Efficacy of Peer-Assisted Learning Across Residencies for Procedural Training in Dermatology

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Abstract

Background With new care models such as the medical home, there is an expanding need for primary care providers to be trained in dermatologic procedures. Yet, many internal medicine residency program graduates feel unprepared to perform these procedures. The aim of this study was to evaluate the effect of a structured peer-assisted learning approach to improve residents' knowledge and skills related to common dermatologic assessment techniques.

Methods Eight medicine-dermatology resident educators, with a faculty member, facilitated dermatologic procedure workshops for 28 internal medicine and medicine-pediatrics resident learners. Learners completed preworkshop and postworkshop surveys, assessing their knowledge and skill levels as well as the efficacy of the resident educators and the educational value of the workshop as a whole.

Results All learners were able to properly demonstrate the techniques at the workshop's conclusion. The median sum score of self-reported knowledge increased from 3 to 9.5 (scale, 0–10; $P < .001$). The median sum score of self-reported skills increased from 10 to 16 (scale, 4–20; $P < .001$). Resident educators were favorably evaluated by their peers, and 96% of participants rated the experience as being of high educational value.

Conclusion Peer-assisted learning is effective in teaching dermatologic procedures in graduate medical education. Resident learners found peer-assisted learning to be beneficial and rated their peer teachers highly. Further studies should focus on outcomes in practice, looking at the number of dermatologic procedures performed by learners, as well as the effects on resident educators.

Editor's note: The online version of this article contains the survey instrument used in this study.

Background

Patients with dermatologic problems commonly first see a primary care provider. One study reported that 36.5% of patients presenting to their primary care physician had at least 1 skin problem; for 59% of those with skin disease, it was the chief reason they sought medical care.¹ A 2007 survey of 1300

internists found an increase in the number of skin procedures conducted.² Despite this demand for care, many trainees who graduate from internal medicine residencies report feeling unprepared to conduct outpatient dermatologic procedures.^{3,4}

A potential approach to addressing this educational gap is peer-assisted learning (PAL), in which learners at the same, or nearly the same, educational level assist in the education of others. Peer-assisted learning is rooted in the belief that teachers with a similar knowledge base to that of their learners are more effective than educators with a larger “cognitive distance.”⁵ Research has demonstrated the efficacy of PAL in undergraduate settings such as anatomy education,⁶ problem-based learning,⁷ and acquisition of physical examination skills.^{8,9} Peer-assisted learning can also alleviate teaching pressures for faculty while maintaining the same teaching efficacy.^{9,10} Although PAL has been used for centuries, the evidence base for peer teaching in graduate medical education is not well developed. There also is a paucity of studies examining the utility of PAL in dermatology procedures education and between different residency programs.

The University of Minnesota is 1 of 7 US institutions with a combined medicine-dermatology program. Residents in this 5-year program spend 30 months training within each discipline. Trainees have extensive experience with dermatologic procedures and can provide a unique perspective on dermatologic illness to their peers.

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We developed a structured Dermatology Procedure Workshop, led primarily by medicine-dermatology resident educators, to teach residents in our internal medicine and combined medicine-pediatrics residency programs. We proposed that PAL, within the context of dermatologic procedures training, in a structured graduate medical educational setting, would be both effective and well received by learners as measured by learner self-reports.

Methods

Study Design

We used a prepost, within-subject study design to compare residents' knowledge and skills about skin biopsy procedures before and after completing a PAL Dermatology Procedure Workshop. The study was assigned exempt status by the University of Minnesota Institutional Review Board.

Setting and Learners

The procedure workshop is held quarterly during a 3-month ambulatory block for both residency programs. All internal medicine ($n = 90$) and medicine-pediatrics ($n = 42$) residents rotate through the workshop once during their second through fourth years of training. Our study included 28 residents who participated in this workshop from November 2009 to October 2010.

Peer Educators

All 8 medicine-dermatology residents in their second to fourth year served as peer educators. Resident educators provided input on the workshop's didactic component, the instruments to be used for the procedures, and the techniques demonstrated. Peer educators did not receive formal instruction on how to teach the procedures for this workshop.

Workshop Content

The workshop was held in our medical school's Simulation Center (SimPortal). The curriculum was developed by the first author and has 4 learning objectives: (1) recognize suspicious moles, (2) demonstrate understanding of indications for punch and shave biopsies, (3) demonstrate ability to perform both types of biopsies, and (4) demonstrate ability to perform simple suturing techniques. The workshop begins with a 40-minute didactic section, taught by the same faculty member and by our resident educators. Content focuses on indications for biopsy, risks and complications, indications for specialty referral, and identification of suspicious skin lesions. This is followed by a resident-led, 2-hour practicum, consisting of an interactive discussion with pictorial examples and a demonstration of skin biopsy techniques on pigs' feet models. Residents then practice biopsy techniques on pigs' feet. Each learner has a formal checkout, overseen by the resident educators, to assess competence on a pass/fail basis. A passing grade requires correct completion of all procedures in their entirety.

Data Collection

Before the start of the workshop, all resident learners completed an anonymous survey evaluating their self-reported knowledge and skills in basic dermatology procedures. Knowledge was rated on a 3-point scale from "not at all" to "completely" for 5 items corresponding to the core dermatologic concepts (eg, "distinguish when to use shave versus punch biopsy," "limitations and complications of these procedures"). Skill was rated in 4 biopsy areas (eg, "performing a shave biopsy of skin lesions") on a 5-point scale, based on Dreyfus levels of skills acquisition (1 = novice, 5 = expert).

Participants completed a postworkshop survey with the same knowledge and skills questions. Respondents also evaluated the faculty instructor and peer educators; responses were on a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). A single item asked respondents to give an overall assessment of the educational value of the workshop (3-point scale; 0 = no value, 2 = high value). Surveys took approximately 5 minutes to complete and were batched by individual participants.

Analysis

We computed frequencies of the knowledge and skill level responses for preworkshop and postworkshop surveys. A separate sum score was created for the knowledge level (scale, 0–10) and skill level responses (scale, 4–20). The Wilcoxon signed rank test was used to compare the prerespouses and postresponses and sum scores. *P* values were compared to the Bonferroni adjusted significance level of .004 for the 2 primary hypotheses related to the sum scores and for each individual response to the knowledge and skill level questions.

Results

All 28 learners properly demonstrated the techniques at the conclusion of the workshop. The response rate for the baseline and follow-up surveys was 100%. However, 3 respondents did not complete all of the skills questions on the follow-up survey.

From preworkshop to postworkshop, the median sum score of self-reported knowledge increased from 3 to 9.5 (scale, 0–10; $P < .001$). The median sum score of self-reported skills increased from 10 to 16 (scale, 4–20; $P < .001$). The change in sum score ranged from 1 to 10 for the knowledge level responses and from –3 to 11 for the skill level responses.

Frequencies of the changes in the individual knowledge and skill level responses from preworkshop to postworkshop are shown in TABLE 1. The median change for each response and the corresponding *P* value are also shown in TABLE 1; changes from preworkshop to postworkshop were statistically significant (all *P* values $< .002$) for each of the knowledge level and skill level responses.

TABLE 1 DISTRIBUTION OF CHANGE FOR INDIVIDUAL KNOWLEDGE AND SKILL LEVEL RESPONSES FROM PREWORKSHOP TO POSTWORKSHOP

	Change From Preworkshop to Postworkshop								
	−2	−1	No Change	1	2	3	4	Median	P Value ^a
Knowledge									
Shave biopsy	...	...	3	13	12	...	...	1	<.001
Punch biopsy	...	...	4	12	12	...	...	1	<.001
Distinguish procedures	...	...	4	12	12	...	...	1	<.001
Limitation of procedures	...	...	6	18	4	...	...	1	<.001
When to refer	...	...	8	17	3	...	...	1	<.001
Skills									
Administering anesthesia	0	1	8	12	3	1	0	1	.006
Perform shave biopsy	1	1	2	5	6	9	1	2	.001
Perform punch biopsy	0	2	1	7	6	9	0	2	<.001
Suture	1	0	6	12	5	1	0	1	.001

^a P value based on Wilcoxon signed rank test.

Note: No entry indicates that participants did not respond to this question on the survey.

Resident learners highly rated the teaching skills of their educator-peers (TABLE 2). In addition, 96% of participants (27 of 28) responded that the workshop was of “high educational value”; 1 participant rated the educational value as “moderate.”

Discussion

While residents have taught their peers for decades, there is little understanding of when and how these peers are most effective. Our review of the literature revealed little as far as structured opportunities for peer-assisted learning in graduate medical education, and we found no published data on the use of PAL for procedural instruction in residencies.

Residents who completed our workshop for dermatology procedures had statistically significant increases in their self-rated dermatologic knowledge and skills immediately after workshop completion. Our peer educators were highly rated as instructors, and a global evaluation demonstrated that residents found this activity to be of high educational value.

Three of our 28 learners reported a decrease in their procedural skills at the end of the workshop; however, all of these same learners rated this learning experience as being of “high educational value.” It may be that these learners overestimated their skills before demonstration of the proper technique and completion of the practical training.

TABLE 2 POSTWORKSHOP EVALUATION OF MEDICINE-DERMATOLOGY RESIDENT EDUCATORS BY RESIDENT LEARNERS

Teaching Skill Area	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Explained equipment, rationale, complications	0	0	0	4	24
Demonstrated and explained each step	0	0	1	4	23
Gave clear directions	0	0	1	2	25
Observed and coached	0	0	0	4	24
Pointed out correct and incorrect methods	0	0	0	4	24

A limitation of our study is that it evaluated a new PAL Dermatology Procedure Workshop at 1 institution over a period of 11 months, and it is not clear whether these results can be generalized to other settings. Having additional residency programs implement the same workshop would strengthen the conclusions. Our study is limited by the use of learner self-assessment of skill and knowledge for evidence of efficacy. Another limitation is the inability to distinguish separate effects of the lecture component and practicum on learner outcomes. Moving forward, we plan to track the number of biopsies performed by learners later in their training and while in practice to ascertain the workshop's longer-term impact. Future research in this area should also consider the development and testing of a competency-based evaluation tool and evaluation of the effects of PAL procedural training on the peer educators themselves.

Conclusions

As the primary-care medical home¹¹ model develops, there will be a growing need for internists to competently perform basic dermatologic procedures. As academic general internists report low levels of confidence in teaching these procedures,^{12,13} we may need to continue to turn to other educators to teach these skills. With the growth of medicine-dermatology training programs, it makes sense that we continue to test educational models that use residents in our combined program as peer educators in this area. Peer educators can effectively fill this gap at a much lower cost to

university programs while simultaneously reducing pressure on faculty educators to leave the clinical setting.

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