Original Article

Intentions of and Barriers to Carrying Out Medical Research among Clinical Pharmacy Students: A Cross-sectional Study in the Eastern Region of Saudi Arabia

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Aims: This study was aimed at exploring the intentions of clinical pharmacy students to be involved in clinical research, and to identify the perceived and existing barriers to conducting research activities in the Eastern region of Saudi Arabia. Settings and Design: This was a cross-sectional questionnaire survey. Materials and Methods: This study was conducted between February and March 2019, in the Eastern region of Saudi Arabia, using clinical pharmacy students at the two universities that offer a pharmacy program there (King Faisal University and Imam Abdulrahman bin Faisal University). An electronic questionnaire tool was adapted to explore the intentions of and barriers to carry out medical research among the students. Statistical Analysis: Descriptive statistics are presented as frequencies and percentages. A $\chi^2$ test was used to explore any statistically significant difference between the student demographics and the intentions and barriers regarding medical research. $P \leq 0.05$ was considered statistically significant. Results: Only 35.1% ($n = 33$) of the participating clinical pharmacy students had previous research experience. Of these, the majority encountered barriers to medical research (81.8%, $n = 27$). The most commonly reported barriers were a lack of funding, a lack of support from the college for research activities, and difficulties in coordination between the research team. Around 36.2% ($n = 34$) of the participants were currently involved in research activities, with a majority of them (67.6%, $n = 23$) spending an average of 5 h or less per week for research. Conclusion: Our study highlights that the intention among clinical pharmacy students to carry out medical research was poor. Educational institutions are advised to provide more financial and logistic support to their medical researchers.

Keywords: Barriers, intention, pharmacy, research, Saudi Arabia

INTRODUCTION

Research is a systematic process applied to achieve new knowledge, science, or invention by using standard methods. Medical research has an impact on the prevention, diagnosis, and treatment of diseases. [1-3] Pharmacists have been involved in improving the patient health-care system in a variety of ways, and one of them is through clinical research. Currently, the level of involvement of pharmacists in research remains low. [4] The two main factors seen to have an impact on the decision of clinical pharmacy students to participate in medical research are the intentions of carrying it out and the barriers to it. [5] The intention to

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conduct medical research stems from the researcher’s curiosity and their interest in a specific field or their concern regarding solving a health problem within the community.\[6\] Barriers to conducting medical research directly affect the performance of the researcher.\[1\]

The barriers to research participation were classified into main four groups: perception, communication, resources, and skill with knowledge.\[6\] Perception means that they are not aware of how research can help in improving the current health-care system.\[4,6\] One of the most commonly reported barriers to carrying out research is having inadequate resources, such as financial support, limited access to relevant medical journals and databases, difficulties in participant recruitment, the poor availability of research facilities, and limited time.\[7,8\] In addition, communication problems with other researchers in the same team can result in a lack of motivation and guidance.\[1,6,8,9\] Besides this, a lack of skills and knowledge concerning how to conduct medical research were also seen as important barriers.\[7,8,10,11\]

Despite the existence of research courses within the curricula of the colleges of pharmacy, and considering it is one of the mandatory criteria required by Saudi clinical pharmacy students to graduate, there are still clinical pharmacy graduates who are unable to conduct medical research, which indicates that such barriers exist.

Medical research is one of the most important criteria for clinical pharmacy students wishing to continue their postgraduate studies. Despite this, students are not encouraged enough to publish their research in medical journals or to present at conferences. Several studies have been carried out in different countries to evaluate the knowledge about and attitudes toward scientific research among health professionals and medical student.\[8\] To the best of our knowledge, no study has specifically looked at the attitudes of clinical pharmacy students in the Eastern region of Saudi Arabia regarding this, and the perceived and existing barriers to participate in such research. The objectives of this study were to explore the intentions of clinical pharmacy students to become involved in clinical research, and to identify the perceived and existing barriers to conduct research activities in the Eastern region of Saudi Arabia.

**Materials and Methods**

A cross-sectional questionnaire study was carried out during the period between February and March 2019. This study aimed at assessing the intention of being involved in clinical research and identifying the perceived and existing barriers to conduct research activities among clinical pharmacy students in the Eastern region of Saudi Arabia.

The questionnaire tool was adapted based on a previous study conducted in Australia and New Zealand by Gurunathan et al.\[5\] A convenience sampling technique was implemented to invite clinical pharmacy students to participate in the study by completing an electronic questionnaire. The use of electronic survey had many advantages such as eliminating geographical dependence, save time, more cost-effective, and can collect response from large number of respondents in a considerable time. All the students in the Eastern region of Saudi Arabia at the two universities that offer a pharmacy program (King Faisal University and Imam Abdulrahman Bin Faisal University) who met the inclusion criteria were invited to participate in the study through the students’ leaders in the two universities. Faculty of pharmacy at King Faisal University was established in 2002, and there are around 500 students registered in the pharmacy program. Imam Abdulrahman Bin Faisal University was established in 2011 with around 400 students registered according to the latest available statistics. Students to be eligible to participate in the study had to be pharmacy students from any level of study, and from one of the two universities in the Eastern region in Saudi Arabia.

An electronic questionnaire consisting of 19 questions was designed to assess their intentions to carry out and the barriers to medical research. The questionnaire tool was composed of three main sections, which were student demographics, research experience, and perceptions about research. The demographics included gender, the name of the university, and the academic level of the participant. A detailed history regarding research experience was gathered. This included previous research exposure, barriers encountered during research, research training, presenting at conferences, number of publications, critiques by reviewers of submitted manuscripts, if currently involved in any research activity, and offering encouragement to other colleagues to be involved in research activities. The last part of the questionnaire was about student perceptions of research, including their beliefs about the importance of research, whether they believed that more exposure to research activities would increase the number of residents involved in such activities, and the perceived advantages of getting involved in research and useful topics related to clinical research. The questionnaire questions were presented
in two formats: yes/no questions and multiple-choice questions.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) software, version 25.0. For quantitative variables, descriptive analysis was reported as mean (µ) ± standard deviation (SD). Categorical data were reported as percentages (%) and frequencies (n). A χ² test was used to explore the difference between the student demographics and their intentions to carry out and the barriers experienced in medical research. A confidence interval of 95% (P < 0.05) was used to represent the statistical significance of the results, and the level of significance was 5%.

RESULTS

We received a total of 101 questionnaires from the targeted pharmacy students (n = 750). Of the 101 questionnaires, seven were excluded as they did not meet the inclusion criteria; the total number of participants was 94 (response rate, 12.5%). Around 77.7% (n = 21) of the participants were female. The majority of them were studying at King Faisal University (60.6%; n = 57). Most of the students were interns (37.2%; n = 35), followed by those attending their third year (20.2%; n = 19). For further details of the demographic characteristics of the study participants, refer to Table 1.

Characteristics of students’ research activities and encountered barriers

Table 2 shows the details of the students’ research experience and encountered barriers, stratified by the participating university. Around 35.1% (n = 33) of the participating pharmacy students reported that they had previous research experience. Of those who had previous experience in research, 81.8% (n = 27) encountered barriers. The most common types of barriers were lack of funding (39.4%; n = 13), followed by a lack of support from the college regarding research activities (33.3%; n = 11), and difficulties in coordination among the research team (30.3%; n = 10). Of those who had previous research experience, 36.4% (n = 12) had undergone research training and presented their research at conferences or meetings. Only 18.2% (n = 6) of the students reported that they had one publication, while the majority were still to be published. Of those who had been published, statistical analysis, selection of patients, and the aims of the research were the most common critiques expressed by the reviewers when they had submitted their papers for publication. Of the students, 36.2% (n = 34) were currently involved in research activities. Of those who were currently involved in research, 67.6% (n = 23) of them averaged 5 h or less per week for research. When the students were asked “What influenced you to not be involved in research?,” 81.7% (n = 49) stated that it was about “having no time due to excessive studying and assignments,” 35.0% (n = 21) of them said it was about “lack of interest and support in the college or my colleagues,” and 25.0% (n = 15) said it was about “lack of supervisors in the college.” Students who reported that they would like to extend support and encouragement to colleagues involved in research activities numbered 66.0%.

Student perceptions of research

Regarding student perceptions about research, the majority (91.5%; n = 86) of the students reported that they believed that involvement in research activities was important for clinical pharmacy students in clinical practice. Around 87.2% (n = 82) of the students believed that more exposure to research activities during training or studying would increase the number of residents involved in research and scholarly activities. They reported different perceived advantages of getting involved in research. Around 72.3% (n = 68) of them stated that involvement in research enhances their professional reputation, 69.1% (n = 65) of them stated that “participating in research helps them to practice evidence-based medicine,” and 60.6% (n = 57) of them reported that “participating in research enables them to discover new scientific concepts.”

The students reported different topics related to clinical research, which they thought were useful to them. The medical ethics course was the most commonly reported course (54.3%; n = 51), followed by the statistical analysis course (42.6%; n = 40) and the “how to take informed consent form from the patients” course (39.4%; n = 37).

### Table 1: Description of sociodemographic characteristics (n = 94)

| Study data        | Frequency (%) |
|-------------------|---------------|
| Gender            |               |
| Male              | 21 (22.3)     |
| Female            | 73 (77.7)     |
| Institution       |               |
| KFU               | 57 (60.6)     |
| IAU               | 37 (39.4)     |
| Academic year level|              |
| First             | 9 (9.6)       |
| Second            | 13 (13.8)     |
| Third             | 19 (20.2)     |
| Fourth            | 18 (19.1)     |
| Intern            | 35 (37.2)     |

KFU = King Faisal University, IAU = Imam Abdulrahman bin Faisal University
With regard to future plans for doing research, a majority of the students (69.1%; \( n = 65 \)) reported that they would like to increase the amount of time spent performing research activities, whereas around 26.6% \( (n = 25) \) of the students reported that they would like to maintain the same amount of time.

**Discussion**

Over the past decades, research has been an integral part of the medical profession, and its progress is reflected in the improvement of the quality of care provided to patients. In this study, we aimed at assessing the intentions to carry out research and the barriers

**Table 2: Details of research experience and barriers encountered according to participating institutions**

| Parameters                                      | Overall \( N \) (%) \( (n = 94) \) | KFU \( N \) (%) \( (n = 57) \) | IAU \( N \) (%) \( (n = 37) \) | \( P \) value§ |
|------------------------------------------------|-------------------------------------|---------------------------------|-------------------------------|---------------|
| Previous research exposure                      |                                    |                                 |                               |               |
| Yes                                            | 33 (35.1)                          | 18 (31.6)                       | 15 (40.5)                     | 0.374         |
| No                                             | 61 (64.9)                          | 39 (68.4)                       | 22 (59.5)                     |               |
| Barriers encountered during research†          |                                    |                                 |                               |               |
| Yes                                            | 27 (81.8)                          | 13 (72.2)                       | 14 (93.3)                     | 0.117         |
| No                                             | 6 (18.2)                           | 5 (27.8)                        | 1 (06.7)                      |               |
| Types of barriers being encountered**†         |                                    |                                 |                               |               |
| Lack of funding                                 | 13 (39.4)                          | 6 (33.3)                        | 7 (46.7)                      | 0.435         |
| Lack of support from the college for my research activities | 11 (33.3)      | 5 (27.8)                        | 6 (40.0)                      | 0.458         |
| Coordination was difficult                      | 10 (30.3)                          | 7 (38.9)                        | 3 (20.0)                      | 0.240         |
| Ethics approval was complicated                 | 5 (15.2)                           | 0                               | 5 (33.3)                      | 0.008**       |
| Recruitment of patients was difficult and slow  | 4 (12.1)                           | 2 (11.1)                        | 2 (13.3)                      | 0.846         |
| Colleagues were not supportive of research activities | 4 (12.1)            | 2 (11.1)                        | 2 (13.3)                      | 0.846         |
| Underwent research training†                   |                                    |                                 |                               |               |
| Yes                                            | 12 (36.4)                          | 8 (44.4)                        | 4 (26.7)                      | 0.290         |
| No                                             | 21 (63.6)                          | 10 (55.6)                       | 11 (73.3)                     |               |
| Presented research at conferences or meetings† |                                    |                                 |                               |               |
| Yes                                            | 12 (36.4)                          | 6 (33.3)                        | 6 (40.0)                      | 0.692         |
| No                                             | 21 (63.6)                          | 12 (66.7)                       | 9 (60.0)                      |               |
| Number of publication†                          |                                    |                                 |                               |               |
| None                                           | 27 (81.8)                          | 16 (88.9)                       | 11 (73.3)                     | 0.249         |
| One                                            | 6 (18.2)                           | 2 (11.1)                        | 4 (26.7)                      |               |
| Critique of reviewers when submitted manuscript for publication† |                                    |                                 |                               |               |
| No publication                                  | 27 (81.8)                          | 16 (88.9)                       | 11 (73.3)                     | 0.444         |
| Statistical analysis                           | 2 (6.1)                            | 1 (5.6)                         | 1 (6.7)                       |               |
| Selection of patients                           | 2 (6.1)                            | 1 (5.6)                         | 1 (6.7)                       |               |
| Aim of research                                 | 2 (6.1)                            | 1 (5.6)                         | 1 (6.7)                       |               |
| Currently involved in research activity         |                                    |                                 |                               |               |
| Yes                                            | 34 (36.2)                          | 23 (40.4)                       | 11 (29.7)                     | 0.295         |
| No                                             | 60 (63.8)                          | 34 (59.6)                       | 26 (70.3)                     |               |
| Average hours/week on research activity‡       |                                    |                                 |                               |               |
| ≤5 h/week                                      | 23 (67.6)                          | 16 (69.6)                       | 7 (63.6)                      | 0.730         |
| >5 h/week                                      | 11 (32.4)                          | 7 (30.4)                        | 4 (36.4)                      |               |

KFU = King Faisal University; IAU = Imam Abdulrahman bin Faisal University

§\( P \) value has been calculated using chi-squared test

**Significant at \( P \leq 0.05 \) level

*Variable with multiple answers

†Analysis was based on the students with research exposure only

‡Analysis was based on those who were currently involved in research activity
encountered among clinical pharmacy students. The findings of this study show that only 35.1% (n = 33) of the students had previous experience in research activities, whereas 36.2% (n = 34) of them were currently involved in research. In Saudi Arabia, Basudan[12] assessed the attitudes and barriers concerning conducting research among dentists and found that of 128 practicing dentists, 87.5% of them were willing to be involved in research and 83.6% altered an element of their practice as a consequence of the research. This was supported by Amin et al.[8] in their study as they also found that around 69.0% of their participating medical students showed a willingness to be involved in research. Willingness to participate in medical research was relatively poor among medical students as well as healthcare providers, ranging from 14.9% to 29% only.[5,9,13] This is contrary to a study published in Iran,[1] which reported that all undergraduate and postgraduate students had participated in at least one piece of research; they further noted that at least 36.0% had published their work. Another study in Pakistan[14] reported that 70.0% of undergraduate medical students had previous research experience, which was relatively high compared to our findings.

The most common barriers to conducting research, as perceived by the pharmacy students, were lack of funding, lack of support from the college with regard to research activities, and difficulties in coordination among the research team. These were the main reasons why students did not participate in research activities. Time constraints and a lack of funding were the most common barriers encountered in previous studies.[1,7-9,13,14]

### Table 2: Details of research experience and barriers encountered according to participating institutions (cont’d.)

| Parameters                                                                 | Overall N (%) | KFU N (%) | IAU N (%) | P value§ |
|----------------------------------------------------------------------------|---------------|-----------|-----------|---------|
| [variable] Factors influencing students to be not involved in research*‡  |               |           |           |         |
| No enough time due to excessive studying and assignments                   | 49 (81.7)     | 29 (85.3) | 20 (76.9) | 0.406   |
| Lack of interest and support in the college or my colleagues               | 21 (35.0)     | 15 (44.1) | 6 (23.1)  | 0.090   |
| Lack of supervisors in the college                                         | 15 (25.0)     | 9 (26.5)  | 6 (23.1)  | 0.764   |
| Personal commitments                                                       | 13 (21.7)     | 7 (20.6)  | 6 (23.1)  | 0.817   |
| I am not interested in research                                             | 9 (15.0)      | 5 (14.7)  | 4 (15.4)  | 0.942   |
| No research labs at my college                                             | 6 (10.0)      | 2 (5.9)   | 4 (15.4)  | 0.224   |
| Willingness to extend support and encouragement to colleagues to be involved in research activities |               |           |           |         |
| Yes                                                                        | 62 (66.0)     | 39 (68.4) | 23 (62.2) | 0.792   |
| No                                                                         | 4 (4.3)       | 2 (3.5)   | 2 (5.4)   |         |
| Unsure                                                                     | 28 (29.8)     | 16 (28.1) | 12 (32.4) |         |
| Perception about research                                                  |               |           |           |         |
| Believe that involvement in research activity is important for clinical pharmacy students in clinical practice |               |           |           |         |
| Yes                                                                        | 86 (91.5)     | 52 (91.2) | 34 (91.9) | 0.910   |
| No                                                                         | 8 (8.5)       | 5 (08.8)  | 3 (08.1)  |         |
| Believe that more exposure to research activities during training or studying would increase the number of residents involved in research and scholarly activities |               |           |           |         |
| Yes                                                                        | 82 (87.2)     | 49 (86.0) | 33 (89.2) | 0.647   |
| No                                                                         | 12 (12.8)     | 8 (14.0)  | 4 (10.8)  |         |
| List of perceived advantages of getting involved in research*              |               |           |           |         |
| Involvement in research enhances my professional reputation                | 68 (72.3)     | 43 (75.4) | 25 (67.6) | 0.405   |
| Participating in research helps me to practice evidence-based medicine, therefore improves patient care | 65 (69.1)     | 39 (68.4) | 26 (70.3) | 0.850   |
| Participating in research enables me to discover new scientific concept    | 57 (60.6)     | 34 (59.6) | 23 (62.2) | 0.808   |
| More publication can lead to better job opportunities                      | 56 (59.6)     | 33 (57.9) | 23 (62.2) | 0.680   |
| Perceive no benefit in participating in research activities                | 7 (7.4)       | 4 (7.0)   | 3 (8.1)   | 0.844   |
| Other                                                                      | 7 (7.4)       | 6 (10.5)  | 1 (2.7)   | 0.158   |

KFU = King Faisal University, IAU = Imam Abdulrahman bin Faisal University
§P value has been calculated using chi-squared test
*Variable with multiple answers
‡Analysis was based on those who were currently involved in research activity
In this study, the majority of the pharmacy students spent 5 h or less per week in doing research, whereas about 70.0% of them showed that they would like to increase that amount of time. The most commonly expressed reason for getting involved in research was that “involvement in research enhances professional reputation.” Most of the students agreed that involvement in research was important for clinical pharmacy students, and more exposure to research activities during training or studying would increase the number of residents involved in research. The most common courses or lectures they were interested in were about medical ethics and statistical analysis. These findings were in agreement with the study published by Gurunathan et al. Students reported that the average time spent in research was 5 h or less. They further elaborated “time” as the most commonly cited reason for not being currently involved in research. The most commonly cited perceived advantage to being involved in research was that participation in research helps students to practice evidence-based medicine, and therefore, improves professional reputations. Around two-thirds of those surveyed believed that more exposure to research activities during training or studying would increase the number of residents involved in research. The most common courses or lectures they were interested in were about medical ethics and statistical analysis. These findings were in agreement with the study published by Gurunathan et al. Students reported that the average time spent in research was 5 h or less. They further elaborated “time” as the most commonly cited reason for not being currently involved in research. The most commonly cited perceived advantage to being involved in research was that participation in research helps students to practice evidence-based medicine, and therefore, improves professional reputations. Around two-thirds of those surveyed believed that more exposure to research activities during training would increase the number of participants involved in research and scholarly activities. Decision makers in the higher institution for education are recommended to increase the funding allocated for research purposes, support from the college with regard to research activities, and time allocated for research purposes during students training course.

This is the first study to assess intentions and barriers related to medical research among clinical pharmacy students in the eastern region of Saudi Arabia. Our study adapted a previously validated questionnaire, which increased its reliability. Our study included clinical pharmacy students from all levels of study, which increased the generalizability of our results to all clinical pharmacy students. On the contrary, this study was subjected to some limitations. First, the study design itself, a cross-sectional study design, limited our ability to identify causality between the study variables. The sample size was relatively small. This study was carried out at only two universities that are in the eastern region, so the possibility of generalization to all universities in Saudi Arabia is limited. However, the results should be generalizable to the eastern region in Saudi Arabia as the study participants are from the only two universities there that offer the pharmacy program. Finally, the response rate was higher at King Faisal University compared to Imam Abdulrahman bin Faisal University.

**Conclusions**

This study found that the intention to participate in medical research by clinical pharmacy students was poor. Lack of support, lack of funding, and difficulties in coordination among the teams were the most commonly cited obstacles mentioned by the students. This study suggests that there is a need to address the poor perceptions and attitudes of pharmacy students toward medical research. Addressing the barriers will engender a more positive attitude of the students toward medical research. Educational institutions are advised to provide more financial and logistic support to their medical researchers. Supporting medical
research will have numerous advantages that will have a positive impact on the overall performance and image of their academic medical staff and students.

**Ethical approval**
Ethics approval was obtained for this study from Research Ethics Committee of Pharmacy Practice Department in Clinical Pharmacy College at King Faisal University.

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**Conflicts of interest**
There are no conflicts of interest.

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