

## Brief Intervention to Improve Diagnosis and Treatment Knowledge of Skin Disorders by Family Medicine Residents

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**Background and Objectives:** Family medicine residents encounter and treat a significant number of skin diseases. It is important for them to make correct diagnostic and treatment decisions for these diseases. Our study was done to assess residents' competence in diagnosing and treating skin disorders before and after a brief educational intervention. **Methods:** A questionnaire containing photographs of 40 skin conditions was administered to 45 family medicine residents, who were asked to identify the conditions shown in the photos. The subsequent intervention consisted of a lecture by a senior resident and a photographic quick reference guide, which was given to each resident. A posttest was administered 8 months later to again assess residents' ability to identify skin conditions. For comparisons of pretest and posttest performance, *t* tests were used. **Results:** Participants showed significant improvement in both diagnosing (from 22.3% correct to 54.9% correct) and providing treatment recommendations (from 15.4% correct to 48.5% correct) for skin disorders. **Conclusions:** A peer-prepared lecture combined with a take-home photographic quick reference guide is an effective way to improve a family medicine resident's knowledge of skin disorders.

(Fam Med 2007;39(10):720-3.)

Primary care residents encounter and treat a significant number of skin conditions.<sup>1-4</sup> Approximately 6% to 7% of all visits made by patients to physicians are for diseases of the skin, hair, and nails, and non-dermatologists treat almost 60% of these patients.<sup>1,5-7</sup> Whether family physicians are able to correctly diagnose or treat patients with common cutaneous diseases has often generated considerable debate.<sup>5,6</sup>

Several studies indicate that non-dermatologists have difficulty in diagnosing and treating skin disorders,<sup>2-4,7,8</sup> and some have questioned whether family medicine residencies provide sufficient training in this content area.<sup>1-4,6,9,10</sup> Poor diagnostic, therapeutic, and referral skills may negatively influence the delivery of health care.<sup>1,4,8,10,11</sup>

Adequate training in dermatology can be achieved for family medicine residents by a variety of methods. Gerbert showed that after receiving a multi-component intervention, which comprised a combination of elements including a booklet, magnifying tool, and skin color guide, primary care residents could diagnose and make evaluation plans for cancerous lesions, including

malignant melanoma, at a level equivalent to that of dermatologists.<sup>12</sup> Brochez noted that after a lecture on melanoma, general practitioners' ability to recognize malignant disease increased from 72% to 84% of cases.<sup>13</sup> Fawcett suggests that using photos of skin problems as a teaching tool improved residents' ability to make correct diagnoses.<sup>14</sup> Finally, Gerbert also showed that previous experience in dermatology clinic by way of clinical rotation improved treatment and diagnostic performance by primary care residents.<sup>13</sup>

Our study assessed family medicine residents' knowledge about diagnosing and treating a variety of skin disorders before and after a brief educational intervention. We also compared knowledge levels based on whether or not residents had completed a required dermatology rotation.

### Methods

#### *Subjects and Setting*

The University at Buffalo's Institutional Review Board approved this project. All residents were included in this study except those excused for patient care duties.

The University at Buffalo's family medicine residency has 16 residents each year and a total of 48 residents

in the program. Residents see patients in university-directed community-based hospitals, family medicine centers, and nursing homes. The patients seen in these clinical settings are a mixture of inner-city low-income residents, suburban residents, and patients from rural areas around Buffalo.

The family medicine residency has a required 4-week rotation in dermatology for the third-year residents. There are also two 4-week blocks of elective time for second- and third-year residents, which offer residents the opportunity to rotate in any area of interest. During the past 3 years, a total of 12 residents opted for a dermatology rotation during their elective time.

#### *Pre-intervention Questionnaire*

The study involved administering a questionnaire to all family medicine residents at the University at Buffalo's family medicine residency program. The questionnaire was made up of photographs, and questions assessed residents' knowledge about diagnosis and treatment of 32 common and eight emergency dermatologic disorders depicted in the photographs. The specific conditions were selected from the textbook *Primary Care Dermatology*.<sup>14</sup>

Photographic images of these skin conditions were distributed in a handout format. Residents were expected to identify each condition and also indicate what the treatment options would be. The questions required residents to enter the correct answer; there were no multiple-choice questions. It took residents about 15–20 minutes to complete the questionnaire.

Personal identifiers such as name, address, and identification numbers were not collected. However, residents identified their year in the residency and whether they had completed a required dermatology rotation.

#### *Educational Intervention*

Five months after the administration of the first questionnaire, a lecture was given by a senior resident on diagnosis and treatment options for the 40 skin disorders tested in the initial questionnaire. This was immediately followed by distribution to all residents in the department of a photographic quick-reference guide composed of 32 common and eight emergency skin disorders. Pictures were derived from *Primary Care Dermatology*.<sup>14</sup>

#### *Post-intervention Questionnaire*

A posttest was administered 3 months after the intervention using procedures similar to those used for the initial questionnaire. While the skin conditions depicted in the second questionnaire were the same as in the pretest, the specific pictures were different. Residents did not have an opportunity to study prior to administration of either the pre-intervention or post-intervention test.

#### *Data Analysis*

Simple descriptive statistics were calculated for each item on the diagnostic/therapeutic knowledge test. Items from the knowledge questionnaires were used to create two scores at each time point: (1) knowledge of diagnosis and (2) knowledge of therapeutic recommendations, both scored as the percentage of correct answers. Groups were stratified by whether or not they had completed the third-year dermatology rotation. We used *t* tests to test for mean differences in knowledge scores (diagnostic and therapeutic) between those who had and had not taken the dermatology rotation. In addition, *t* tests were used to assess mean differences prior to and following the intervention.

#### **Results**

Table 1 presents the proportion of residents who were able to correctly diagnose and treat each skin disorder on the pre- and post-intervention assessment. Diagnostic knowledge scores increased from 22.3% correct before the intervention to 54.9% correct after the intervention ( $t [84]=8.74, P<.001$ ). Similarly, following intervention, treatment knowledge scores increased from 15.4% correct to 48.5% correct responses ( $t [84]=8.99, P<.001$ ).

Prior to the intervention, residents had difficulty diagnosing many disorders but the fewest were able to recognize varicella, irritant contact dermatitis, cutaneous drug reaction, madura foot, hidradenitis suppurativa, erysipelas, erythroderma, and toxic epidermal necrolysis, respectively. Following intervention, the percentage of individuals answering correctly with regard to both diagnosis and treatment improved for all but one item, oral hairy leukoplakia. In terms of cancer diagnosis, identification of basal cell carcinoma improved from 28.6% to 59.1%, squamous cell carcinoma from 17.1% to 70.5%, and malignant melanoma from 54.8% to 79.5%,  $P<.001$ . No knowledge measure varied significantly based on whether or not residents had completed a dermatology rotation.

#### **Discussion**

This study found that a one-time peer-presented lecture combined with a take-home pictorial quick-reference guide led to an improvement in the ability of family medicine residents to correctly state the diagnosis and treatment for a variety of skin conditions. Prior to the intervention, residents scored poorly. The poor performance may have been related to deficient training, since studies have shown that the average medical school educational requirement in dermatology is only 21 hours, and most of this occurs in the first 2 years of medical school before clinical medicine experience is acquired.<sup>1,3,4,6,10,15,18</sup> Indeed, McCarthy notes that many American medical students graduate without having taken care of a patient with a dermatologic condition.<sup>2</sup>

During residency, this deficiency persists because 1 month or less of clinical dermatology training may still be inadequate.<sup>5,8,15</sup> Other avenues by which family medicine residents commonly learn dermatology are through daily clinical experience augmented by didactic lectures. However, each resident's experience depends on what problems are encountered.<sup>16</sup> These experiences can be supplemented by way of educational

materials, and this approach has been shown to improve knowledge of skin conditions and diagnostic skills of the residents.<sup>17</sup>

#### *Effectiveness of Single Lectures*

The relevance of our finding that the combination of the peer lecture and quick-reference guide improved diagnostic and therapeutic knowledge is important in

Table 1  
Competence—Percent Correct

<i>Items (Skin Conditions)</i>	<i>Pretest (n=42)</i>		<i>Posttest (n=44)</i>	
	<i>Diagnosis %</i>	<i>Treatment %</i>	<i>Diagnosis %</i>	<i>Treatment %</i>
1. Abscess	7.1	9.5	34.1	36.4
2. Acne	16.7	11.9	95.5	90.9
3. Alopecia areata	76.2	28.6	97.7	77.3
4. Atopic dermatitis	14.6	19.5	63.6	68.2
5. Candidiasis	52.4	47.6	93.2	88.6
6. Cellulitis	35.7	38.1	88.6	88.6
7. Varicella	0.0	0.0	18.2	22.7
8. Contact dermatitis	2.4	2.4	27.3	34.1
9. Drug reaction	2.4	0.0	13.6	20.5
10. Erythema multiforme	2.4	11.9	43.2	25.0
11. Infectious folliculitis	9.5	21.4	61.4	50.0
12. Madura foot	2.4	2.4	65.9	63.6
13. Herpes simplex	38.1	16.7	86.4	77.3
14. Herpes zoster	47.6	38.1	84.1	75.0
15. Hidradenitis suppurativa	0.0	0.0	45.5	45.5
16. Oral hairy leukoplakia	29.3	2.4	4.5	0.0
17. Impetigo	40.5	33.3	75.0	68.2
18. Inflamed epidermoid cyst	26.2	33.3	59.1	63.6
19. Leg ulcers	41.5	34.1	72.7	72.7
20. Lichen simplex chronicus	4.8	11.9	11.4	20.5
21. Melasma	28.6	2.4	75.0	22.7
22. Molluscum contagiosum	47.6	19.0	81.8	45.5
23. Nummular dermatitis	7.1	11.9	20.5	25.0
24. Pityriasis rosea	38.1	9.5	56.8	25.0
25. Psoriasis	42.9	28.6	88.6	75.0
26. Raynauds disease	19.0	9.5	50.0	34.1
27. Rosacea	33.3	11.9	34.1	18.2
28. Scabies	14.3	7.1	15.9	13.6
29. Seborrheic dermatitis	11.9	7.1	65.9	54.5
30. Pityriasis versicolor	33.3	0.0	65.9	54.5
31. Warts	40.5	38.1	86.4	75.0
32. Bullous pemphigoid	12.2	9.8	79.5	52.3
33. Erysipelas	2.4	2.4	18.2	40.9
34. Erythroderma	2.4	9.5	29.5	27.3
35. Lyme borreliosis	7.3	2.4	27.3	22.7
36. Toxic epidermal necrolysis	2.4	2.4	40.9	29.5
37. Hypersensitivity vasculitis	4.8	7.1	9.1	9.1
38. Basal cell carcinoma	28.6	28.6	59.1	63.6
39. Squamous cell carcinoma	17.1	19.5	70.5	77.3
40. Malignant melanoma	54.8	42.9	79.5	84.1
Total	22.3	15.4	54.9	48.5

that the information received by the residents during the intervention not only improved their knowledge immediately. It also led to a long-term (3 month) retention of the acquired knowledge.

Effectiveness of single lectures has been studied. Fiel determined that significant learning of lecture content could occur during a single lecture given to second-year medical students. The mean level of learning of the required content rose from 63% to 92% in both groups.<sup>18</sup> Brochez, as described earlier, also showed the effectiveness of a single lecture on melanoma.<sup>12</sup> Ergene demonstrated that an effective education could be achieved by the use of peer educators and lectures.<sup>19</sup> Finally, in evaluating the ability of senior house officers to interpret electrocardiographs (ECGs) in the emergency department, White, in his study tested the value of a single seminar on ECG interpretation delivered by a cardiologist. Four weeks after the lecture, a prospective audit of ECG interpretation indicated that the number of clinically important errors and the rate of inappropriate discharge were halved.<sup>20</sup>

On the other hand, limited effectiveness of a single lecture has also been described. Wendling showed that even when it is timely, a single didactic lecture could not be relied on as an effective tool to improve short-term clinical care provided by residents.<sup>21</sup> FitzGerald found a lack of relationship between attendance and residents' adjusted board scores in didactic lectures;<sup>22</sup> Picciano's study had similar findings.<sup>23</sup>

Our study combined a peer lecture with a take-home pictorial quick reference guide to which residents had easy access. We believe the additive effect of these teaching methods led to the improvement we found in residents' knowledge.

### Limitations

The major limitation of the study is that this was done in a single family medicine residency program. It should be repeated in other residency programs to test generalizability. Other limitations are the small size of the study population and the limited number of skin conditions involved, several of which are rare.

### Conclusions

A one-time peer-provided lecture combined with distribution of a quick reference guide can lead to increased knowledge of the diagnosis and treatment of skin disorders.

*Acknowledgments:* Financial support for this project was provided by the University at Buffalo's 2004 Evidence-based Medicine/Quality Improvement Award. Thanks to all the family medicine residents at the University at Buffalo.

This manuscript was presented at the 2006 Medical Society of the State of New York, Buffalo, NY (first place prize at poster presentation); the University at Buffalo's 2006 Ninth Annual Scholarly Exchange Day; and as a poster presentation at the 2006 North American Primary Care Research Group Annual Meeting, Tucson, Ariz.

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