

BRIEF REPORT

Assessment of medical students' proficiency in dermatology: Are medical students adequately prepared to diagnose and treat common dermatologic conditions in the United States?

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Abstract

This study assessed whether a current medical school curriculum is adequately preparing medical students to diagnose and treat common dermatologic conditions. A 15-item anonymous multiple choice quiz covering fifteen diseases was developed to test students' ability to diagnose and treat common dermatologic conditions. The quiz also contained five items that assessed students' confidence in their ability to diagnose common dermatologic conditions, their perception of whether they were receiving adequate training in dermatology, and their preferences for additional training in dermatology. The survey was performed in 2014, and was completed by 85 students (79.4%). Many students (87.6%) felt that they received inadequate training in dermatology during medical school. On average, students scored 46.6% on the 15-item quiz. Proficiency at the medical school where the study was performed is considered an overall score of greater than or equal to 70.0%. Students received an average score of 49.9% on the diagnostic items and an average score of 43.2% on the treatment items. The findings of this study suggest that United States medical schools should consider testing their students and assessing whether they are being adequately trained in dermatology. Then schools can decide if they need to re-evaluate the timing and delivery of their current dermatology curriculum, or whether additional curriculum hours or clinical rotations should be assigned for dermatologic training.

Key Words: Curriculum; Dermatology; Medical students; United States

The majority of medical schools devote very few curriculum hours to training in dermatology. One study found that half of the medical schools surveyed provided 10 or fewer hours of instruction in dermatology, and 8% of the schools required no instruction in dermatology [1,2]. Additionally, not all residency programs require additional training in dermatology. The limited curriculum hours allotted to dermatology in medical training does not reflect the increasing prevalence of der-

matologic conditions in the primary care outpatient setting [3]. Primary care physicians are often the initial contact for patients with dermatologic conditions. This raises the question of whether medical schools adequately prepare medical students to diagnose and treat common dermatologic conditions.

With institutional review board approval, a 15-item anonymous multiple-choice quiz covering fifteen diseases was developed to test students' ability to diagnose and treat common dermatologic conditions. The content of the quiz was primarily based on The American Academy of Dermatology's Medical Student Core Curriculum, which outlines diseases that academic dermatologists and primary care physicians deemed

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important for medical students to be able to diagnose and treat. Both a dermatologist and a primary care physician reviewed the content and difficulty of the quiz. The quiz also contained five items that assessed students' confidence in their ability to diagnose common dermatologic conditions, their perception of whether they were receiving adequate training in dermatology, and their preferences for additional training in dermatology. In order to control for differences in the amount of exposure to dermatology, the quiz was administered at the very beginning of fourth year, before students' schedules started to diverge. At Wright State University Boonshoft School of Medicine, where the study was performed, students take the same courses for the first three years, so their curriculum until fourth year is almost completely identical and does not include a third year clerkship or elective in dermatology. Additionally, there is no required training in dermatology during fourth year. All 107 fourth-year students in the class of 2014 were invited to take the quiz, and 85 students completed the quiz (79.4%). To increase the response rate, the paper survey was completed after an academic exercise at which attendance was required. The five additional items were completed in 81 responses and the dermatology diagnosis and treatment items were entirely filled out in 74 responses. Incomplete responses were not included in the final average score calculations.

Eighty-nine percent of respondents reported that they felt either 'neutral,' 'slightly confident,' or 'not at all confident' when asked how confident they feel in their ability to correctly diagnose skin lesions. Only 11.1% of respondents felt 'fairly confident,' and none felt 'very confident.' Additionally, 87.6% of respondents felt that they received inadequate training in dermatology during medical school, and 95.1% of respondents agreed that there should be a general dermatology lecture during third year. Students were also asked about their learning preferences for additional training in dermatology. A total of 61.7% of respondents preferred interactive lectures. Some respondents also chose online case-based modules (24.7%), online PowerPoint presentations (19.8%), and team based learning (21.0%). A few students even chose to write in additional answer choices (shadowing, clinical experience, clerkship experience, and Jeopardy games). Multiple respondents indicated that the family medicine and internal medicine clerkships would be the best place to include additional dermatology lectures.

The majority of respondents (77.8%) felt that additional training in dermatology should occur during third year. At Wright State University, 13 of the approximately 18 required curriculum hours in dermatology occur during second year. One hour is provided during first-year and four hours are presented in the third-year. Wright State University does not require any clinical training in dermatology. However, studies

have shown that dermatology electives significantly increase primary care physicians' confidence in their ability to diagnose and treat common skin conditions [3], which suggests that clinical hours may also improve medical students' ability to diagnose and treat common dermatologic conditions.

Proficiency at Wright State University is considered an overall score of greater than or equal to 70.0%. Students received an average score of 49.9% on the diagnostic items, an average score of 43.2% on the treatment items, and an overall average score of 46.6% on the 15-item quiz. It was expected that students would be more proficient at diagnoses since the medical school curriculum tends to focus slightly more on diagnosis. Examination of responses to individual items based on the content being tested revealed that students were proficient in the diagnosis of only psoriasis, tinea versicolor, and melanoma, and students were proficient in the treatment of only verruca vulgaris and melanoma (Table 1).

Despite the students' inadequate performance on the quiz, many of the mistakes students made would be fairly easy to teach in a one- to two-hour lecture on basic dermatologic conditions. For example, students were tested on their ability to diagnose and treat verrucae vulgaris on the dorsum of a person's finger. Only 47.1% of students chose the correct answer. The incorrect distracter most commonly chose was condylo-ma acuminatum (41.2%), which is the name for warts located near the genitalia or rectum. The students were correct in the general diagnosis of warts, but were not sure how to classify the lesions correctly based on their location. This explains why 94.0% of students were correct in the treatment portion of the item because in many cases both types of warts can be treated

Table 1. Score breakdown by subject on 15-item dermatology proficiency quiz

Disease being tested	Average diagnosis score (%)	Average treatment score (%)
Verruca vulgaris	47.1	94.0 ^{a)}
Psoriasis	74.1 ^{a)}	41.7
Tinea versicolor	77.6 ^{a)}	60.0
Basal cell carcinoma	50.6	17.6
Mycosis fungoides	67.9	48.2
Dermatofibroma	35.3	37.6
Seborrheic keratosis	32.5	4.8
Tinea corporis	50.6	51.2
Milia	25.9	49.4
Alopecia areata	47.1	10.6
Keratosis pilaris	38.8	40.0
Neurofibroma	27.7	50.0
Melanoma	77.6 ^{a)}	70.2 ^{a)}
Keratoacanthoma	38.8	10.6
Furuncle	44.7	57.6

^{a)}Scores equal to greater than 70% are considered proficient.

in the same way.

Closer study revealed that medical students often selected answers that suggested a tendency to over treat benign lesions. For example, 33.7% of students chose to excise seborrheic keratoses and another 33.7% chose 'refer to a dermatologist,' both of which would be unnecessarily expensive for patients. Students choose more expensive or invasive treatment choices such as referral and excision for benign lesions because they are unable to confidently diagnose common, benign dermatologic conditions that require no treatment. It is expected that additional lecture hours and clinical exposure to dermatology would increase students' ability to confidently diagnose and treat dermatologic conditions that are commonly seen in primary care practice. This study prompted our medical school to consider adding an interactive basic dermatology lecture to the third year internal medicine clerkship. Retesting the medical students who receive the additional lecture hour would determine if dermatology knowledge and confidence among medical students is increased through this intervention.

When limited lecture time and competing interests make it impossible to expand dermatology lecture time, repurposing time allocated to dermatology may be necessary. For example, second year basic science lectures focused on dermatology could be condensed to permit interactive dermatology lectures in the third year that focus on clinical diagnoses and treatment. This content should be reinforced through third year clinical exposure. Grand round style dermatology teaching with live patients, small group problem-based learning, and on-line interactive learning sessions in dermatology are curricular methods that are already being utilized [4,5]. Finally, even a two-day rotation in a dermatology clinic could prove to be an effective intervention. Medical schools have a responsibility to provide effective dermatologic education for their students. The finding that our students were not proficient in dermatology despite a curriculum that contains 18 hours of training has caused us to re-evaluate the effectiveness of our curriculum. Since half of the medical schools in the United States provide less than 10 hours of required instruction in dermatology [2], we suggest that medical schools assess the effectiveness of their dermatology curriculum. If they find their current efforts to be ineffective, we recommend evaluating the timing and methods of delivery of their didactic curriculum and consider the introduction of required clinical rotations.

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CONFLICT OF INTEREST

No potential conflict of interest relevant to the study was reported.

SUPPLEMENTARY MATERIAL

Audio recording of abstract.

Editorial comments: For the learning of special fields of medicine by medical students, the specific competency should be included as learning objectives in each medical school. Also, it is not merely hours of teaching but providing incentive to think about special fields' problems to augment the medical student's knowledge and skill. Therefore, this suggestion on the dermatology curriculum should be considered in the context of medical graduates' minimum performance. Although it is a result of one institute's research, the report provides a hint about the present curriculum in dermatology in the United States.

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