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Research Article

**KNOWLEDGE AND PERCEPTION OF MBBS STUDENTS
REGARDING CLINICAL RESEARCH IN QUETTA, PAKISTAN**
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Objectives: The aim of this study was to find out knowledge and perceptions regarding clinical research among the medical students (MBBS) of Quetta. To assess the knowledge of clinical research at student level and their perceptions regarding to clinical research.

Methods: A cross sectional study was conducted using self-made questionnaires among the MBBS students of 1st year to 5th year of Bolan medical college (BMC) and Quetta Institute of Medical sciences (QIMS). Study was conducted from July to October 2017. 40 questionnaires were randomly distributed in each class among male and female students of each institute thus total 400 samples was distributed in both institutes. The data was analyzed by SPSS 20. P value of < 0.05 was considered to be significant.

Results: Maximum respondents 202 (55.5%) were from 17-21 years. Majority of respondents 184 (50.5%) were males where's 180(49.5%) respondents were from BMC and 180(50.5%) respondents were from QIMS. The individual demographics characteristics were taken and mean comparison was calculated and showed all the p-values less than 0.05 that shows significance over study, i.e. Age (p<0.001), year of study (p<0.001), Institution (p<0.001) and been part of research (p<0.001) were statistically significant with Knowledge where's demographic Institution (p<0.001), Parents education level (p<0.021), Family member in research (p<0.034) and been part research project (0.049) were significantly associated with Perception i.e. p>0.05.

Conclusions: Study concluded that research is detailed study of subject in order to discover new facts, finding problem, solution and carrying out researches may prove to be beneficial in future for clinical practices, residency and medical trainings etc. There is large number of MBBS students who had basic knowledge about research and were interested in carrying out clinical research, however lack of platforms and supervisors are the barriers.

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INTRODUCTION:**BACKGROUND**

A reported drop in the number of physician-scientists in the medical practice has been observed in past few decades [1].one of the Postulated explanations for this drop includes inadequate exposure to research before career paths are selected [1-4].

Personality traits and participation in research activities carried out during medical school studies are other factors that play an important role in determining the attitude of students towards research and choosing research oriented careers after graduation [5].

The reasons for which physician scientists are considered to be important include many such as a clinician can incorporate the valuable knowledge gained by the clinical trials in their practice which can improve patient dealing and can provide better disease management [6] and the reason why medical students can be considered to be important contributors to the field of clinical research is their immense exposure to the newly emerging problems in patients. They are the first to encounter a problem situation and based on their knowledge can better address the problem situation at various levels including the ways to develop effective treatment to correct the situation, creating general awareness regarding the problem situation [7].

Ample knowledge and awareness of research principles are necessary to undertake any research. former studies conducted on medical students showed that they had insufficient knowledge of research, but that did not influence their interest in pursuing research [8]. However the lack of knowledge, interest and active participation in of medical students in clinical research can be attributed to factors like insufficient guidance towards research methodology at institute level, lack of mentors, time management issues and limited access to appropriate facilities required to carry out research [5]. Motivating students at undergraduate level and providing facilities to conduct clinical research level can increase the number of clinical researches [3].

In Pakistan similar study was conducted to find out Perceptions and attitudes towards research amongst medical students at Shifa College of Medicine [3] and Knowledge and attitudes about health research amongst a group of Pakistani medical students at Agha Khan University [9]. Study conducted at shifa college of medicine show that 78(45.3%) students were aware of research. Research was considered useful for their professional careers and relevant to

their daily life by 133(65.7%) students, while 72(41.9%) did not consider it worthwhile to pursue research as a career. Besides, 71(41.3%) students enjoyed research, while 120(70%) perceived research as stressful and 107(62.2) complex [3] where's study conducted at Agha Khan show that mean scores of students were 49.0% on knowledge scale and 53.7% on attitude scale. Both knowledge and attitudes improved significantly with increasing years of study in medical college [9].

Worldwide similar study was also conducted to find out Attitudes and Perceived Barriers among Medical Students towards Clinical Research in an Egyptian Medical School [10], Perceptions, attitudes and practices toward research among senior medical students of King Saud University, Riyadh, Saudi Arabia [1] and Perceptions, barriers, and practices of medical research at Taibah college of Medicine, Madinah, Saudi Arabia [11] and their result show that the majority of students (74.2%) agree that undergraduates should participate in clinical research [10], The obstacles that prevented the students from conducting research included lack of professional supervisors (84.7%), lack of training courses (88.8%), lack of time (72.3%) and lack of funding (54.1%) [1] and the average attitude score was significantly higher among fourth- and fifth-year medical students compared with that of the third, second and first year students [11].

To promote the issue of lacking knowledge of medical students this study has been design to assess the knowledge and perception of medical students at Bolan medical college and Quetta institute of Medical sciences and prove the seriousness of the issue which is endangering the number future of physician scientist belonging to Quetta.

METHOD AND MATERIAL:**Study design & Study setting:**

Cross sectional questionnaire based descriptive study was conducted to assess knowledge and perception of MBBS students of Bolan Medical College and Quetta Institute of Medical Science regarding clinical research, in Quetta, Pakistan. This survey was carried out to analyze the orientation of medical students toward research at undergraduate level. This research was done on 1st, 2nd, 3rd, 4th & 5th year MBBS students of both institutes. The study involved distribution of questionnaire among the students.

Study duration:

The study was conducted over a period of 7 months from its first discussion to its thesis. 13 May to 25

Nov 2017. The data collection for the study was completed over a period of 2 Months.

Study Sampling:

The study was consisted of 400 sample which were distributed among students in both institution, 200 in each institute. 40 Questionnaires was distributed in each class from 1st year to 5th year MBBS of each institute randomly among males and female students.

The distribution of questionnaire was random. Only those students were involved who were willing to participate. We approached to students to fill these questionnaires in lecture hall, the questionnaires were filled during the class and handed over after completion. We payed special visit to QIMS, for data collection from their students.

Students from first to final year willing to participate in the survey were included, while BDS students, Pharmacy students, DPT students, House officers and those who complete their graduation were excluded. Students who did not give consent for participation in the trial were also excluded.

Total 364 students responded thus respond rate was 91%, 7.5% was no respond rate and 0.75% was discarded because of incomplete filling of questionnaire.

Study Tool:

Questionnaire was developed by extensive literature search on related studies and it consists of 28 Questions which were covering following sections:

1. Demographic section.
2. Knowledge section.
3. Perception section.

In demographic portion, questions like age, gender, Institution, year of study, high school type, parent's education, parent's profession, family members in research and have they themselves been part of

research project were asked. Where in knowledge portion students were asked about Knowledge of clinical research which were answered by those students who had some orientation toward research work. Where in perception part, they were asked about the importance of research at undergraduate level and its advantage in long run. The close ended questions having three options i.e., YES, NO, & I DON'T KNOW were provided to students.

Statistical analysis:

The collected data was entered and analyzed in SPSS(PSW) version 20. Descriptive statistics were used to demonstrate the characteristics of the study population. Categorical variables were measured as frequency and percentage where continuous variables were expressed as mean standard deviation. Inferential statistics (Kruskal Willis test, Mann-Whitney test and Chi square test $p < 0.05$) were used to assess the significance among study variables.

Ethical Consideration:

The study was reviewed by the Institution review board. Every participant signed an informed consent of confidentiality before filling the questionnaire.

RESULTS:**Demographic characteristics:**

Table 1 showed demographic characteristics of respondents. Maximum respondents 202 (55.5%) were from 17-21 years. Majority of respondents 184 (50.5%) were males where's 180(49.5%) respondents were from BMC and 180(50.5%) respondents were from QIMS. Majority of respondent 78(21.4%) were from 4th year. Most of respondents 310(85.2) have done FSc in their high school. It was observed from the table that most of respondents 163(44.8) parent's qualification was Masters. Majority of respondents 227(62.4%) family members have not taken part in any Research and majority of respondents 209(57.4%) themselves have not been part of any research either.

Table 1: Demographics

Demographic characteristics	Frequency N=364	Percent
Age group		
17-21	202	55.5
22-26	159	43.7
27-31	2	0.5
32-36	1	0.3
Gender of responder		
Male	184	50.5
Female	180	49.5
Institution		
BMC	180	49.5
QIMS	184	50.5
Year of study		
1st year	77	21.2
2nd year	71	19.5
3rd year	73	20.1
4th year	78	21.4
5th year	65	17.9
High school type		
Fsc	310	85.2
A-Level	32	8.8
others	22	6.0
parents Education level		
School	65	17.9
Bachelor	88	24.2
Masters	163	44.8
PhD	39	10.7
others	9	2.5
Parents Profession		
Teaching	67	18.4
Doctor	69	19.0
Business	76	20.9
Others	152	41.8
Family member in research		
Yes	68	18.7
No	227	62.4
Don't know	69	19.0
Have you been part of research project?		
Yes	135	37.1
No	209	57.4
Don't know	20	5.5
Total	364	100.0

Questionnaire description:

Table 2 showed questionnaire description, majority of respondents 311 (85.4%) knew about clinical research. Most of respondents 336 (92.3%) agreed that research is detailed study of subject in order to discover new facts, finding problem & solution. Majority of respondents 251(69.0%) acknowledged that research can be classified as basic and applied research, 282(77.5%) respondents admit that research can be classified as qualitative and quantitative

research and 204(56.0%) respondents comes to terms that research can be classified as prospective and retrospective research. Greater number of Respondents 284(78.0%) agreed that basic research is concerned with improvement in scientific theories. Most of respondents 279(76.6%) acquiesce that applied research is concerned with introducing any intervention or technique to solve problems. Maximum respondents 273(75.0%) concede that Qualitative research is concerned with

investigating/determining the facts. Most of respondents 255(70.1) approve the fact that quantitative research is concerned with quantifying the facts, 183(50.3%) respondents support the statement that a retrospective study looks backwards and examines exposures to suspected risk or protection factors in relation to an outcome that is established at the start of the study and 214(58.8%) respondents thought a prospective study watches for outcomes, such as the development of a disease, during the study period and relates this to other factors such as suspected risk or protection factor(s). Majority of respondents 232(63.7) agreed Clinical trial is a type of clinical research while 305(83.8) respondents have opinion that clinical research can be done in labs as well as in field (hospital, clinics). Maximum respondents 250(68.7) differentiate that clinical research is different from clinical practice while 321(88.2) respondents confirmed that Clinical research is essential for improving the quality of health care services. Most of respondents 296(81.3) agreed Clinical research make student to better understand the clinical issues during studies. Majority of respondents 229(62.9) thought clinical research is important for residency training after graduation, 258(70.9%) respondents have opinion that clinical research is important for practice of medicine and 270(74.2%) respondents agreed that clinical research

is important for orientation of a doctor toward clinical practice. 155(42.6%) respondents thought clinical research have financial benefits. Maximum number of respondents 314(86.3%) confirmed that research is regarded as important component of every field worldwide while 301(82.7%) respondents thought conducting research is valuable & useful for their career. Most of respondents 298(81.9%) have opinion that research requires a lot of time and effort, 270(74.2%) respondents agreed Lack of funding is one of the barrier in conducting research while 203(55.8%) respondents confessed that unavailability of supervisor is one of the barrier in carrying out research. Majority of respondents 221(60.7%) thought complexity of data collection and analysis is the barrier of research. Maximum number of respondents 243(66.8%) have opinion that clinical research should be part of undergraduate course. Majority of respondents 306(84.1) thought conducting research by MBBS students during their studies will be help them in Orientation toward their field, where's 313(86.0%) respondents thought it will Help them in future, 163(44.8%) respondent's thoughts it's important for residency, 272(74.7%) thought it's important for medicine training, while 124(34.1%) respondents thought it will be financially beneficial.

Table 2: Questionnaires

Questionnaires	Yes N (%)	No N (%)	Don't Know N (%)
Have you ever heard about a term clinical research?	311(85.4)	42(11.5)	11(3.0)
Research is detailed study of subject in order to discover new facts, finding problem & solution.	336(92.3)	18(4.9)	10(2.7)
Research can be classified as basic and applied research.	251(69.0)	15(4.1)	95(26.1)
Research can be classified as qualitative and quantitative research.	282(77.5)	18(4.9)	62(17.0)
Research can be classified as prospective and retrospective research.	204(56.0)	32(8.8)	125(34.3)
Basic research is concerned with improvement in scientific theories	284(78.0)	37(10.2)	41(11.3)
Applied research is concerned with introducing any intervention or technique to solve problems.	279(76.6)	21(5.8)	57(15.7)
Qualitative research is concerned with investigating/determining the facts.	273(75.0)	31(8.5)	55(15.1)
Quantitative research is concerned with quantifying the facts.	255(70.1)	39(10.7)	63(17.3)
A retrospective study looks backwards and examines exposures to suspected risk or protection factors in relation to an outcome that is established at the start of the study.	183(50.3)	40(11.0)	127(34.9)
A prospective study watches for outcomes, such as the development of a disease, during the study period and relates this to other factors such as suspected risk or protection factor(s).	214(58.8)	39(10.7)	98(26.9)
Clinical trial is a type of clinical research.	232(63.7)	58(15.9)	69(19.0)
Clinical research can be done in labs as well as in field (hospital, clinics).	305(83.8)	35(9.6)	23(6.3)
Clinical research is different from clinical practice.	250(68.7)	65(17.9)	49(13.5)

Clinical research is essential for improving the quality of health care services.	321(88.2)	19(5.2)	23(6.3)
Clinical research make student to better understand the clinical issues during studies.	296(81.3)	33(9.1)	34(9.3)
Clinical research is important for residency training after graduation.	229(62.9)	68(18.7)	67(18.4)
Clinical research is important for practice of medicine.	258(70.9)	53(14.6)	49(13.5)
Clinical research is important for orientation of a doctor toward clinical practice.	270(74.2)	53(14.6)	39(10.7)
Clinical research have financial benefits	155(42.6)	108(29.7)	100(27.5)
Research is regarded as important component of every field worldwide.	314(86.3)	25(6.9)	25(6.9)
Conducting research is valuable & useful for your career.	301(82.7)	38(10.4)	25(6.9)
Research require a lot of time and effort.	298(81.9)	44(12.1)	21(5.8)
Lack of funding is one of the barrier in conducting research.	270(74.2)	53(14.6)	41(11.3)
Unavailability of supervisor is one of the barrier in carrying out research.	203(55.8)	111(30.5)	49(13.5)
Complexity of data collection and analysis is the barrier of research	221(60.7)	91(25.0)	50(13.7)
Clinical research should be part of undergraduate course.	243(66.8)	80(22.0)	41(11.3)
Conducting research by MBBS students during studies will be helpful for you in;			
a. Orientation toward field	306(84.1)	24(6.6)	30(8.8)
b. Helpful in future	313(86.0)	28(7.7)	22(6.0)
c. Important for residency	163(44.8)	105(28.8)	92(25.3)
d. Important for medicine training	272(74.7)	49(13.5)	41(11.3)
e. Financially beneficial	124(34.1)	138(37.9)	99(27.2)

Comparison of mean and Significance:

The individual demographics characteristics were taken and mean comparison was calculated and showed all the p-values less than 0.05 that shows significance over study, i.e. Age ($p<0.001$), year of study ($p<0.001$), Institution ($p<0.001$), Parents education level ($p<0.058$) and been part of research

($p<0.001$) were statistically significant. Beside these, none of the demographic significantly associated with knowledge i.e. $p>0.05$. where's demographic Institution ($p<0.001$), Parents education level ($p<0.021$), Family member in research ($p<0.034$) and been part research project (0.049) were significantly associated with Perception i.e. $p>0.05$.

Table 3: Comparison of Mean of Knowledge and perception scores:

Demographics	Knowledge			Perception		
	N	Mean \pm SD	P value	N	Mean \pm SD	P value
Gender of responder						
Male	184	14.51 \pm 3.792	0.489	184	8.42 \pm 2.739	0.398
Female	180	13.99 \pm 4.766		180	8.22 \pm 2.520	
Age group						
17-21	202	13.72 \pm 4.067	0.001	202	8.20 \pm 2.470	0.337
22-26	159	14.97 \pm 4.477		159	8.48 \pm 2.837	
27-31	2	15.50 \pm 2.121		2	8.00 \pm 2.828	
32-36	1	5.00 \pm 0.0		1	8.00 \pm 0.00	
Institution						
BMC	180	13.54 \pm 4.195	0.001	180	7.91 \pm 2.507	0.000
QIMS	184	14.95 \pm 4.304		184	8.72 \pm 2.695	

Year of study						
1st year	77	13.45±3.271	0.001	77	7.84±2.289	0.064
2nd year	71	14.04±4.416		71	8.76±2.435	
3rd year	73	13.73±4.866		73	8.15±3.121	
4th year	78	14.68±4.560		78	8.63±2.604	
5th year	65	15.51±4.051		65	8.22±2.607	
High school type						
FSc	310	14.22±4.236	0.396	310	8.36±2.585	0.630
A-Level	32	15.16±3.936		32	8.50±2.436	
others	22	13.36±5.585		22	7.50±3.433	
Parents Education level						
School	65	14.14±4.596	0.058	65	8.22±2.724	0.021
Bachelor	88	15.35±2.913		88	9.01±2.098	
Masters	163	13.99±4.167		163	8.19±2.516	
PhD	39	12.87±5.736		39	7.31±3.365	
others	9	15.00±6.819		9	9.00±3.708	
Parents Profession						
Teaching	67	14.60±3.689	0.313	67	8.63±2.557	0.397
Doctor	69	14.17±4.452		69	8.32±2.938	
Business	76	15.05±3.629		76	8.68±2.015	
Others	152	13.74±4.739		152	8.00±2.769	
Family member in research						
Yes	68	15.21±3.647	0.063	68	9.01±2.154	0.034
No	227	14.38±3.996		227	8.22±2.562	
Don't know	69	12.90±5.464		69	7.94±3.148	
Have you been part of research project?						
Yes	135	15.66±3.528	0.001	135	8.70±2.389	0.049
No	209	13.53±4.311		209	8.18±2.643	
Don't know	20	12.35±6.235		20	7.25±3.626	

Mann-Whitney U test

Kruskal Wallis test

Sig <0.05

Knowledge and Perception Score association among demographics:

Chi square test was performed among knowledge and perception score groups; categorized into three as poor, average and good knowledge and perception. Result showed that demographic significantly associated with knowledge score group i.e. $p < 0.05$ were Age, Institution Year of study, Family member and been a part of research where's demographic significantly associated with perception score group i.e. $p < 0.05$ were Institution, Parents education level, Family member in research and been part of research project.

Table 4: Knowledge and perception crosstabulation:

Demographic	Knowledge Crosstab				Perception crosstab			
	Poor Knowledge	Adequate Knowledge	Good Knowledge	P value	Poor Perception	Adequate Perception	Good Perception	P value
Age Group								
17-21	17	101	84	0.001	72	25	105	0.178
22-26	10	46	103		47	20	92	
27-31	0	1	1		1	0	1	
32-36	1	0	0		0	1	0	
Gender								
Male	10	74	100	0.222	64	19	101	0.375
Female	18	74	88		56	27	97	
Institution								
BMC	16	87	77	0.004	71	30	79	0.001
QIMS	12	61	111		49	16	119	
Year of study								
1 st year	5	43	29	0.004	33	11	33	0.164
2 nd year	5	35	31		20	6	45	
3 rd year	8	29	36		26	8	39	
4 th year	7	25	46		23	8	47	
5 th year	3	16	46		18	13	34	
High school type								
Fsc	23	128	159	0.309	99	43	168	0.330
A level	1	12	19		11	3	18	
Others	4	8	10		10	0	12	
Parents Education level								
School	6	25	34	0.034	22	7	36	0.164
Bachelor	2	30	56		23	9	56	
Masters	12	76	75		54	26	83	
PHD	7	15	17		19	4	16	
Others	1	2	6		2	0	7	
Parents Profession								
Teaching	2	28	37	0.359	25	3	39	0.048
Doctor	6	28	35		22	4	43	
Business	4	27	45		21	13	42	
Other	16	65	71		52	26	74	
Family member in research								
Yes	3	24	41	0.001	13	7	48	0.036
No	12	102	113		83	32	112	
Don't know	13	22	34		24	7	38	
Have you been part of research project?								
Yes	3	47	85	0.001	34	17	84	0.095
No	20	96	93		76	27	106	
Don't know	5	5	10		10	2	8	
Total	28	148	188		120	46	198	

DISCUSSION:

This study focused at finding out the knowledge and perceptions of medical students (including MBBS only) at undergraduate level. Good knowledge and interest in clinical research at an undergraduate level increases the chances that the students will pursue research after graduation. It was seen that 35% of the postgraduate students taking part in research had past research experience from medical school [7, 12]. Thus educating and introducing research studies in undergraduate programs can help rectify the situational decline in number of physician scientists [5, 13]. As found in several researches all over the world and in Pakistan, lack of time while studying medicine, lack of supportive mentors and financial support are some of the leading causes of lack of interest and thus less knowledge in students related to research [4, 5, 7, 12-15].

This study showed 46% of students from 4th and 5th year had good knowledge as compared to 29%, 31% and 36% for students of 1st, 2nd and 3rd year. The finding of this research about the knowledge of students regarding to research were similar to study carried out at Army medical college Rawalpindi where it was found that about 27.69% of the senior (5th year MBBS) had good knowledge as compared to juniors where only 4.80% had good knowledge, same results were obtained in study "Evaluation of attitude to, knowledge of and barriers toward research among medical science students" and "Attitudes of developing world physicians to where medical research is performed and reported" [5, 8, 12].

Our results also showed that majority of students perceived that knowledge of research and conducting research can increase orientation towards field (84.1%), will be helpful in future (86.0%) and is important for medicine training (74.7%). These findings were comparable to the findings of research on perceptions attitudes towards research amongst medical students at Shifa medical college Islamabad where 65.7% agreed research was useful and 68.9% stated that it will be helpful in their future professional life [11].

Self-administered questionnaire limit the individual identification, and we selected the willing students so it doesn't cover the targeted information of whole students. Field of study include only the BMC and QIMS so the results can't apply on the whole country and further research done throughout the country to give us better insight of student's level of knowledge.

CONCLUSION

Medical schools in Quetta must include Clinical research in their co-curriculum as a part of

undergraduate study. Study concluded that carrying out researches may prove to be beneficial in future for clinical practices, residency and medical trainings etc. There is large number of students having basic knowledge about research and interested in carrying out clinical research however lack of platforms and supervisors are the barriers. Thus, encouraging students, helping them carry out researches at undergraduate level and limiting the barriers must be considered by the head of Medical schools of Quetta.

Author's contribution:

Saliha kakar, Kanzul-eman, Sumeera ghayas, Sara sahar, Mamoona Ahmed and Khaleel Ahmed Khan conceived, designed the study and administrated the questionnaire. Saliha kakar managed, entered, analyzed and interpreted the data.

Conflict of interest

None

REFERENCES:

1. AlGhamdi, K.M., et al., *Perceptions, attitudes and practices toward research among senior medical students*. Saudi Pharmaceutical Journal, 2014; **22**(2): p. 113-117.
2. Burgoyne, L.N., S. O'Flynn, and G.B. Boylan, *Undergraduate medical research: the student perspective*. Medical education online, 2010; **15**(1): p. 5212.
3. Meraj, L., et al., *Perceptions and attitudes towards research amongst medical students at Shifa College of Medicine*. JPMA, 2016. **66**(165).
4. Siemens, D.R., et al., *A survey on the attitudes towards research in medical school*. BMC medical education, 2010; **10**(1): p. 4.
5. Zehra, N., A. Hassaan, and S. Mushtaq, *RESEARCH AMONGST JUNIOR AND SENIOR MEDICAL STUDENTS; COMPARISON OF KNOWLEDGE, ATTITUDE AND PRACTICE*. Professional Medical Journal, 2015; **22**(1).
6. Sabzwari, S., S. Kauser, and A.K. Khuwaja, *Experiences, attitudes and barriers towards research amongst junior faculty of Pakistani medical universities*. BMC medical education, 2009. **9**(1): p. 68.
7. Scaria, V., *Whisking research into medical curriculum*. Calicut Medical Journal, 2004; **2**(1): p. e1.
8. Memarpour, M., A.P. Fard, and R. Ghasemi, *Evaluation of attitude to, knowledge of and barriers toward research among medical science students*. Asia Pacific family medicine, 2015; **14**(1): p. 1.
9. Khan, H., et al., *Knowledge and attitudes about health research amongst a group of Pakistani*

medical students. BMC Medical Education, 2006; **6**(1): p. 54.

10.Ibrahim Abushouk, A., et al., *Attitudes and Perceived Barriers among Medical Students towards Clinical Research: A Cross-Sectional Study in an Egyptian Medical School*. Journal of Biomedical Education, 2016; **2016**.

11.Noorelahi, M.M., A.A. Soubhanneyaz, and K.A. Kasim, *Perceptions, barriers, and practices of medical research among students at Taibah College of Medicine, Madinah, Saudi Arabia*. Advances in medical education and practice, 2015; **6**: p. 479.

12.Segal, S., et al., *The association between students' research involvement in medical school and their*

postgraduate medical activities. Academic Medicine, 1990; **65**(8): p. 530-3.

13.Bickel, J. and T.E. Morgan, *Research opportunities for medical students: an approach to the physician-investigator shortage*. Academic Medicine, 1980; **55**(7): p. 567-73.

14.Shrestha, A., *The importance of doing research as a medical student*. 2007.

15.Sheikh, A.S.F., et al., *Factors contributing to lack of interest in research among medical students*. Advances in medical education and practice, 2013; **4**: p. 237.