

Effectiveness of Residents as Teachers, Researchers and Role Models: A Unique Program at SUMS

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Abstract

Background and purpose: Residents across the world spend several hours every week teaching medical students and junior residents. Workshops developed with the aim of improving resident teaching skills are becoming increasingly common in the various fields of medicine. The objectives of this study were to evaluate the effect of a resident-as-teacher educational intervention on the resident's knowledge of medical education.

Methods: The study was performed in SUMS, Iran, in 2010-2011 on all the junior residents from the different fields, including 104 men and 66 women. For data collection, a questionnaire (pre-test, post-test) was used with 40 questions on medical education. The data were analyzed using descriptive statistics, tables and t test employing the SPSS software.

Results: In total, 120 participants completed the questionnaires. According to the pre-test and post-test results, residents received extremely low scores in different subjects before the course implementation, whereas after it was implemented their scores had significantly increased fairly well. The comparison between the participants, average scores before and after the program indicates that the "resident-as-a-teacher, researcher and role model" course has been meaningful and significantly effective in improving their knowledge in this area.

Conclusions: A few residency programs had instituted the resident teacher training curricula. A resident teacher training workshop was perceived as beneficial by the residents, and they reported improvement in their teaching skills.

Keywords: EFFECTIVENESS, RESIDENTS AS TEACHERS, NOVEL PROGRAM

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Introduction

Many studies have demonstrated that residents play an important role in the undergraduates' clinical education and medical students' evaluation (1-3). Students reported that they had gained most of their clinical learning through interacting with the residents (4). Residents actually played a significant part in molding the students'

attitude towards their profession (5). In Scott Wright's studies, students have indicated that the residents conduct more teaching at the bedside compared with the attending physicians. They also maintained that the residents generally spend up to one-quarter of their work hours in teaching, evaluating and supervising the medical students and other residents (6, 7). However, their training was insufficient to handle such responsibilities. In fact, despite their significant teaching responsibilities, many residents received no formal education on how to teach effectively (8). Teaching skills are, in fact, important for residents for two reasons. First, they are responsible for teaching the medical students. The second reason that residents need to acquire teaching skills is that teaching itself is

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the best way to learn. Teaching is considered an essential competency for residents which should be programmed, improved and evaluated (4). Recently, there has been some evidence showing that residency curricula are moving towards helping the residents improve their teaching skills in different disciplines (9-11). A survey in 2001 showed that 55% of the residency training programs in the United States recommended offering teaching skills to their residents (7). Residents also felt that they would be better teachers if they received some form of training in teaching skills (12).

Consequently, training the residents to teach and become efficient role models is an essential issue. A program named "Resident Training Development Program" (RTDP) was implemented in Mount Sinai Hospital and its affiliated centers to provide primary teaching skills for the residents in all specialties. The objective of the program was to improve the quality of clinical education in the hospital and its affiliated centers. To implement the program, the residents were assigned to train medical students and first-year residents and try to improve the teaching skills of these new residents. The program was conducted in the medical schools due to the availability of more facilities and also the wider participations of the residents. In reality, this teaching guideline was developed to help the residents to act as teaching assistants (13).

Family physicians in AAFP have presented some general guidelines to teach residents how to search and investigate. These guidelines include valuable information concerning medical skills and searching which have been published for family physicians and other specialized fields. It is divided into several sections dealing with manners, knowledge and advanced skills. Most of the subjects relating to research are subdivisions of the advanced skills. These subjects include designing a questionnaire, designing a study, data collection and analysis, discussing findings, writing a research article and making a presentation (14).

Morrison et al. designed an educational program entitled "resident as a thirteen-hour teacher" and randomly chose a number of residents in order to implement the program. The results of the course evaluation, done by the medical students indicated progress in effective teaching (11). The results also revealed that the residents who had participated in the thirteen-hour training course showed great enthusiasm for teaching. They mostly used the learner-centered approach, expressed their deepest sympathy for the ones who had not passed this course and tended to continue teaching in the future (15).

In spite of the residents' crucial role in improving the teaching quality, there is some evidence showing that in the Tehran Universities, the students do not receive sufficient information regarding teaching and learning methods, evaluation or curriculum planning. At none of their educational levels, are any teaching skills transmitted from the teachers to the students based on a focused teaching program and it is taken for granted that the residents will acquire such skills implicitly (16).

Based on a study in the Tehran University of Medical Sciences, it has been recommended that greater attention should be paid towards implementing an educational program for the residents from different clinical departments in medical schools during the residency tenure. In other words, it is better to design a training course on teaching skills for the residents at the beginning of their residency, based on needs assessment (17). Considering the importance of the residents' roles in the teaching and learning processes and the promotion of instructional quality, Shiraz University of Medical Sciences has designed and implemented the "Resident as a Teacher" training program.

Methods

The study was conducted in Shiraz University of Medical Sciences. In the preliminary phase, or Teaching skills development, we

designed and delivered a six-day long workshop on teaching skills, clinical reasoning and evidence-based education for 170 residents in four groups. The course was conducted at Shiraz University of Medical Sciences and was cosponsored by the Vice Chancellor for Education and Medical Schools, in 2010. The participants' objectives to attend the workshop included: 1) to discuss the effective lecturing and, small-group and large-group teaching, 2) to learn about new methods of student assessment, and 3) to reflect more on the professional duties with the approval of the Vice Chancellor for Education. The training course with a multi-disciplinary approach was implemented for the four different groups. The educational programs were presented in different formats. But the most commonly used formats were the mini lectures and workshops (7, 18).

In the "Resident as a Teacher" course presented as workshops, the participants were divided into four groups, each consisting of 40 participants. As no evaluation has been done for the effectiveness of the program, the purpose of the present survey which is both descriptive and cross-sectional is to assess the effectiveness of the program and provide feedback to the designers and program

executives.

For evaluating the program's effectiveness, an MCQ test with 40 items, each having 0.5 points, was designed to assess the residents' knowledge. The test was distributed among the participants in a pre-test and post-test at the beginning and end of the course. According to expert opinions, the study outcomes were grouped under four broad categories: scores from 17 to 20 were considered "very good", scores from 14 to 16 "good", and scores from 10 to 13 "fairly good" and scores below 12 "unacceptable". This means that score "12" was considered as the cut off score for this exam. Differences in the means were tested using the paired T-test. Confidence intervals (CIs) were set at 95%. Differences in the categorical variables were tested using the chi-square analysis. Statistical significance was set at $p \leq 0.05$. The data were analyzed, using the SPSS version 17.

Results

A total of 170 residents attended the study. The distribution of the residents was equal in all the four workshops. The residents who participated in the workshops included 11

Table 1. Differences in students' scores between the two teaching methods

Subject		Mean (max=20) & Standard Deviation		
		Level of Significance	Pre-test	Post-test
instructional designing	27 questions	$p < 0.01$	2.6 ± 3.8	2.6 ± 12.2
clinical education	8 questions	$p < 0.01$	4.09 ± 3.8	3.6 ± 12.2
research	5 questions	$p < 0.01$	4.6 ± 6.6	4.2 ± 15
total score	40 questions	$p < 0.01$	2.9 ± 3.8	2.3 ± 12.1

Table 2. Frequency and percentage of the residents' scores in the pre-test and post-test, (very good, good, fairly good and unacceptable)

subject	Desirability							
	very good		Good		fairly good		Unacceptable	
	n=120	Percent	n=120	percent	n=120	percent	n=120	Percent
Pre-test	0	0	0	0	2	1.7	118	98.3
Post-test	4	3.3	14	11.7	80	66.7	22	18.3

Table 3. Frequency and percentage of the residents' scores in the different subjects, before and after the course, (very good, good, fairly good, and unacceptable)

topical subjects	test	very good		good		fairly good		unacceptable	
		n=120	%	n=120	%	n=120	%	n=120	%
		Instructional designing	pre-test	0	0	0	0	0	0
	post-test	7	5.8	21	17.5	68	56.7	24	20
research	pre-test	0	0	9	7.5	22	18.3	89	74.2
	post-test	32	26.7	42	35	31	25.8	15	12.5
clinical education	pre-test	1	0.8	2	1.7	4	3.3	113	94.2
	post-test	20	16.7	12	10	41	34.2	47	39.2

from Pediatrics, 10 from Internal Medicine, 9 from Obstetrics & Gynecology, 4 from Rehabilitation, 4 from Dermatology, 9 from Surgery, 4 from Urology, 13 from Anesthesia, 8 from Radiology, 6 from Ophthalmology, 4 from ENT, 6 from Psychiatry, 2 from Neurology, 7 from Orthopedics, 5 from Neurosurgery, 9 from Cardiovascular, 6 from Pathology and 3 from Community Medicine. Among these residents 66 (38.8%) were women and 104 were men (61.1%).

The table above shows that after completion of the course, the residents' scores significantly increased compared with their scores before the period. The results showed that the achievement in this educational program had mostly been very good. The frequency and percentage of very good, good, fairly good and unacceptable scores in the pre-test and post-test and also the scores on the different subjects (instructional designing including planning a curriculum, teaching methods, evaluation, medical ethics, research methods, and clinical education) are presented in table 2 and 3. The results show that the scores increased after the completion of the course compared with the ones before the program.

A review of the total scores and the scores on the different subjects shows that scores below 10 are considered unacceptable. According to table 4, the scores were below the expectancy level before the course while they remarkably increased after completion of the course.

Discussion

The residents obtained extremely low scores in the different subjects before the course implementation, while their scores significantly increased after program completion.

The comparison between the participants' average scores before and after the program reveals that the "Resident as a Teacher, Researcher and Role Model" course has been significant and effective in improving their knowledge in this area. Other studies also concluded that the educational programs for the residents were very effective (20, 21). Frequency and percentage of the very good, good, fairly good and unacceptable scores in the pre-test and post-test and also the scores on the different subjects (instructional designing, research methods and clinical education) show that the scores increased after course completion compared with that before the course, and according to the standard or cut off score (scores above 12 are considered "very good" and the scores below 10 are "unacceptable"). As we had observed that the scores' desirability and the scores on different subjects were extremely low before the program, after completion more than 80 percent of the scores were very good. As the studies indicate the residents require teaching skills, with an emphasis on their professional specialties. Generally, a competent teacher helps the students learn by themselves. In an evidence-based case study (22), Morrison had offered some special programs for improving the residents' educational skills. Resident-as-

Teacher courses are now quite common in the Western Medical Schools. However, they are rarely found in the Asian and developing countries (23).

Considering the residents' scores which increased significantly after the course completion, it can be concluded that the course was effective in helping the residents acquire more knowledge in this relation. A survey, a codified program, by Mann et al., in Dalhousie University, Canada implemented the 12 fundamental steps of "Resident-as-a-Teacher" course and found that the course had a great effect on the residents (24). Another study showed that the knowledge gained by the pediatric residents on CPR after a PALS (Pediatric Advanced Cardiac Life Support) course significantly increased (25). Several studies have indicated that medical schools should design a few codified programs for teaching and improving the residents' teaching skills (24, 21). Researches have demonstrated that teaching improves the residents' own knowledge to a great extent (26, 27). In the survey conducted by Ostapchuk on a three-year educational program designed for the residents of Louisville University in America, considering the opinions of the lower level students and the survey results, he concluded that courses on "learning and teaching skills" have significantly influenced the residents' skills and the quality of the clinical education (28). Program directors also suggested that the residents become active contributors to the teaching in most programs. They argued that the residents would benefit from structured training so that they can also enhance their own teaching skills (29).

Generally, workshops either own or provide sufficient quality equipment which every participant can access. Furthermore, workshops permit the students to use the equipment in different projects and thus the students become familiar with the equipment in a work environment.

Workshops with the objective of improving the residents' teaching skills are becoming increasingly common in various fields of

medicine (29). In a training program for internal medicine residents, the participants defined the various roles of the clinician-educators and described the goals, training opportunities, assessment and resource requirements for such programs through open discussion and small group work and concluded that such programs were essential for the residents (30).

Regarding the results of this survey, it can be concluded that the "Resident as a Teacher, Researcher and Role Model" course has greatly influenced the residents' future performance. Consequently, medical schools should value such training courses and not consider them as additional expenses, but as a part of organizational responsibilities.

This survey investigated only the participants' knowledge before and after a training course. However, in future studies, it is necessary to consider the opinions of the attending physicians, residents and junior students regarding the course quality and its effectiveness on the residents' skills compared with the skills of those who did not pass the course. One of the limitations of this study is that it was held in one university, which might limit its generalization to different settings.

Conclusions

Residents have a crucial and important role to play as teachers. This is the first residency program that has incorporated a teaching skills training curriculum for residents in Iran. This course definitely improved the residents' teaching skills. Further studies are, of course, warranted to evaluate the components of the workshop that are the most beneficial to the residents and to those they teach.

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References

1. Busari JO, Scherpbier AJ, van der Vleuten CP, Essed GG. Perceptions of attending doctors of the role of residents as teachers of undergraduate clinical students. *Medical education*. *Med Educ*. 2003;37(3):241-7.
2. Cullimore AJ, Dalrymple JL, Dugoff L, et al. The Obstetrics and Gynaecology Resident as Teacher. *J Obstet Gynaecol Can*. 2010;32(12):1176-85.
3. Hill AG, Yu TC, Barrow M, Hattie J. A systematic review of resident-as-teacher programmes. *Med Educ*. 2009;43(12):1129-40.
4. Farrell SE, Pacella C, Egan D, et al. Resident-as-teacher: a suggested curriculum for emergency medicine. *Acad Emerg Med*. 2006;13(6):677-9.
5. Coverdale JH, Ismail N, Mian A, Dewey C. Toolbox for Evaluating Residents as Teachers. *Acad Psychiatry*. 2010;34(4):298-301.
6. Wright SM. Examining What Residents Look for in Their Role Models. *Acad Med*. 1996;71(3):290-2.
7. Swainson J, Marsh M, Tibbo PG. Psychiatric Residents as Teachers: Development and Evaluation of a Teaching Manual. *Acad Psychiatry*. 2010;34(4):305-9.
8. Morrison EH, Friedland JA, Boker J, Rucker L, Hollingshead J, Murata P. Residents-as-teachers training in U.S. residency programs and offices of graduate medical education. *Acad Med*. 2001;76:S1-S4.
9. Bing-You RG, Tooker J. Teaching skills improvement programmes in US internal medicine residencies. *Med Educ*. 1993;27(3):259-65.
10. Busari JO, Scherpbier AJ, van der Vleuten CP, Essed GG. The perceptions of attending doctors of the role of residents as teachers of undergraduate clinical students. *Med Educ*. 2003;37(3):241-7.
11. Morrison EH, Rucker L, Boker JR, et al. The effect of a 13-hour curriculum to improve residents' teaching skills: a randomized trial. *Ann Intern Med*. 2004;141(4):257-63.
12. Barrow MV. Medical student opinion of the house officer as a medical educator *J Med Educ*. 1966;41(8):807-10.
13. Bensinger LD, Meah YS, Smith LG. Resident Teaching Development Program. Mount Sinai: Institute for Medical Education Mount Sinai School of Medicine. *Mt Sinai J Med*. 2005;72(5):307-11.
14. Seehusen DA, Weaver SP. Resident Research in Family Medicine: Where Are We Now? *Fam Med*. 2009;41(9):663-8.
15. Morrison EH, Shapiro JF, Harthill M. Resident doctors' understanding of their roles as clinical teachers. *Med Educ*. 2005;39(2):137-44.
16. Arif M. Strategic planning in higher education curriculum. Publication of jihad, Shahid Beheshti University. 1384
17. Soltani-Arabshahi K, Ajami A, Syabany, S. The effect of teaching skills workshop on the quality of teaching residents. *Journal of Iran Medical Sciences university*. 1383;11(39):49-58.
18. Donovan A. Radiology resident teaching skills improvement: impact of a resident teacher training program. *Acad Radiol*. 2011;18(4):518-24.
19. James MT, Mintz MJ, McLaughlin K. Evaluation of a multifaceted "Resident-as-Teacher" educational intervention to improve morning report. *BMC Med Educ*. 2006;26(6):20.
20. Post RE, Quattlebaum RG, Benich JJ. Residents-as-teachers curricula: a critical review. *Acad Med*. 2009;84(3):374-80.
21. Sánchez-Mendiola M, L Graue-Wiechers E, C Ruiz-Pérez L, García-Durán R, Durante-Montiel I. The resident-as-teacher educational challenge: a needs assessment survey at the National Autonomous University of Mexico Faculty of Medicine. *BMC Med Educ*. 2010;16(10):17.
22. Morrison EH, Rucker L, Boker JR, Hollingshead J, Hitchcock MA, Prislin MD, Hubbell FA. A pilot randomized, controlled trial of a longitudinal residents-as-teachers curriculum. *Acad Med*. 2003;78(7):722-9.
23. Singh S. Senior Resident Training on Educational Principles (STEP): A Proposed Innovative Step from a Developing Nation. *J Educ Eval Health Prof*. 2010;7:3.
24. Mann KV, Sutton E, Frank B. Twelve tips for preparing residents as teachers. *Med Teach*. 2007;29(4):301-6.
25. Soltani AE, Khan ZH, Arbabi S, Hossini B, Nahvi H, Agamohammadi A. Evaluation of pediatric CPR course on knowledge of pediatric residents-before and after ACLS course. *Middle East J Anesthesiol*. 2009;20(1):89-92.
26. Greenburg LW, Goldberg RW, Jewett LS. Teaching in the clinical setting: factors influencing residents' perceptions, confidence and behavior. *Med Educ*. 1984;18(5):360-5.

27.Schmidt HG. Problem-based learning: rationale and description. Med Educ. 1983;17(1):11-6.

28.Ostapchuk M, Patel PD, Miller KH, Ziegler CH, Greenberg RB, Haynes G. Improving residents' teaching skills: a program evaluation of residents as teachers' course. Med Teach. 2010;32(2):49-56.

29.Donovan A. Radiology residents as teachers: Current status of teaching skills training in United States residency programs. Acad Radiol. Acad Radiol. 2010;17(7):928-33.

30. Heflin MT, Pinheiro S, Kaminetzky CP, McNeill D. 'So you want to be a clinician-educator...': designing a clinician-educator curriculum for internal medicine residents. Med Teach. 2009;31(6):233-40.

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