

Assessment of the current knowledge and willingness to conduct medical research work of future healthcare providers: A cross-sectional study in Jeddah, Saudi Arabia

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ABSTRACT

Background and Objectives: Healthcare research work contributes significantly to the advancement and development of medical education. Numerous studies have demonstrated the efficiency and productivity of student participation in medical research work, which has a positive impact on the health system. In this study, we intended to examine medical students' knowledge and attitudes regarding, and actual participation in, medical research work. **Methods:** This cross-sectional study was conducted on 184 medical students of Batterjee Medical College. The students received a paper-based survey questionnaire, containing multiple parts that related to their knowledge and attitudes regarding, and actual participation in, research work. One-way analysis of variance was utilized for the comparison of the average scores of the academic specialization groups. **Results:** One hundred and forty-three participants completed the questionnaire, with a response rate of 78%. The overall average scores for the students' knowledge and attitudes regarding, and actual participation in, research work were 57.2%, 76%, and 31.5%, respectively. Medicine students obtained significantly higher average scores than the students of other specializations in terms of the scale of knowledge and attitudes regarding, and actual participation in, research work. The principal barriers that deterred the students from undertaking research work were poor time management (68.5%), inadequate feedback (64.3%), and a lack of research skills (54.5%). **Conclusion:** Medical students showed a low level of knowledge relating to research work and infrequently participated in them, but they reported a positive attitude toward research work activity. Extensive work is needed to overcome several barriers, such as poor time management and insufficient research skills.

Keywords: Attitudes, knowledge, medical students, perceptions, research work

Introduction

Educational medical research courses have made a significant contribution to the healthcare system.^[1] It is crucial for expanding

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activities, and it has been implemented in almost all academic institutions. In fact, studies have shown that by learning about the concept of research at the undergraduate level, students improve their confidence, skills, and knowledge relating to conducting research.^[2] For instance, adding a compulsory research class, along with the medical curriculum, will not only provide professional

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academic work, but will also help students in their career decisions, as a result of the improvement of analytical thinking skills, and improve their understanding of disease prevalence.^[3]

Furthermore, in order to conduct medical research, having sufficient knowledge of research manners, practical skills, and positive attitudes is essential. However, poor time management, insufficient motivation, inadequate research methodology skills, and stress related to the massive study load were identified as significant barriers deterring medical students from conducting research work.^[4,5] In the meantime, studies have shown the perspective of medical students toward research work, in which it was found that many students had considered research work very stressful and complicated. Therefore, they obtained an insufficient level of knowledge about medical research and infrequently participated in research.^[6]

Medical research courses are a new phenomenon in our country, despite the fast spreading and importance of these courses. However, adequate training in research work is a fundamental requirement in all of the medical fields. Accordingly, medical research courses require professionally trained academic doctors to aid students in conducting research work.^[7,8] These courses aim to teach students about the concept of medical research, collecting data and samples, and choosing the right topics for medical research. Moreover, these courses mainly target undergraduate medical students, who have little or no previous research experience.^[7] Studies confirmed that involving students in research work from early stages will increase their chances of getting accepted into postgraduate programs.^[9,10]

Medical research courses are included in several undergraduate programs. However, many medical schools do not yet appreciate the significant benefits of research work and still exclude these valuable courses from their curriculum.^[3,11] A previous study found that the quality of medical research in India ranked the lowest among other countries, because research work was the lowest priority in their medical education system.^[12]

A study was conducted in several medical universities from three different Middle Eastern countries, showing that even though the majority of participants have a positive attitude toward medical research; their level of knowledge of research work was unacceptable.^[13] Another study carried out on Pakistani medical students reported particular barriers that deter students from conducting research work, such as a shortage of time, inadequate supervision perceived by the study participants, and financial deficiencies.^[14]

Although numerous studies have been performed on healthcare students to review their knowledge and attitudes regarding, and actual participation in, medical research work in recent years; very few studies have been carried out in Middle Eastern countries. In this research study, we intended to examine the current knowledge and attitudes regarding, and actual participation in, research work of medical students, the most important factors

that encourage them to conduct research work, as well as the barriers that deter them from undertaking research work.

Materials and Methods

Study population

A cross-sectional study was performed at Batterjee Medical College in Jeddah, Saudi Arabia. In this study, all of the undergraduate medical students of Batterjee Medical College, one of the largest medical and health sciences colleges in the gulf cooperation council countries, were asked to be a part and to cooperate in this cross-sectional research. Accordingly, the study was performed on undergraduate healthcare students during the academic year of 2019, both genders (male and female) aged between 20 and 27 were asked to participate, and the study targeted a varied group of medical students from different specializations: Medicine, dental, pharmacy, and nursing students.

Survey design

This cross-sectional survey consisted of multiple items, divided into six parts. The questions in the first part were related to the participant's demographic characteristics, including age, gender, nationality, and specialization. The second part was comprised of eight basic questions relating to research work and activities, in which the students' knowledge of medical research work was assessed. The third part consisted of five items relating to the students' attitude toward medical research work, and they were asked if they agree or disagree with the given statements. The fourth part was comprised of six questions relating to the students' participation in medical research work. The fifth part contained factors relating to encouraging students to conduct research work, and they were asked to answer the questions with a "yes or no" answer. In the last part, we gave the students some potential barriers that could deter them from undertaking research work, and they were also asked to answer the questions with a "yes or no" answer.

Statistical analysis

A statistical analysis software (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY, USA: IBM Corp.) was used to analyze the data, and the data were inputted into Microsoft Excel for Mac (Version 16.30). One-way ANOVA was utilized to determine the significant difference between the average scores of the four medical specialty groups regarding the students' knowledge and attitudes regarding, and actual participation in, research work. A *P* value less than 0.05 was considered statistically significant in this research study.

Ethical and legal considerations

The study was approved by the Institutional Review Board at Batterjee Medical College. In addition, the medical students who participated in this research study were fully informed about the purpose and objectives of the research study, before their data were collected. A written informed consent was obtained from each student. Confidentiality regarding the participants'

personal information was maintained, and the anonymity of the students was ensured.

Results

A total of one hundred and eighty-four medical students were given the questionnaire survey, and one hundred and forty-three students completed the survey, giving a response rate of 78%. The age of the respondents was between 20 and 27 years, with an average score of 23.11 years. Table 1 shows the demographic characteristics of the study participants. About 60.1% were females and 39.8% were males. The majority (40.5%) of the respondents in this study were medicine students, whereas dental, pharmacy, and nursing students constituted 30%, 15.38%, and 13.98%, respectively.

Among the 143 medical students, 63.6% correctly answered the question about the main components of a structured abstract, and 62.2% could differentiate between research types. Correct answers about sampling techniques in a research paper, general components of informed consent, statistical analysis software, statistical analysis software, and reference management were 57.3%, 58.7%, 54.5%, and 56.6%, respectively [Table 2].

The majority (89.5%) of the study participants agreed that medical students need to be more engaged in medical research work, and 85.3% also agreed that medical universities should teach their students more about research methodologies. Nearly, half of the study participants (53.1%) believed that undertaking medical research will improve their understanding of disease prevalence. Almost 78% of the participants agreed that medical research has a positive influence on treatment outcomes, and 74.1% believed that research experience will enhance their employability [Table 3].

Among the study participants, only 37% had participated in writing medical research, and 38.4% read medical journals consistently. About 28.6% of the medical students had attended workshops on research methodologies, and 34.2% had presented research posters in conferences. The majority (84.6%) of the medical students who participated in this study never received any award for a research project, and nearly 64% of the study participants had not published a paper [Table 4].

Moreover, the results, presented in Table 5, reveal that the overall average knowledge, attitudes, and actual participation scores of the participants were 57.2%, 76%, and 31.5%, respectively. In addition, medicine students obtained the highest average scores among the other specializations regarding their knowledge and attitudes regarding, and participation in, research work. There was a significant association between the academic specializations and the students' attitudes regarding the conducting of medical research work ($P < 0.05$).

Regarding the motivating factors that would encourage medical students to conduct research work, 74.1% believed

that it would strengthen their resume, 69.2% believed that it would increase their chances of being accepted into programs, and 66.4% believed that it would develop their research skills. These were the most cited factors, which might result in more medical students being involved in research work. About 37.7% of the students conduct research work to fulfill their university requirements. Other selected encouragement factors, like prompting interest in research, enhancing research productivity, and getting rewards or financial incentives, were indicated by 35.6%, 28.6%, and 25.1% of the students, respectively [Table 6].

The principal barriers that deterred medical students from conducting research work were difficulty in time management (68.5%), inadequate feedback (64.3%), and inadequate skills (54.5%). The least cited barriers were a lack of financial support (18.1%) and difficulty in getting approval for a research proposal (23%) [Table 7].

Discussion

We have conducted the present study in order to evaluate medical students' knowledge and attitudes regarding, and actual participation in, medical research work. This research study focuses on research work activity, which is a significant element to the growth and improvement of the primary care quality. Every medical student should be able to conduct medical research in order to achieve career success and acquire essential knowledge. Prior studies in different countries evaluated medical students' knowledge and attitudes regarding, and actual participation in, medical research work.^[15-17]

This study involved 184 medical students from different academic specializations, with a response rate of 78%. There were more female medical students (60.1%), compared to male medical students (39.8%), which is in accordance with previous studies

Table 1: Demographic characteristics of the participants

Demographic characteristics	Number (n=143)	Percentage
Age (in years)		
Range 20-27		
Average 23.11		
Gender		
Male	57	(39.80)
Female	86	(60.10)
Nationality		
Saudis	122	(85.31)
Non-Saudis	21	(14.68)
Specialization		
Medicine	58	(40.55)
Dental	43	(30.06)
Pharmacy	22	(15.38)
Nursing	20	(13.98)
Marital status		
Married	69	(48.25)
Not married	74	(51.74)

Table 2: Assessment of the participants’ knowledge regarding research work

Question	Correct, n (%)	Incorrect, n (%)
Which of the following is not an element of a structured abstract? Result Method Acknowledgment (true) I do not know	91 (63.6)	52 (36.3)
Which of the following types of research is more generalized and targeting larger group? Qualitative research Quantitative research (true) I do not know	89 (62.2)	54 (37.7)
Which one of the following is nonprobability sampling method? Quota sampling (true) Simple random sampling Systematic sampling I do not know	82 (57.3)	61 (42.6)
Which of the following elements is essential in an informed consent? Purpose of the research confidentially of data Voluntary participation and withdrawal rights All of the above (True) I do not know	84 (58.7)	59 (41.2)
What does the abbreviation “ <i>et al.</i> ” mean? And other authors (true) All authors contributed equally I do not know	74 (51.7)	69 (48.2)
What does it indicate when the $P < 0.05$? The result is statistically significant (true) The result is not statistically significant I do not know	78 (54.5)	65 (45.4)
Which of the following software can be used for statistical analysis? Trello SPSS (true) EndNote I do not know	81 (56.6)	62 (43.3)
Which of the following software can be used for reference management? Trello SPSS EndNote (true) I do not know	76 (53.1)	67 (46.8)

Table 3: Assessment of the participants’ attitudes regarding research work

Statement	Agreement	
	Frequency	Percentage (%)
Medical universities should train their students more about research methodologies	122	(85.3)
Medical students should participate more in medical research	128	(89.5)
Undertaking medical research improve students’ understanding of disease prevalence	76	(53.1)
Medical research has a positive influence on treatment outcomes	112	(78.3)
Research experience enhances employability	106	(74.1)

conducted by Vodopivec *et al.*, Abushouk *et al.*, and Kyaw *et al.*^[18-20] However, Al-Shalawy and Haleem. and AlGhamdi *et al.* reported different results in their studies, wherein male medical students were found to be more numerous than female students.^[21,22]

The overall average score of the participants in this study regarding their knowledge regarding research work was 57%. Similarly, a study conducted in Malaysia on undergraduate medical students revealed that the overall average score of the students’

knowledge regarding research work was 56%.^[17] In another study in a European country, Croatia, the level of knowledge of medical students regarding medical research was found to be low, with an average score of 27%.^[23]

This present study revealed that medical students have a positive attitude, with an average score of 76%. A similar study was conducted by Amin *et al.*, wherein the average score of the students for their attitudes toward medical research was

found to be 75.2%.^[13] This finding was higher in comparison to that found in a previous study by Khan *et al.*, where it was found that medical students' attitudes regarding medical research work was relatively not acceptable, with an average score of 53.7%.^[24]

In the present study, we reported significant obstacles that deter medical students from conducting medical research work. Difficulty in time management was the most cited issue among the other mentioned factors. This finding was also similar to that found in the study by Kyaw *et al.*^[20] In accordance with a study conducted in India, a lack of financial support and inadequate guidance from the professors were also significant barriers deterring medical students from conducting clinical research.^[25] A lack of financial support was also cited as an obstacle by some of the study participants; therefore, medical students should be financially funded in order to participate in medical conferences, which will encourage and motivate them to share their research work.

In this study, we reported various findings that would be of concern to medical universities and medical education developers. Students' knowledge of research methodologies was somewhat unsatisfactory. Although the study participants exhibited positive attitudes regarding the conducting of medical research work, an apparent gap was observed between their attitudes and actual participation in medical research work. We also found that a large group in this study was motivated to conduct medical research. However, an insufficient number of medical students had participated in research work.

Furthermore, medical students who had published a research paper or presented a research poster were very few. Another study on medical students in the United States of America

also found the same contradictory results regarding the students' attitudes regarding and actual participation in research work.^[26] In that study, the percentage of participants who were interested in research experience was 85%, whereas 92% had no publications.

Comprehensive research skills assessment should be undertaken before all students graduate to ensure that they learn these skills. Medical professors are also responsible for being accessible and interactive with their medical students, and they should guide them in conducting research work to ensure that they develop and maintain excellent research skills.

This study has several limitations. It was conducted in only one city, and the participants who were involved in this research were from a single medical university. Therefore, we are not able to generalize the findings and conclusions of this study. However, future research targeting a larger group of medical students in multiple universities needs to be conducted in order to gain a broader view of their knowledge and attitudes regarding, and actual participation in, medical research work.

Conclusion

The students who were involved in this research showed a positive attitude toward undertaking research work. On the contrary, their level of knowledge regarding research work and actual participation were somewhat unsatisfactory. Poor time management and a lack of research skills were the main obstacles that deterred medical students from undertaking research work. Medical students should be motivated, encouraged, and guided by medical universities and professors to ensure that they develop and maintain proper research skills.

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Conflicts of interest

There are no conflicts of interest.

Table 4: Assessment of the participants' actual participation in research work

Question	Yes, n (%)	No, n (%)
Have you participated in writing any medical research?	53 (37)	90 (62.9)
Do you read medical journals consistently?	55 (38.4)	88 (61.5)
Have you attended workshops on research methodologies?	41 (28.6)	102 (71.3)
Have you presented a research poster?	49 (34.2)	94 (65.7)
Have you published any research paper in a medical journal?	51 (35.6)	92 (64.3)
Have you received an award for any research project?	22 (15.3)	121 (84.6)

Table 5: Comparison of the average scores of students by their academic specialization

	Medicine		Dental		Pharmacy		Nursing		P
	Average Score (%)	±SD	Average Score (%)	±SD	Average Score (%)	±SD	Average Score (%)	±SD	
Knowledge	(58.4)	±4.5	(57.9)	±4.4	(56)	±3.5	(56.3)	±3.7	0.161
Attitudes	(77.4)	±7.1	(76.9)	±6.2	(74.2)	±3.7	(75.5)	±3.5	0.001*
Practice	(32.4)	±6.7	(31.9)	±5	(31.2)	±4.3	(30.4)	±3.3	0.174

SD=Standard deviation. *Significant P (P<0.05)

Table 6: Motivating factors that encourage medical students to conduct research work

Questions	Yes, n (%)	No, n (%)
To fulfill college requirements	89 (62.2)	54 (37.7)
To increase chances of being accepted into programs	99 (69.2)	44 (30.7)
To develop research skills	95 (66.4)	48 (33.5)
To enhance research productivity	41 (28.6)	102 (71.3)
To promote interest in research	51 (35.6)	92 (64.3)
To get rewards or financial incentives	36 (25.1)	107 (74.8)
To strengthen your resume	106 (74.1)	37 (25.8)

Table 7: Barriers that deter medical students from conducting research work

Questions	Yes, n (%)	No, n (%)
Poor time management	98 (68.5)	45 (31.4)
Not enough research facilities	49 (34.2)	94 (65.7)
Lack of financial support	26 (18.1)	117 (81.8)
Inadequate skills and knowledge	78 (54.5)	65 (45.4)
Lack of interest	39 (27.2)	104 (72.7)
Lack of rewards	42 (29.3)	101 (70.6)
Lack of motivation	41 (28.6)	102 (71.3)
Inadequate feedback	92 (64.3)	51 (35.6)
Difficulty in getting approval for a research proposal	33 (23)	110 (76.9)
Inability to find a research title	52 (36.3)	91 (63.6)
Inadequate knowledge of collecting research samples	48 (33.5)	95 (66.4)

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