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PERCEPTIONS, OBSTACLES AND PRACTICES OF RESEARCH AMONGST STUDENTS' OF AL-MAAREFA COLLEGES: A CROSS SECTIONAL COMPARATIVE STUDY

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ABSTRACT

Undergraduate research in health science stream is important to expose and encourage the students towards the newer advances and research practices. The present study was taken up to assess the perception, obstacles and practices of research amongst students of college of medicine (COM), college of pharmacy (COP) and college of applied sciences (COAS) of Al-Maarefa Colleges (MCST), Riyadh, Saudi Arabia. A validated, pretested, and structured questionnaire was completed by 358 students of MCST and the results were analyzed by appropriate statistical methods using SPSS IBM 23 application. The level of statistical significance was defined as P#0.05. The average perception score using Likert response scale was significantly higher among COM (4.2/5) and COP (4.1/5) students compared with their

counterparts in COAS (3.7/5). The most important obstacles in not conducting research were lack of time and training for research. The perception of research was favorable in both male and female students. However, the practice was higher among female students. Addressing and solving these obstacles by authorities as well as faculty members of MCST is imperative to promote research atmosphere and enhance research practices among students.

Keywords: Al-Maarefa Colleges; Obstacles; Practices; Perception; Research; students

INTRODUCTION

Research is considered as an important tool to bring about reforms and improvement in the field of science and technology. It is an integral part of learning at university level education in most of the universities across the globe (1). Curriculum even at undergraduate training institutes without exposure to sufficient orientation on research is considered as incomplete. Research helps students to develop critical thinking, reasoning skills and positive attitude from the beginning of their career (2, 3). It helps in the transition of students from novice to expert learners (4).

Education at health science sector forms an essential component of university education in any country. Hands on training on research essentials such as research proposal writing, understanding research methodology, updates on statistical designs, interpretation skills and scientific writing are imperative items that should be inculcated right from the undergraduate level (5, 6). A decline in the number of research scientist among health care professionals (7) necessitates urgent measures to develop research motivation among undergraduate students. Today's health university students are going to be the soldiers of health supply force of tomorrow in the form of physicians, pharmacist, nurses etc. The unfamiliarity with the research (8) at the early stage should not be the excuse for avoiding research productivity, rather, it could be neutralize with constant support and supervision of competent supervisors and mentors. The participation of students' in research not only help them to develop analyzing skill, but also secure admission in higher studies such as residency programs and improve post graduate productivity (9). However, several studies have reported for many obstacles faced by the university students in their research activities (10).

Health Science University train several health professionals such as physician, pharmacist, nurses, emergency medical staff and respiratory therapist. It is imperative to promote credible research activities among

all professionals of health sciences to provide optimized medical care. Although, there are numerous researches done on the perception, barriers and practices of research among medical students (10-13), we could not find any comprehensive study done on determining the similar parameters of research among other health science undergraduate students such as pharmacy, nursing and other applied health science programs. Therefore, the research envisaged was carried out to elucidate the perception, barriers and practices of scientific research amongst undergraduate students of Al-Maarefa colleges, Riyadh and, further, to compare the responses of all three cohorts of Al-Maarefa Colleges (medical, pharmacy and applied sciences).

MATERIALS AND METHODS

Subjects and methods: The present study was based on a cross-sectional survey among students of Al-Maarefa colleges, Riyadh. The study was conducted at the Colleges, from March to May 2017. The study employed a predesigned validated structured questionnaire to collect the data. Participation in this study survey was completely voluntary, and full confidentiality and anonymity were maintained at all times, with no identifying information being recorded in the survey results. A consent form was added at the beginning of the questionnaire explaining the purpose of the study and requesting their participation. Required permission was obtained from the Committee of Research seminar, College of Pharmacy, Al-Maarefa Colleges, Riyadh (MCST).

Eligibility criteria

Students of Al-Maarefa Colleges who completed minimum four levels of studies in their respective programs and have permanent resident status of Saudi Arabia were included in this study. Students participating in part time programs offered by MCST were not included in this study.

Study design: The current research was carried out by cross-sectional comparative study design. It is s time bound study to be completed in a short span of time, hence we selected cross-sectional design. It needs a comparison of College of Medicine cohort with cohort of College of Pharmacy and Cohort of College of Applied science to make a comparison among them; therefore it is a comparative study. The study will be done with the help of a questionnaire design to answer research questions. The questionnaire is developed by thorough literature review in addition to the discussion with the experts in the field. The questionnaire after its validation was

subjected for pilot study involving few study samples. Final refinement and fine tuning of the questionnaire was done based on the pre-test report.

Data collection: The questionnaire consisted of several parts. The first part documented the demographic data of the participants: age, gender, colleges/departments, study level, GPA, marital status, location, nationality, working status, educational level of father and mother.

Questions in the second part pertained to assessing students' perception toward research. The response to the questions are taken based on Likert response scale from 1 to 5 (1= totally disagree; 2= disagree; 3= neutral; 4= agree; 5= totally agree). The perception section included 09 statements representing all aspects of health science research. The average of the response is calculated as mean and that represent the overall response of each cohort. The statements included in this section are: role of research in health science field is important, research helps us in providing better patients' health care, research participation should be made compulsory to all students of health subjects, conducting research during their graduate study will have positive impact on students, research is one of the essential item for your selection to higher studies, research helps us to develop team work spirit, research could be part of long term career goal, undertaking research will increase already overloaded academic activities and research will not help in improvement of subject knowledge.

The study questionnaire also included questions about the obstacles/barriers preventing students from conducting or participating in medical research. Barrier items included in the questionnaire (n=14 items) were formulated. Each studied barrier item was scored as follows: 1= totally disagree; 2= disagree; 3= neutral; 4= agree; 5= totally agree. The average of the response is calculated as mean and that represent the overall response of each cohort. The statements included in this section are: Inadequate facility for research, difficulty in obtaining a research supervisor, unavailability of the samples (or patients), lack of devices/instruments, inadequate support by mentors/assistant, lack of rewarding and/or motivation, difficulty obtaining approval for the study, lack of research funding, lack of time to do research, poor accessibility to database, lack of research training, deficiency of self-motivation, absence of research culture and discouragement from other students.

To understand the current practices of research among all cohorts, the next section included 09 statements. The statement 01 is the decisive statement for rest of the statements. Those who answered in affirmation for any practice of research are requested to answer rest of the questions. Atleast four statements from this section were tabulated and percentage participation was determined. The statements are: participation in any research, oral presentation in conference, poster presentation in conference and published articles in journal

Statistical analysis: The collected data were entered and analyzed using statistical package for social science, version 23 (IBM SPSS Inc., Chicago, IL, USA). Data were presented using frequencies and percentage as appropriate. The students' perception, barriers and practice were assessed, analyzed, and compared by the students' colleges using analysis of variance (ANOVA) and post ANOVA test LSD for multiple comparisons. For all purposes, the criteria of significance were considered at a P-value of #0.05.

RESULTS

As shown in tables 01, more than 83% of the students participated in the study were in age group of 20-25 years, while only 14% were in age group between 26-30 years and rests were above 30 years. There was proportional distribution of the sample size among gender based on the population size of students studying at different colleges of Al-Maarefa. Around 58% of the respondents were female, whereas, only 41% were male. There was almost equal number of surveyors from College of Medicine (39%) and College of Pharmacy (40%) with little over half from the college of Applied sciences (20%). All the participants of the study were at study level equal or above level 05, approximately 64% were in level between 5-8, while, 36% were in level more than 8. Regarding to GPA those taking from 0.5-1 were 22.6%,while, 53.8% with 1.6-3, finally more than average of 3 were 23.6%. The percentages for those were married 15.4%, by contrast the singles with 84.6%. The participants from urban place were with 86.7%, and the rural with 12.3%. The Saudi participants were 78.6%, and non-Saudi were 21.4%. In case of work, those working 8%, and not working 92%. Most of the participants of the study had educated background with both father (72.4%) and mother (59.5%) were at least a graduate, whereas, percentage of uneducated parents (father 4.9% and mother 7.7%) was very less. Rests of the participants have parents with a qualification varying from primary to secondary school.

As demonstrated in table 02, perception of the study on research was obtained from students of all colleges under Al-Maarefa. The data were analyzed by ANOVA and post ANOVA LSD test.

A significantly (P value: 0.004) positive response was obtained from the respondents of the study when we enquired about importance of research in the field of health sciences. Most of the students from all colleges either agree or totally agree on the importance of research in their field of specialization. College of Medicine and College of pharmacy students totally agree with the importance of research in health sciences, whereas, College of applied science students expressed as 'agree' with this statement. Statistically significant (P value: 0.008) response was given by the surveyors of this questionnaire when we asked on the research's role on providing better patients' health care. Average response is around 4.0 in likert scale from all colleges.

When a question was put to determine whether they agree with an idea of making compulsory for research participation while pursuing their studies in health science discipline, significantly (P value: 0.069) greater number replied in affirmation from all colleges. All three colleges were found in the agreement category in likert scale. Another question was been asked to identify if research conduct to their graduate study will have positive impact on them, significantly (P value: 0.263) greater number replied agreement from all colleges. All three colleges were found in agreement category in likert scale. A significant (P value: 0.283) response was given by the surveyors of this questionnaire when we asked if Research is one of the essential item for your selection to higher studies. Average response is around 3.9 in likert scale from all colleges. A significantly (P value: 0.585) response was obtained from the respondents of the study when we enquired about if research helps us to develop team work spirit. Most of the students from all colleges either agree or totally agree on this question. College medicine and college of pharmacy totally agree with the research helps us to develop team work spirit, whereas, College of applied science students expressed as 'agree' with this statement. Statistically significant (P value: 0.295) response was given by the surveyors of this questionnaire when we askedresearch could be part of long term career goal. Average response is around 3.75 in likert scale from all colleges. Another question was given to determine whether they agree that Undertaking research will increase already overloaded academic activities, significantly

(P value: 0.861) greater number replied in affirmation from all colleges. All three colleges were found in the agreement category in likert scale. A strongly significant (P value: 0.000) positive response was obtained from the respondents of the study when we enquired about Research will not help in improvement of subject knowledge. Most of the students from all colleges either disagree or totally disagree with this question. College of Medicine and College of pharmacy students totally disagree with the Research will not help in improvement of subject knowledge, whereas, College of applied science students expressed as 'disagree' with this statement.

Table 03 shows frequency distribution of responses expressed by students of Al-Maarefa Colleges on the obstacles they face in doing research. Significantly higher percentage of research participation was found among students of college of Medicine and college of pharmacy when compared to college of applied sciences. Both college of medicine and college of pharmacy data shows a research participation increases gradually as students advance to their higher level of studies, whereas, there is no change found with college of applied sciences. When we compare feedback from college of medicine with college of pharmacy, involvements into research are seen early in college of medicine when compared to college of pharmacy. Even though, some students agreed for their participation in research, but their role in oral and poster presentation as well as attempt for research publications are very low among all colleges of Al-Maarefa.

Table 01: Demographic characteristics

Age	Frequency	Percentage
20-25 years	**252**	**83.4**
26-30 years	**50**	**14.3**
More than 30 years	**8**	**2.3**
Gender		
Male	**143**	**41.3**
female	**205**	**58.7**
College		
College of Medicine	**142**	**38.8**
College of Pharmacy	**149**	**40.7**
College of Applied science	**75**	**20.5**
Study level		

5-8	**222**	**64.1**
9-11	**123**	**35.9**
GPA		
0-1.5	**65**	**22.6**
1.6-3	**155**	**53.8**
3.1-4	**68**	**23.6**
Marital status		
married	**55**	**15.4**
Single	**301**	**84.6**
Location		
Urban	**294**	**86.7**
Rural	**45**	**13.3**
Nationality		
Saudi	**275**	**78.6**
Non Saudi	**75**	**21.4**
Working		
working	**24**	**8**
not working	**322**	**92**
Educational level of father		
not educated	**18**	**4.9**
primary school	**12**	**3.3**
secondary school	**71**	**19.4**
College	**265**	**72.4**
Educational level of mother		
not educated	**28**	**7.7**
primary school	**24**	**6.9**
secondary school	**89**	**24.5**
College	**215**	**59.5**

Table 02: Frequency distribution of different college students in research perception scale

Perception items	Colleges	1	2	3	4	5	*P value*	Average
Role of research in health science field is important	**M**	**9**	**0**	**9**	**54**	**70**	**0.004**	**4.23**
	P	**13**	**2**	**5**	**58**	**71**		**4.15**
	A	**6**	**3**	**12**	**34**	**20**		**3.78**
Research helps us in providing better patients' health care	**M**	**6**	**5**	**4**	**57**	**70**	**0.008**	**4.26**
	P	**17**	**2**	**5**	**58**	**71**		**4.07**
	A	**6**	**3**	**12**	**34**	**20**		**3.94**

Research participation should be made compulsory to all students of health subjects	**M**	**3**	**21**	**21**	**61**	**36**	**0.069**	**3.74**
	P	**9**	**16**	**20**	**70**	**32**		**3.92**
	A	**5**	**9**	**14**	**37**	**8**		**3.46**
Conducting research during their graduate study will have positive impact on students	**M**	**4**	**9**	**19**	**76**	**34**	**0.263**	**3.89**
	P	**9**	**7**	**15**	**69**	**49**		**3.95**
	A	**3**	**5**	**19**	**31**	**16**		**3.70**
Research is one of the essential item for your selection to higher studies.	**M**	**4**	**11**	**18**	**66**	**42**	**0.283**	**3.92**
	P	**6**	**2**	**18**	**70**	**52**		**4.08**
	A	**5**	**5**	**16**	**28**	**20**		**3.71**
Research helps us to develop team work spirit	**M**	**7**	**12**	**30**	**62**	**30**	**0.585**	**3.68**
	P	**6**	**10**	**23**	**74**	**36**		**3.83**
	A	**5**	**2**	**19**	**35**	**14**		**3.68**
Research could be part of long term career goal	**M**	**2**	**13**	**30**	**65**	**32**	**0.295**	**3.78**
	P	**9**	**6**	**31**	**63**	**39**		**3.79**
	A	**5**	**5**	**15**	**35**	**15**		**3.67**
Undertaking research will increase already overloaded academic activities	**M**	**8**	**11**	**29**	**65**	**28**	**0.861**	**3.67**
	P	**5**	**10**	**30**	**71**	**33**		**3.78**
	A	**5**	**5**	**17**	**37**	**9**		**3.54**
Research will not help in improvement of subject knowledge	**M**	**48**	**60**	**8**	**13**	**13**	**0.000**	**2.17**
	P	**48**	**63**	**11**	**21**	**6**		**2.15**
	A	**9**	**23**	**12**	**20**	**11**		**3.01**

M: College of Medicne; P: College of Pharmacy and A:College of Applied Sciences

Notes: Data are presented as frequency distribution for each scale. Perception toward conducting medical research were assessed using likert response scale from 1 to 5 (1= totally disagree; 2= disagree; 3= neutral; 4= agree; 5= totally agree).

Table 03: Frequency distribution of different college students in research Obstacles scale

Perception items	Colleges	1	2	3	4	5	P value	Average
Inadequate facility for research	**M**	12	11	41	55	22	**0.49**	**3.45**
	P	5	12	40	70	20		**3.59**
	A	5	9	27	26	7		**3.28**
Difficulty in obtaining a research supervisor	**M**	4	16	40	50	30	**0.073**	**3.61**
	P	6	28	37	60	17		**3.36**
	A	3	7	27	32	6		**3.41**
Unavailability of the samples (or patients)	**M**	11	16	40	50	25	**0.820**	**3.43**
	P	5	16	33	61	33		**3.68**
	A	7	12	18	28	10		**3.29**

Lack of devices/instruments	**M**	7	28	28	50	28	**0.106**	**3.45**
	P	5	15	26	79	22		**3.66**
	A	6	8	24	25	12		**3.38**
Inadequate support by mentors/assistant	**M**	3	24	28	59	27	**0.666**	**3.58**
	P	3	26	40	62	15		**3.41**
	A	3	14	17	30	11		**3.42**
Lack of rewarding and/or motivation	**M**	7	28	21	56	28	**0.891**	**3.5**
	P	5	19	28	66	28		**3.63**
	A	3	16	14	30	12		**3.42**
Difficulty obtaining approval for the study	**M**	8	18	42	51	22	**0.937**	**3.43**
	P	6	14	37	72	17		**3.54**
	A	6	12	24	20	11		**3.24**
Lack of research funding	**M**	**4**	**20**	**38**	**48**	**28**	**0.231**	**3.55**
	P	**6**	**17**	**33**	**61**	**28**		**3.6**
	A	**2**	**5**	**23**	**34**	**9**		**3.58**
Lack of time to do research	**M**	**3**	**12**	**25**	**57**	**45**	**0.255**	**3.9**
	P	**8**	**15**	**24**	**71**	**29**		**3.71**
	A	**0**	**13**	**13**	**31**	**18**		**3.72**
Poor accessibility to database	**M**	**2**	**19**	**34**	**57**	**28**	**0.789**	**3.64**
	P	**3**	**18**	**33**	**79**	**14**		**3.56**
	A	**2**	**12**	**22**	**26**	**13**		**3.48**
Lack of research training	**M**	**5**	**12**	**28**	**60**	**34**	**0.144**	**3.7**
	P	**10**	**17**	**21**	**67**	**29**		**3.61**
	A	**1**	**16**	**15**	**24**	**19**		**3.58**
Deficiency of self-motivation	**M**	**6**	**24**	**31**	**51**	**28**	**0.135**	**3.5**
	P	**8**	**28**	**32**	**62**	**17**		**3.35**
	A	**7**	**14**	**23**	**23**	**8**		**3.14**
Absence of research culture	**M**	**3**	**8**	**33**	**60**	**36**	**0.007**	**3.84**
	P	**6**	**20**	**29**	**66**	**25**		**3.57**
	A	**1**	**16**	**11**	**32**	**14**		**3.56**
Discouragement from other students	**M**	**12**	**13**	**34**	**65**	**18**	**0.009**	**3.45**
	P	**8**	**24**	**40**	**58**	**17**		**3.35**
	A	**3**	**16**	**15**	**23**	**18**		**3.49**

M: College of Medicne; P: College of Pharmacy and A:College of Applied Sciences

Notes: Data are presented as frequencies. Obstacles toward conducting medical research were assessed using likert response scale from 1 to 5 (1= totally disagree; 2= disagree; 3= neutral; 4= agree; 5= totally agree).

Table 04: Percentage distribution of students by their research practice

Research participation	Response	College of Medicine		College of Pharmacy		College of applied Sciences		p-value
		3rd y-4th y	>4th y	3rd y-4th y	>4th y	3rd y-4th y	>4th y	
1) Participation in any research	Yes	51.25%	78.18%	25.33%	42.18%	25.39%	25%	0.000
	No	48.75%	21.81%	74.66%	57.81%	74.60%	75%	
2) oral presentation in conference	Yes	16.66%	9.61%	11.53%	2%	34.37%	50%	0.109
	No	83.33%	90.38	88.46%	97.95%	65.62%	50%	
3) Poster presentation in conference	Yes	7.57%	19.23%	9.61%	4%	31.25%	0%	0.260
	No	92.42%	80.76%	90.38%	96%	68.75%	100%	
4) Published articles in journal	Yes	7.57%	11.53%	5.76%	4%	25%	0%	0.186
	No	92.42%	88.46%	94.23%	96%	75%	100%	

DISCUSSION

The current study was carried out to determine the perception, barriers and practices of research among students of Al-Maarefa College, Riyadh, Saudi Arabia. The study outcome shows positive inclination towards research by students of College of Medicine and College of Pharmacy when compared to college of Applied sciences.

The issue of research among health science students is very crucial. Inculcating positive perception among students can lead to improvement in research practice among tomorrow health care professionals. The perception of research among students is changing in today's world which is in contrast to earlier findings conducted in Saudi Arabia (14). Students from both college of medicine and college of pharmacy understand the importance of research in health science field. Among 358 participants of the study (Table 01), most of them were happy to get involved for research. They agree that the research will help them in learning better patients' healthcare and also they feel that the participation of research should be made compulsory for them during their academic degree. There was significantly higher percentage of students negated the misconception that the research will not help them in improvement of knowledge (Table 02). Our findings are in agreement with another study done by Nel et al where reported importance of research is felt by studied samples of health science school (15).

In our study, the studied male and female students' reported significant barriers impeding research during undergraduate education, majority of them attribute to lack

of time and training for research as major barriers for research at Al-Maarefa (Table 03). A possible explanation of this finding could be due to expedited semester due to the order from the higher authorities; however, regular training sessions are required to overcome this barrier. Lack of time among university students for doing research is a universal grievance reported in other studies as well (15). This is one of the factor that prevent them from participating in research despite having interest in research. Other barriers for participation in research agreed by are: Inadequate facility for research, difficulty in obtaining a research supervisor, unavailability of the samples (or patients), lack of devices/instruments, inadequate support by mentors/assistant, lack of rewarding and/or motivation, difficulty obtaining approval for the study, lack of research funding, poor accessibility to database, deficiency of self-motivation, absence of research culture and discouragement from other students. Most of these statements received a higher score in a Likert response scale with 3 to 4 out of 5. These factors have to be dealt with urgency before it becomes a big menace (Table 03).

As shown in table 01, most of them agree for importance of research and would love to participate, but obstacles at Al-Maarefa colleges prevent them from participation. This is evident from lower percentage of research practices by students and even when they are practicing, they participate at the preliminary stage. Therefore almost 50% of the students agree that they practice research, but very less go for oral or poster presentation of their research (Table 04). It is even unexpectedly low percentage dare to communicate their research articles to journals for possible publications. Significantly higher percentage of research participation was found among students of college of Medicine and college of pharmacy when compared to college of applied sciences. Both college of medicine and college of pharmacy data shows a research participation increases gradually as students advance to their higher level of studies, whereas, there is no change found with college of applied sciences. The gradual rise in research practice by students of college of medicine and college of pharmacy is similar to the one reported earlier by Vujaklija et al (16) have also reported similar findings, where they documented an increase in research practice as junior students moved to senior students (16). When we compare feedback from college of medicine with college of pharmacy, involvements into

research are seen early in college of medicine when compared to college of pharmacy.

This study also has some limitations. Self-selection bias may have been a limitation factor in this study because those students who chose to participate may be more familiar with research. However, because of the small refuse rate encountered in this study and the inclusion of only senior students (from level 5) who have some exposure for research, this factor appeared to have little or no role in the study findings. Additionally, this study included only students from Al-Maarefa colleges, with a modest sample size. Number of participation from different colleges of Al-Maarefa is not same as the sample size at applied science college is lesser than other two colleges; therefore, unequal sample size bias might have occurred. Therefore this truly does not express a comparison among three colleges accurately. However, sample size among college of medicine and college of pharmacy were almost same. Future research will need to include longer duration of time to include larger sample size so that the results of this study are generalizable.

CONCLUSION

The perception of the students toward medical research was favorable in both male and female students. However, the practice was higher among female students.

Students from the college of medicine have a better perception and practice of research than college of pharmacy as well applied science college students. However, the difference between college of medicine and college of pharmacy students for research perception and practice are not significantly different. A numbers of barriers were found to prevent students from conducting a research. Addressing and solving these barriers by the faculty staff and administrators are required in order to ensure an improvement in research activities among students of Al-Maarefa colleges.

RECOMMENDATIONS

At the end of our study, we recommend to disseminate more information about research through organizing research orientations, such as, more active research day, and culture campaign for research. Periodically assess the barrier and efforts should be seriously taken to eradicate them by faculty members and administration. Motivation for research for both teachers and students is the need for the hour. If teachers are motivated, they will work hard to motivate their students. This will have a long lasting and ever-encouraging impact for research in colleges of Al-Maarefa.

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