ORIGINAL ARTICLE

KNOWLEDGE AND ATTITUDE OF UNDERGRADUATE DENTAL STUDENTS TOWARDS RESEARCH

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Background: Scientific research is an important part of healthcare curricula and a vital exercise to help develop clinician's research skills. The aim of this study was to evaluate quantitatively the knowledge and attitude of undergraduate dental students towards scientific research. In addition, the study explored the reasons for lack of interest in research by the dental students. **Methods:** This cross-sectional study was conducted among students of three dental schools in Riyadh. The required information was collected through a self-designed, pretested and validated questionnaire used for investigating the students' knowledge, attitudes and reasons for lack of interest if any in research. Descriptive, chi-square and t-tests were used for statistical analysis of the responses considering a *p*-value of <0.05 as the cut-off level for significance. **Results:** Out of 701 completed questionnaires (Response Rate=77.88%), 360 (51.4%) and 341 (48.6%) were for males and female students respectively. Subjects, stratified according to year of study, included students of first year=144 (20.5%); second year=151 (21.5%); third year=132 (18.8%); fourth year=145 (20.7%) and fifth year=129 (18.4%). The mean and standard of the knowledge score was 3.36±1.76 and attitude score was 3.87±2. Students' knowledge and attitude scores tended to increase as the study year went higher. **Conclusion:** A moderate level of knowledge about research was found among dental students. However, attitude of the dental students towards research was positive. Improvements were seen in the knowledge and attitude of students over the study years. Curriculum overload, exposure, literature search, knowledge and finding a topic or mentor in the school seemed to be the barriers in pursuing research.

Keywords: Dental Student; Research; Attitude; Barrier; Research Knowledge.

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INTRODUCTION

One of the best measures of scientific progress in a profession is scientific research in institutions. Emphasis on conducting good scientific research has increased worldwide. This has also resulted in resolution of community issues including healthcare. This makes the communities to rely on their own resources, decrease dependence on other communities and to compete with other communities.[1–5]

Research is a systematic process to achieve new knowledge, science or invention by the use of standard guidelines.[4] Health care research is used for prevention, diagnosis and treatment of diseases and on healthcare policies. Scientific research has been integrated as one of the important subjects in healthcare curriculum.[5,6] Insufficient attention to research by well-educated members of community and the government, contributes to scientific and knowledge lag within the community. Linking research and teaching is important for healthcare policy makers and academics. This has led some to stress the need for undergraduate students to be taught in a research-informed teaching environment. Generally speaking, students in more research-intensive universities may have greater awareness of research.[7–11]

Several factors influence a culture of research among healthcare providers including students. The students' belief and knowledge in establishing a scientific study is the most important to begin with, followed by the students' interest and curiosity in a subject and the desire to solve an unanswered question or problem. However, there are certain barriers other than adequate knowledge and curiosity that need to be addressed for promoting research culture in the institutes. These elements, such as lack of resources, finding a mentor etc. are handicaps that prevent students from pursuing their interest in conducting a scientific research.[8,12–14]

Scientific research should be considered an integral part in medical education. It is important to inculcate critical thinking and reasoning in order to develop a positive attitude among undergraduate students towards scientific research. The involvement of undergraduate students in research has a significant impact in conducting research studies after their graduation, compared to graduates who were inactive in this field in their undergraduate program.[15] Unfortunately, there has been a decline of

physician scientists in the past couple of decades, thus the importance of encouragement and involvement of medical students in research is essential to compensate for the void by physician scientists and fulfil the need of their communities in self-reliance in healthcare.[16–19]

Many researchers[20] have suggested that implementing scientific research in the dental curriculum from year one has broad ramifications that eventually leads dental students in pursuing academic careers. Furthermore, implementation of scientific research in the dental curriculum will contribute to a competitive environment that challenges the faculty leading to increase and expansion of their research capabilities and productivity. An up-to-date community of dental clinicians in new techniques and treatment guidelines that are derived from evidence-based approach would be better accepted and useful in the academic institutes.[18]

Some research studies highlight the importance of research among the undergraduate medical students in Saudi Arabia[3,13,21,22] but very few research studies are available about the dental students. The results of the current study may be a source of recommendation and developing strategies for improving/promoting research environment among the dental schools in Saudi Arabia. Thus, the aim of this study was to investigate quantitatively the knowledge and attitude, and to explore the reasons for lack of interest in research by undergraduate dental students studying at various dental schools in Riyadh, Saudi Arabia.

MATERIAL AND METHODS

This cross-sectional questionnaire-based research project was approved by Ethical Committee of the College of Dentistry Research Centre, King Saud University, Riyadh (CDRC Registration # IR 0169). The study was carried out between September 2015 and March 2016.

Required data was collected anonymously via a validated, pretested and peer-reviewed questionnaire that was adopted from previous studies[1,2,3] and modified to suit the requirements of the current study. Questionnaires were distributed, along with a cover letter stating the instructions, rationale and purpose of the survey, as well as an informed consent to a conveniently selected sample of 900 male and female students in three dental schools in Riyadh. Dental schools accepting both male and female students and having passed out graduates for the last five years were included in the study. The sample size was calculated using 95% confidence level and 3% margin of error and found to be 671. For equal distribution of the sample size, around 300 questionnaires (150 male students and 150 female students) were distributed among the 1st to 5th year dental students (30 per class) in each of the three dental schools.

For the sake of anonymity, the names of the dental schools have been abbreviated as A, B and C in subsequent sections. Dental students at these colleges are enrolled in a 5-year Bachelor of Dental Surgery (BDS) training program. All the students from First to Fifth year of the dental school were included in the study.

The participants answered several questions related to knowledge, attitude of dental students towards research and perceived reasons for lack of interest in research. The questionnaires were distributed by hand for convenience, to avoid the poor response rate by online distribution of the questionnaires, to avoid any chance of cheating and to answer any queries raised by the participating students during the filling of questionnaire. There was no time limit for completion of the questionnaire.

In total, the questionnaire comprised of thirty-four questions distributed into three sections. The first section comprised of 10 multiple choice questions, used for evaluating the students' knowledge about basics of research. The questions in this part had four choices out of which only one was correct. The score in this section ranged between 0 and 10.

The second section tested the students' attitude towards research and it comprised of 8 questions and a 9th sub-question. Students had to answer only with "Yes" or "No" with a value of 1 for each "Yes" and 0 for each "No". The sum of the values of this part was used to evaluate the attitude score of the student towards research with the highest value of 8 indicating a more positive attitude. The ninth sub-question assessed student's self-assessment about his/her current scientific research knowledge on a Likert scale of 1 to 5 with 1 = Poor; 2 = Fair; 3 = Good; 4 = Very Good and 5 = Excellent.

The last section of the questionnaire was to get information about perceived reasons for lack of interest in research and comprised of 15 questions. The answers were based on Likert Scale with score of 1 = Strongly Agree; 2 = Agree; 3 = Undecided; 4=Disagree and 5 = Strongly Disagree.

Descriptive statistics and frequency analysis of the collected data was done using SPSS. Chi-square, One-Way ANOVA, t-tests and Tukey's multi-comparison tests were used for statistical analysis of the responses considering a *p*-value of 0.05 as the cut-off level for significance.

RESULTS

Of 900 questionnaires distributed, 701 completed questionnaires were received (Response rate 77.88%). Out of the 701 participants, 254 (36.2%) students belonged to college A, 238 (34.0%) from B and 209 (29.8%) from C. The gender distribution was almost equal with 360 (51.4%) male students and 341 (48.6%) female students participating in the study. According to the distribution by study year in the dental school: 144 (20.5%) belonged to 1st year students; 151 (21.5%) to 2nd year; 132 (18.8%) to 3rd year students; 145 (20.7%) to 4th year students and 129 (18.4%) to 5th year. Among the participants, 241 (34.3%) students graduated from public high schools and 460 (65.7%) students graduated from private high schools.

The questions used for assessment of the students' knowledge about research and their responses are presented in table-1. Question 8 relating to the sample loss and question 9 relating to the parts of a scientific paper had the least (17%) and highest (54.8%) number of correct answers respectively. The mean and standard of the knowledge score was 3.36±1.76 (Table-1).

The number and gender-wise percentage of participant's correct answers of the knowledge questions in dental and high school are presented in table-2. Comparison using Chi-Square test showed difference between males and females to be statistically insignificant. Difference between colleges A vs B, college A vs C and private vs government high school, was also insignificant. The least number of correct answers (27.7%) was by the first-year students and the highest number of correct answers (38.6%) was by the fifth-year students (Table-3). Response of participants to the attitude questions are presented in the table-4. The mean attitude scores and its comparisons in relation to the study variables are presented in Table 5. Mean attitude score of female students (4.14±1.8) was higher compared to the male students (3.62±2.2). According to multiple comparisons with Tukey's-Test, attitude score of college C students was significantly lower than other two colleges. Attitude scores of 1st year and 2nd year students were significantly lower than 3rd, 4th and 5th year students (Table-5). With the student's self-assessment about the scientific research knowledge, more than half categorized themselves as poor (19%) or fair (37%) (Figure-1). Student's reasons for their lack of interest in research are presented in figure-2.

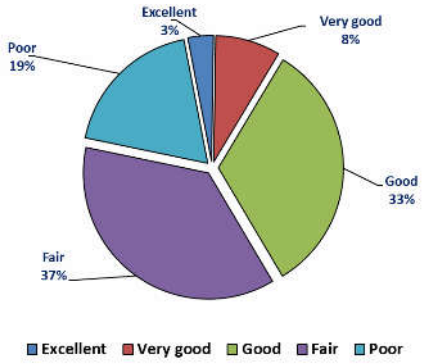

Figure-1: Students self-assessment of scientific research knowledge

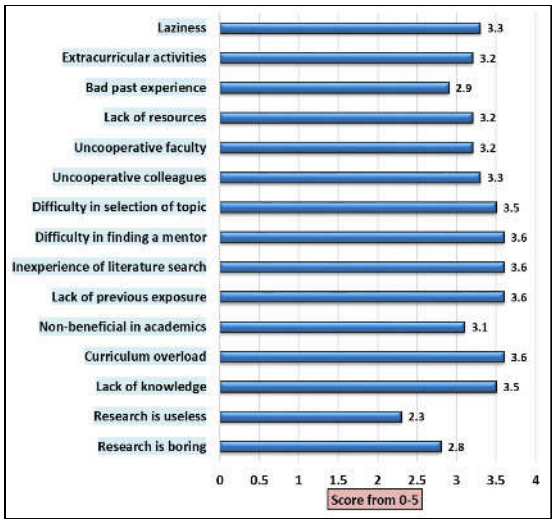

Figure-2: Reasons for lack of interest in research by the dental students (based on Likert scale).

Table-1: Responses of the students to the questions related to the knowledge of research. (n=701)

Questions		Responses	
		Correct n (%)*	Incorrect n (%)
1	How would you define a scientific hypothesis?	202 (28.8)	499 (71.2)
2	A scale from 1 to 5 (like grades in examinations) is called:	196 (28)	505 (72)
3	The part of a scientific paper is:	245 (35)	456 (65.0)
4	Which of the following software is used for referencing scientific articles?	183 (26.1)	518 (73.9)
5	Which style of writing references is recommended by most health sciences journals?	154 (22.0)	547 (78.0)
6	What is Medline?	221 (31.5)	480 (68.5)
7	Which section of a scientific paper contains limitations of a study?	267 (38.1)	434 (68.5)
8	Which of the following types of research usually suffers higher sample loss?	119 (17.0)	582 (83.0)
9	Which item is not a part of a scientific paper?	384 (54.8)	317 (45.2)
10	Which software is used for statistical analysis of data?	314 (44.8)	387 (55.2)

Table-2: Comparison of knowledge of research (correct responses) according to gender, College type and high school type.

Questions	Gender n (%)		Dental College n (%)			High School n (%)	
	Male 360 (51.4)	Female 341 (48.6)	A 254 (36.2%)	B 238 (34.0)	C 209 (29.8)	Private 460 (65.7)	Govt. 241 (34.3)
1.	106 (29.4)	96 (28.2)	86 (33.9)	54 (22.7)	62 (29.7)	76 (32.2)	121 (26.6)
2.	105 (29.2)	91 (26.7)	63 (24.8)	84 (35.3)	49 (23.9)	59 (25.0)	134 (29.5)
3.	128 (35.6)	117 (34.3)	95 (37.4)	61 (25.6)	89 (42.6)	75 (31.8)	169 (37.1)
4.	109 (30.3)	74 (21.7)	73 (28.7)	55 (23.1)	55 (26.3)	52 (22.0)	126 (27.7)
5.	80 (22.2)	74 (21.7)	64 (25.2)	53 (22.3)	37 (17.7)	54 (22.9)	99 (21.8)
6.	128 (35.6)	93 (27.3)	76 (29.9)	45 (18.9)	100 (47.8)	74 (31.4)	145 (31.9)
7.	122 (33.9)	145 (42.5)	92 (36.2)	88 (37.0)	87 (41.6)	94 (39.8)	168 (36.9)
8.	60 (16.7)	59 (17.3)	52 (20.5)	19 (8.0)	48 (23.0)	41 (17.4)	77 (16.9)
9.	197 (54.7)	187 (54.8)	154 (60.6)	111 (46.6)	119 (56.9)	126 (53.4)	253 (55.6)
10.	165 (45.8)	149 (43.7)	119 (46.9)	109 (45.8)	86 (41.1)	103 (43.6)	207 (45.5)
Correct Answers %	33.3	31.8	34.4	28.5	35.0	31.9	32.9

Table-3: Comparison of knowledge of research (correct responses) according to study year in the dental school.

Questions	Year of study n (%)				
	1st year (n=144)	2nd year (n=151)	3rd year (n=132)	4th year (n=145)	5th year (n=129)
1.	34 (23.6)	44 (29.1)	49(37.1)	35(24.1)	40 (31.0)
2.	40 (27.8)	40 (26.5)	21(15.9)	39(26.9)	56 (43.4)
3.	39 (27.1)	55 (36.4)	56 (42.4)	53 (36.6)	42 (32.6)
4.	32 (22.2)	34 (22.5)	29 (22.0)	37 (25.5)	51 (39.5)
5.	28 (19.4)	35 (23.2)	24 (18.2)	33 (22.8)	34 (26.4)
6.	45 (31.3)	51 (33.8)	39 (29.5)	48 (33.1)	38 (29.5)
7.	52 (36.1)	50 (33.1)	51 (38.6)	58 (40.0)	56 (43.4)
8.	19 (13.2)	23 (15.2)	25 (18.9)	28 (19.3)	24 (18.6)
9.	53 (36.8)	77 (51.0)	80 (60.6)	92 (63.4)	82 (63.6)
10.	57 (39.6)	51 (33.8)	61 (46.2)	70 (48.3)	75 (58.1)
Correct Answers %	27.7	30.5	32.9	34.0	38.6

Table-4: Response of the students to the questions related to attitude towards research.

No.	Questions	Response	
		Yes n (%)	No n (%)
1.	Have you ever participated in a research project (apart from the mandatory academic projects)?	228 (32.5)	473 (67.5)
2.	Have you ever participated in writing a scientific paper?	228 (32.5)	473 (67.5)
3.	Do you feel confident while reading/interpreting a research paper?	356 (50.8)	345 (49.2)
4.	Do you think undergraduate students should participate in scientific research?	494 (70.5)	207(29.5)
5.	Do you think undergraduate students can plan and conduct a research project and write a scientific paper?	448 (63.9)	253 (36.1)
6.	Can dental students plan and conduct research project without supervision?	195 (27.8)	506 (72.2)
7.	Have you ever attended a seminar/workshop regarding scientific research?	320 (45.6)	381 (54.4)
8.	Do you find scientific research interesting?	446 (63.6)	255 (36.4)
Over all percentage (%)		48.4	51.6

Table-5: Comparison of attitude scores towards research by the students in relation to the study variables.

Study variables	*Attitude Score Mean (Standard Deviation)	t-value/F-value	*p*-value
Gender			
Male	3.62 (2.2)	-3.394	0.001
Female	4.14 (1.8)		
Type of school			
Private	3.84 (1.9)	-0.230	0.818
Govt.	3.88 (2.1)		
Study college			
A.	4.06 (1.8)		
B.	4.09 (2.1)	8.216	0.001
C.	3.40 (2.2)		
Year of study			
1st year	3.47 (1.9)		
2nd year	3.54 (2.1)		
3rd year	4.05 (1.9)	4.273	0.002
4th year	4.23 (1.8)		
5th year	4.13 (2.2)		
*The maximum attitude score is 8 and minimum is 0. The higher the score indicates positive attitudes towards research			

DISCUSSION

The present study has provided information about the knowledge and attitude of dental students towards scientific research based on the information collected via a custom designed self-administered questionnaire. The response rate of the questionnaire (77.88%) was found to be satisfactory. Although many studies[3,13,21,22] have been carried out about the knowledge and attitudes of medical students towards research, similar studies among the dental students are scarce in Saudi Arabia.

Possible limitations of the study included students copying from other students and they may have been casual while completing the questionnaire as it was lengthy and non-academic for them. The authors are aware of limitations but consider the method useful in finding and proposing new perspectives on research in the dental schools.

Based on the results of the current study a moderate level of knowledge (Mean Score 3.36±1.76) and attitude (Mean score 3.87±2) towards research among the dental students of Riyadh was reported. The overall percentage of correct answers for the knowledge (32.61%) in the current study is lower than the results of the study reported by Khan H *et al*[1] (43.2%) and Vodopivec *et al*[2] (44%) who conducted studies with almost similar questionnaire among Pakistani and Croatian medical students respectively. But the knowledge score is close to the score by Amin TT *et al*[3] (3.6±1.7) in Arab Medical Universities. However, the findings for the attitude score among the participants of the current study were higher than the Pakistani medical students (48.4% vs 39.2%) and lower than the Croatian medical students (48.4% vs 62.5%). The dental students' knowledge about scientific research seems to be lower compared to the medical students and possible reasons could be less teaching hours for research in the dental schools. The results of the study by Khan H *et al*[1] indicates that medical students are involved in designing and implementing their research questions, analysing their data and writing a detailed report of their project. These could be the possible reasons for higher knowledge score among medical students. However, trend among dental students about scientific research is changing and becoming more positive. This is also evident from the results of current study where the attitude of the students towards research is higher than their knowledge. 70.5% and 63.6% of the participating students in the current study believe that research is important and dental students should be involved in conducting research respectively.

Gender was not found to be a significant predictor of knowledge about scientific research, with males and females having almost the same percentage of correct answers 33.3% and 31.8% respectively. However, females (4.14±1.8) compared to the males (3.62±2.2) had a significantly (p=0.001) higher mean score on the attitude scale. The student's high school background did not affect their knowledge or attitude scores. Students' knowledge and attitude towards research significantly improved with increasing years of education. This finding was similar to previous studies reported by Khan H *et al*[1] and Oliveira C *et al*[16]. This indicates the contribution of teaching research methodology, statistics, epidemiology and community dentistry during the last 2 years of dental school. According to Segal S *et al*[15] mandatory participation in research projects is the key for improving students' knowledge and awareness towards research. Students who had been involved in research activities during their undergraduate education years are given priority for getting admission into postgraduate programs in many of the institutes. In a Canadian study by Siemens *et al*, 43% of respondents agreed that the main reason to participate in research during the medical school was to facilitate acceptance into a residency program of choice.[23] It is not surprising to see the same happening among dental undergraduate students.

There are many reasons/barriers, which directly or indirectly discourage the undergraduate dental students from research activities. This study identifies many reasons for lack of interest in research. Main issues were curriculum overload, lack of exposure to research, lack of experience in literature search, lack of knowledge about research and difficulty in finding a topic or mentor for research supervision. These findings are similar to the previous studies conducted by Oliveira C *et al*[16], Deniz KZ *et al*[14], Ismail MI *et al*[8], Alghamdi KM *et al*[13] and Seimens *et al*[23]. Overall the students were undecided about the usefulness of research.

Although the current study provided some information, there is a need for conducting further detailed studies across dental schools all over the country to address this important subject of research. The factors affecting research among dental students such as lack of research supervisors, funding, cost of dental education and time management need to be evaluated and addressed further. The authors believe that ways need to be found to motivate the dental students to participate in research. Dental schools should provide the students with environment and facilities conducive for research activities and the faculty should guide, encourage and motivate students to participate in research.

CONCLUSION

A moderate level of knowledge about research was found among dental students in Riyadh, Saudi Arabia. However, attitude of the dentals students towards research was positive. Improvements were seen in knowledge and attitude of students over the study years owing to research being taught and involvement in

research. Curriculum overload, exposure, literature search, knowledge and finding a topic or mentor in the school seemed to be the barriers in pursuing research among the dental students. Measures must be taken to address these barriers for improving the research environment among dental schools.

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AUTHORS' CONTRIBUTION

SRH devised the project and the main conceptual ideas, performed the data analysis and interpretation, write up and critical revision of the manuscript and final proof outline. SSA, FAA and IMA worked out almost all of the technical details, participated in data collection and helped in tabulation of the data and statistical analysis. After the revision/approval of the final draft by all the authors it was submitted to the journal.

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