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Research Article

**EMERGENCY MEDICINE RESIDENTS AS TEACHERS:
AN UNDERGRADUATE MEDICAL STUDENTS' PERCEPTION****Running title: Medical Students Survey – Residents as Teachers**Mohammad Al-Ghofili¹, Mohammed Al-Shehri¹, Ebraheem Al- Rabiah¹, Yazeed Al-harbi¹¹College of Medicine, King Saud University Medical City, King Saud University, Riyadh,
Saudi Arabia**Abstract:**

Objectives: Clinical rotations play a major role in the learning process for medical students. During training, students are usually supervised by a team of residents and their consultants. This study was conducted in order to determine the perceptions of undergraduate medical students towards Emergency Medicine [EM] residents as teachers. **Methods:** An online survey that could be downloaded via Google documents was conducted among undergraduate medical students and interns from six government teaching hospitals in Riyadh, Saudi Arabia. **Results:** The survey was completed by 384 undergraduate medical students [interns: 88.8%; 5th year students: 11.2%]. About 63% of respondents indicated that EM residents taught them the general principles of medicine; 40.0% of respondents agreed that EM residents have a high level of theoretical knowledge, and 59.0% felt relaxed and confident when an EM resident was present to teach and guide them. Approximately 18% of students attributed 75 % of their clinical knowledge to the EM residents who taught them. However, 62.0% of the respondents believed that there is a need for EM residents to acquire more teaching skills. **Conclusion:** Undergraduate medical students and interns perceived teaching by EM residents positively. Moreover, EM residents who undertook a teaching role had a great impact on the acquisition of knowledge by undergraduate students. However, many students thought that there was still a need for EM residents to acquire more teaching skills and gain further competence in teaching.

Keywords: emergency residents ; Education; teaching; medical student ; perception**Corresponding author:****Mohammad Al-Ghofili,**
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INTRODUCTION:

Most medical training institutions require their residents to teach undergraduate medical students and interns as part of their duties and responsibilities aside from their clinical duties. Residents are involved in a multitude of educational experiences designed to assist students develop their critical thinking and decision-making procedures, which are required for the future management of patients.[1] Studies indicate that residents as teachers have a positive impact on students' learning.[2-4] On the other hand, teaching provides residents with an opportunity to learn extra skills, gain better knowledge, and update their existing knowledge in line with current principles of best practice.[5,6] Many residents believe that teaching and supervising medical students improves their self-confidence and also widens and expands their knowledge base.[7,8] Student feedback pertaining to the teaching conducted by EM resident tutors was found to significantly contribute to an overall improvement in their teaching. In fact, most of the residents felt that the student feedback they had obtained influenced them to make positive changes in their teaching style and content.[9]

Only a few studies have been conducted thus far in order to assess the perceptions towards emergency medicine [EM] residents as teachers in relation to the undergraduate medical students that they teach. However, most of the studies that have been conducted to date are largely related to the nursing profession and other specialties rather than the emergency room.[10-14] Therefore, the current study was conducted in order to determine the perceptions of undergraduate medical students and interns towards their EM resident teachers.

METHODS:

After obtaining approval from the Institutional Review Board [IRB] at King Saud University, Riyadh, Kingdom of Saudi Arabia, an online survey was conducted for all interns and 5th year medical students in six government hospitals in Riyadh, Saudi Arabia.

The survey questionnaire was developed after an extensive review of the literature was carried out, which explored both the teaching and learning norms of undergraduate students, both medical and non-medical.[2,3,5,10-14] A thorough review of these articles provided us with concrete ideas on how to frame the survey questions and in selecting appropriate questions that fit the study's objectives. The reference articles that were selected for framing the survey questions had used validated

questionnaires. A modified version of the validated questionnaires that we had encountered in our research was constructed in order to come up with our own particular survey questionnaire. The questionnaire then underwent a process of validation among ten healthcare workers in King Saud University Medical City, Riyadh, Saudi Arabia, and a 0.9 Cronbach's alpha was obtained as a result.

The survey tool that was developed consisted of several quantitative types of question that aimed to determine the psychological, pedagogical, and academic perceptions of the respondents. Responses were designed in a Likert-type-5 points scale format [1= strongly disagree; 2= disagree; 3=neutral; 4=agree; 5=strongly agree] wherein we asked for comments in order to expound some important issues. The survey questionnaire was prepared as a Google Document and uploaded to <https://www.google.com/forms/about/> and the corresponding link was sent via email to the potential respondents [i.e. both medical students and interns]. We included interns and undergraduate medical students in their fifth year, who had undergone rotations within EM department government teaching hospitals in Riyadh. Data was analyzed using the Statistical Package for Social Sciences [SPSS®], version 23 [SPSS Inc., Armonk, New York, USA] for Windows®. A P value of <0.05 was considered statistically significant.

RESULTS:

The survey was completed by 384 undergraduate medical students [for males n=207 [53.9%]], 341 [88.8%] were interns while 43 [11.2%] were 5th year medical students. About 63% [n=243] of the respondents stated that the EM residents had taught them the general principles of medicine and 40.0% agreed that the EM residents had a high level of theoretical knowledge. Approximately 46% [n=180] of the participants were assigned by EM residents to reach the diagnosis while only 37% of the participants were requested to create/produce an assessment plan.

On the other hand, 47% of undergraduate medical students [n=184] had been supervised in practical skill performance by their EM resident teacher during an EM rotation. 179 [47%] of the respondents described their EM resident as being 'a good teacher in terms of clinical skills and techniques'. Two hundred and fifteen [55%] of them said that the EM residents were able to clearly answer their questions. 40% claimed that the EM residents were always available in order to answer their queries. One

hundred and forty-five [37.0%] of undergraduate medical students noticed that the EM residents were dedicated to teaching. 134 [34.9%] of students claimed that the EM residents showed a high degree of responsibility when they were teaching the undergraduate students.

Forty-eight percent of respondents [n=188] pointed out that EM residents were able to bridge the gap between theory and practice. Seventy-two of the students [which represented eighteen percent of the survey respondents] claimed that 75% of their clinical knowledge could be attributed to their EM resident teacher. In terms of feedback, almost 44.5% of the participants [n=171] stated that they were given a high level of feedback by the EM residents. One hundred and forty-one [36%] of the respondents identified their EM resident teacher as being the major influencer in their choice of specialty in the future. However, two hundred and forty-four [62%] of the respondents pointed out that there was a need for EM residents to acquire more teaching skills. As ninety-two [24%] of respondents disparaged their EM resident teacher for not having imparted the necessary

information that they needed for their studies during their EM rotation.

There were 224 students and interns [58%] who claimed that the EM residents had maintained a high degree of moral and ethical standards. About one hundred and ninety-four [50%] of the participants denied having experienced any occurrence of stress while undergoing training with EM residents. In addition, two hundred and twenty-nine [59.6%] of the respondents reported feeling both relaxed and confident whenever an EM resident taught and guided them. Out of a total of 384 respondents, 187 of them [48.7%] stated that they would like to spend more time on duty with the EM residents. 50% of the participants considered their EM resident teacher to be a good role model in terms of teaching.

Table 1 shows the total mean score in relation to the students' perception towards their EM resident teachers as being 3.33 ± 0.75 [within the range of 1.4 – 5.0]. The mean score pertaining to their academic impact on students was 3.19 ± 1.08 [within the range of 1.0 – 5.0], where the mean total psychological impact score was 2.97 ± 0.75 [within the range of 1.17 – 4.83].

Table 1. Mean and standard deviation of medical students' perceptions towards the teaching and the academic and psychological impact of the EM resident as a teacher

	PERCEPTION OF TEACHING	ACADEMIC IMPACT	PSYCHOLOGICAL IMPACT
N	401	401	401
Mean	3.334996	3.190	2.972153
Median	3.333333	3.000	2.833333
Std. Deviation	.7541865	1.0754	.7511937
Minimum	1.4000	1.0	1.1667
Maximum	5.0000	5.0	4.8333

Table 2 shows that when compared with interns, the fifth-year medical students perceived the teaching of EM residents to be significantly better [a total mean score of 3.5 ± 0.62 was recorded versus 3.30 ± 0.77 , $P=0.039$], which had a significant academic impact on their learning [mean = 3.47 ± 1.05 versus 3.14 ± 1.07 , $P=0.037$]. This result was also shown to have a significant psychological impact on their learning [mean = 3.19 ± 0.70 versus 2.94 ± 0.75 , $P=0.018$].

Table 2. Perceptions of fifth-year medical students compared with the teaching styles of interns with those of EM residents.

Year level		N	Mean	Std. Deviation	Std. Error Mean	P-value
PERCEPTION OF TEACHING	5th year	57	3.526316	.6160144	.0815931	0.039
	intern	344	3.303295	.7708922	.0415637	
ACADEMIC IMPACT	5th year	57	3.465	1.0474	.1387	0.037
	intern	344	3.144	1.0747	.0579	
PSYCHOLOGICAL IMPACT	5th year	57	3.190058	.6975287	.0923899	0.018
	intern	344	2.936047	.7546073	.0406857	

DISCUSSION:

This study aimed to determine the perceptions of undergraduate medical students towards EM residents as teachers. It has subsequently highlighted some rather salient details regarding the psychological, academic, and pedagogical aspects of teaching and learning from the perspective of the students who were surveyed. This study showed that 5th year medical students benefited greatly from the teaching that was carried out by EM residents. Students seemed to benefit from all aspects of teaching, and reported that such teaching had had a positive academic impact upon them as well as bringing certain psychological benefits.

Approximately 18% of the subjects attributed 75% of their clinical knowledge to their EM resident teacher. This is in contrast to a study that was conducted in Spain where 69% of the medical students attributed 50% of their knowledge to their EM residents' guidance and teaching.[10] The Iranian students believed, however, that the feedback provided by their EM resident teachers during every shift was not all that helpful in bridging their knowledge gap. [11] This could be due to boredom, inadequate free time of residents due to their having to complete multiple tasks, and lack of basic training skills.[11] On the contrary, our study showed that Saudi students were highly satisfied with their resident teachers' feedback and degree of theoretical knowledge. About 48% of

the students believed that residents were able to bridge the gap between theory and practice, owing to the fact that a majority of students were assigned to reach the diagnoses even though some students were assigned to assessment and plan, this led students to discuss and ask residents about the problems they

faced while they were training with them.

Furthermore, this study indicated that students' perceived that there was a lack of teaching skills in their EM residents. This issue warrants thorough assessment by the residency training program heads and supervisors. Students in Iran suggested that EM resident teachers should acquire the teaching skills they require during the residency program before they actually begin to teach.[11] Many residents felt that they were not fully equipped with the skills to be a medical educator.[15] In order to teach students basic clinical skills such as history taking and physical examination, critical reasoning, charting and procedures, residents should receive appropriate training to teach them adequate skills.[16] An improvement in the teaching skills of residents could be achieved by implementing several techniques such as month-long elective rotations in developing teaching abilities, targeted training in rudimentary teaching skills, engaging in learning methods workshops, and by undergoing teacher training under various educational consultants.[17]

Another highlight of this study showed that 31% of students considered their EM teacher as a role model and 36% of respondents identified them as being major influencers in their choice of specialty, a result consistent with previous reports.[18,19] Moreover, this study showed a good relationship between the students and their tutor residents since more than half of the respondents [60%] were confident and relaxed in their presence. This study substantiates the great impact of EM residents in influencing and shaping the future medical careers of undergraduate students.[16]

Our study had some limitations, however. Firstly, the

sampling included only the students who trained in Riyadh, Saudi Arabia. Therefore, the results would have been more accurate if we had included several other regions. Secondly, the information is limited to what was asked only, which could leave some relevant areas unexplored. Thirdly, the cross-sectional design of the study could be considered as being yet another limitation.

CONCLUSION:

In conclusion, most medical students perceived EM residents to be good clinical teachers, although some students felt that there was a need for EM residents to improve their teaching skills. To the best of our knowledge, this is the first study in Saudi Arabia that has investigated the perceptions of medical students in relation to Emergency medicine residents as teachers. It is also the first study to assess their teaching, as well as their academic and psychological impact on the students. Therefore, we hope that our study will encourage researchers and practitioners to conduct further studies in Saudi Arabia. Nonetheless, it is unclear at this time as to what types of teaching modalities will improve the teaching abilities of EM residents. Further researches and population-based studies needed to be conducted in order to validate our research and to answer the questions that this study has raised.

Conflict of interest

The authors report that there were no conflicts of interest in producing this work.

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