology curriculum and understanding of dermatology's multidisciplinary nature were collected from clinical-year students (third- and fourth-year medical students on clinical rotations). The survey was designed using information from published studies on interventions and multidisciplinary care in dermatology, as well as by looking at present dermatology learning goals in the curriculum. A dermatologist, a dermatology resident and medical students formed the development team, all helping with the setup and phrasing of the questions. Following this, some changes were made to the survey by five clinical-year medical students before it was sent to students.

RESULTS

Table 1:Needs assessment survey of opinions regarding pre-clerkship dermatology curriculum

Statement	1	2	3	4	5	Mean (SD)	P value*
I feel the pre-clerkship dermatology education I received is sufficient	18.0%	37.0%	28.0%	13.0%	4.0%	2.63 (0.95)	< .001
I feel comfortable seeing patients with skin conditions in clinical settings	25.0%	35.0%	20.0%	12.0%	8.0%	2.49 (1.08)	< .001
After finishing the residency of my desired specialty, I will likely encounter patients with skin conditions	1.0%	6.0%	8.0%	27.0%	58.0%	4.39 (0.79)	< 0.001
I would describe dermatology as a specialty that often involves multidisciplinary care	1.5%	12.0%	18.5%	48.0%	20.0%	3.75 (0.92)	< .001

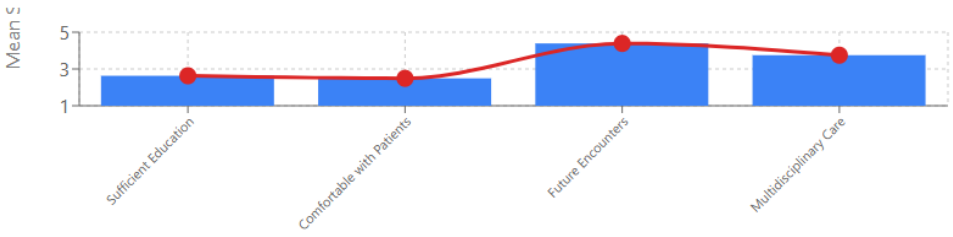
Table 2 .Qualitative feedback

Themes	Illustrative Quotes
Accessibility of module design	• Straightforward to navigate, material is clear and succinct • Coverage of pregnancy-related rashes was limited during medical school; this resource addresses that gap well • Some dermatology images were challenging to interpret; the detailed morphology descriptions were appreciated • The questions were varied, and explanations for answers were comprehensive and clear • The combination of images, case details, and questions created a realistic clinical experience • The case-based format was engaging and enjoyable, with questions maintaining interest

Need for enhanced visual support	• Including images for each condition in follow-up questions would be beneficial • Additional pictures and possibly video materials could make learning more interactive and captivating • More diagrams throughout the content might reinforce understanding • When references to signs and diagnostic tests like pathology are made, visual examples would be very helpful
Integration of modules (preclinical phase)	• These modules could be integrated into the dermatology week during preclinical training • Incorporating dermatology content across various teaching blocks would be advantageous • Modules would be useful before exams and during the transition into clinical years • The single week of dermatology was intensive and content-heavy; having these modules as optional would be appreciated • Some conditions covered exceed the typical preclinical dermatology curriculum
Integration of modules (clinical phase)	• A mandatory two-week module-based dermatology rotation during clinical years would be greatly beneficial • Having 2–3 required cases for completion during non-dermatology rotations would add value • Offering the modules as optional resources during dermatology or family medicine rotations would be useful • Modules could serve as review materials in the final year, aiding preparation for licensing examinations
Advantages of multidisciplinary approach	• Dermatologic manifestations can signal systemic diseases that require consultation and follow-up with various specialists in hospital and community settings • These cases emphasize the importance of dermatology knowledge regardless of chosen specialty • I was unaware of the dermatology-psychology clinic; this highlights dermatology's broad scope • This module will help me become a more comprehensive physician, especially in rural family medicine • Through outpatient cases like moles and psoriasis, I learned how drug reactions may present and how multiple specialties collaborate in patient management
Clarification on referral indications	• It remains unclear when to involve other specialties in certain cases—for example, when should a general practitioner refer? When is ophthalmology consultation necessary? • I understand that referral to other specialties is a component of multidisciplinary care; however, this seems equally applicable across various medical fields

Figure 1: Pre-Clerkship Dermatology Curriculum Needs Assessment

Figure 2: Mean Scores Comparison



The survey found that medical students had particular views about their dermatology learning before starting clerkships. Most participants said their education in dermatology had gaps and the majority did not feel sure about treating patients with skin problems in hospitals. Even so, most students saw that skin treatment often requires different professionals and were prepared to meet patients with skin issues in their own specialties. What we uncovered shows that school education does not truly help students apply what they learn in clinical practice. Together, the readings and interviews found repeating themes in participants' comments. Students said they liked the module's simplicity and that it was straightforward, active and realistic in how it presented clinical cases (figure 1). Having full morphological descriptions was useful for understanding dermatology images and covering various topics held their attention. Still, a lot of respondents placed great importance on getting more visual assistance. Many suggested that graphics, photographs and diagrams should be used more often when talking about related signs and diseases. Students suggested including these modules in the week devoted to preclinical dermatology and including dermatology throughout various teaching weeks. A number of us noticed how much we had to cover in dermatology, so making the modules optional would give more time for study (figure 2). The clinical group suggested that students should do a two-week dermatology rotation and gain experience with dermatology through modules, also including some cases in family medicine. Many students understood that multidisciplinary dermatology is important for finding systemic diseases and linking with other medical specialists. It was also advised that guidance should be given on referrals so all important parties are involved when required. Together, these results underline the importance of introducing new, combined and largely visual teaching methods in dermatology to better prepare those studying medicine.

DISCUSSION

Whether in medical or surgical settings, all physicians often face diagnosing skin diseases [11]. Nonetheless, the fact that students have few opportunities to choose dermatology electives can make it more difficult to give those trainees a broad education [7]. Since skin problems are common, generic medical knowledge should include a clear understanding of dermatology. We aim to help medical students provide complete care for patients, whether or not they become dermatologists. Since teaching and clinical time in dermatology are limited, our study showed that case-based online modules are useful for learning. These modules make it convenient for students to choose learning content based on what they need for their future careers. With our findings, educators may use an alternate method to better teach dermatology, since there are few helpful studies available for medical student dermatology [13]. A vast number of students reported feeling poorly prepared to help with skin diseases during their clinical courses which is consistent with earlier findings [14–16]. Students thought the single week dedicated to preclinical dermatology was not enough, a view that was confirmed by dermatology educators [6]. The survey showed that specially made educational tools for medical students are often ignored; better curriculum could help students improve in this area. This supports why we offer a targeted intervention just for students finishing their clinical years. In addition, students in other medical fields are able to pick modules specifically designed for their needs. First-year residents in the module have to handle patient cases and coordinate care with different experts. Although clinical-year dermatology training still takes up little time in most areas, key dermatologic diseases related to other specialties are rarely discussed [6]. To tackle this problem, our modules describe the major dermatologic issues found in various fields of medicine. On a larger scale, we hope other countries can use the same online, case-based, multidisciplinary model to improve dermatology teaching. From our study, we learned that online modules with multiple-choice questions, learning objectives and key summaries fit well with how students like to learn. The fact that resources on the platform can be accessed and used easily makes it possible to integrate dermatology education into curricula when there is no nearby dermatology department [11]. Successful feedback from students both confirms and builds on the previous evidence that they like and accept online courses [17]. Students expressed a strong interest in clinical images which makes including more photos in upcoming modules important. Prior studies have noted that it is hard to teach dermatology because classes are packed and the information does not usually fit with what is already being taught [13]. It was recommended that dermatology education be provided outside of the designated clinical dermatology week and include lessons during preclinical blocks, their transition to clinical training, non-dermatology rotations and preparation for exams. Our overall findings show students prefer having

ongoing exposure to dermatology, mainly due to the current dermatology week being packed with information. Also, improving curricula and considering the ideas of students might help educators offer more time in courses to dermatology. After completing the module, many more students felt ready to handle skin problems, increasing from 10.2% to 78.3%. Furthermore, 82.6% thought they were more prepared to take care of dermatology patients during their first year of residency, citing improved knowledge of rash appearances, generating more useful diagnostic options and being responsible for deciding on investigations and treatments. Online learning might be an effective way for medical students to get better dermatology training. Still, only about half of the students (52%) filled out the post-intervention survey which may create a selection bias. Because students who couldn't or didn't complete the survey may have other views, more people should be encouraged to complete surveys to test the intervention's effectiveness. An overwhelming majority (79.6%) of students agreed that the intervention helped them see how dermatology depends on multiple areas, giving the event an average score of 3.98 ± 0.81—clearly above neutral. More students believed dermatology involves care from multiple disciplines, with the proportion increasing from 69.3% to 77.3% over the study period. However, statistics show this change is not meaningful and may only be due to the involvement of more interested students. Future studies should utilize focus groups to examine more deeply the way future doctors see the various specialties in dermatology. Many participants indicated that it was important to explain when to refer patients to other specialties and how dermatology relates to several medical and surgical fields. A larger number of students agreed with other statements (over 80%) than expressed interest in a dermatology rotation (56.8%). Since there are numerous kinds of skin problems, students should be able to choose subjects that support their future careers, mainly for those not interested in dermatology. Since all students may not respond to mandatory rotations, more flexible learning through online modules lets students learn about topics they care about. There are several problems with this study. Just 15% of students took part in the optional modules and of those, 52% went on to finish the survey after the intervention which reduces the ability to generalize. Making a survey too long, setting too many questions or offering too many opportunities to take surveys may all lead to lower completion rates. Since most saw themselves working in dermatology jobs, this may have improved the study's results. An additional challenge was not having clear measures of what students understood before and after the modules, because the content was extensive and their slow-assessments are not completely accurate. Future research using standard tests and questions about when to refer might give us more unbiased information on multidisciplinary learning. Overall, this pilot research gives helpful advice on teaching in medical schools with resource and time shortages. We can use our approach to improve the teaching of pathology, medical genetics and radiation oncology in the medical curriculum. The online modules in Beyond Skin Deep help students identify and care for common dermatologic conditions as well as skin signs of various diseases addressed by medical teams.

CONCLUSION

The findings indicate that students in medicine are not given much opportunity to study dermatology, especially how different specialties collaborate in practice. Because of these online modules, students could access flexible information that captures what they're studying and what careers might appeal to them. After the intervention, students became more confident at managing their skin concerns and realized how important it was for dermatology to combine various specialties. Even though not many lessons are being finished and survey results are low, the encouraging input makes online case-based learning appear to be a suitable complement to regular dermatology modules. Student participation should be increased, they should be tested with fact-based quizzes and topics from different fields should be provided for future doctors. The method can be applied to other medical specialties that are under-represented, to enhance teaching in medicine.

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