

# Knowledge, Attitude, and Barriers towards Health Research among Students from Health Science Colleges: A Northern Saudi Cross-Sectional Study

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## Abstract

**Background:** Advancement in health care is primarily due to health research as well as the active involvement of research participants. Health college students are future health care professionals and their role in research activities is essential for the effective and scientific public health care system. **Objectives:** This study assessed knowledge, attitude, and barriers towards health research among students from health colleges at Jouf University, Saudi Arabia. **Methodology:** This cross-sectional study surveyed students from health science colleges of Jouf University. The students' responses were collected on a self-administered questionnaire. Data analysis was performed by independent t-test, one-way Analysis of Variance, and Pearson's correlation tests. **Results:** With a response rate of 82.4%, 11.9% of participants belonged to the high knowledge category, 33.2%, and 36.5% were in a positive attitude and high barrier category respectively. The mean knowledge score was significantly lower among students who were living alone ( $p < 0.001$ ) and who perceived smartphone addiction ( $p = 0.044$ ). Male students had a lower barrier score compared to females ( $p = 0.035$ ). Lack of time and lack of good research ideas were some of the perceived barriers. The attitude scores were positively correlated with barrier score ( $r = 0.256$ ,  $p < 0.001$ ). **Conclusion:** Students showed inadequate scientific knowledge and a moderate attitude towards health research. The program should enable student research activities by providing sufficient time dedicated to research. Counseling services on judicious use of smartphones and student self-help groups are other potential suggestions that can help overcome research barriers.

**Keywords:** Knowledge, Attitude, Barriers, Health research

## INTRODUCTION

In the context of health, research is a core and fundamental component of improving the health of a community.<sup>[1]</sup> Health care research makes an impact on diagnosis, prevention, and novel treatment options for medical conditions. Also, health care research has brought about changes in policies on healthcare-related programs.<sup>[2]</sup> The type of health research includes but is not limited to: Behavioral studies, clinical trials, observational studies, public health research, and prevention studies.<sup>[3]</sup> The world over, there has been a rising critical assessment of the importance of health research financial support and assistance.<sup>[4, 5]</sup> The Kingdom of Saudi Arabia (KSA) has managed to attract top research expertise from all over the world to its research institutes and universities. Over the last few years, the KSA has moved up in the ratings of Nature Index to have the second-highest word fraction count (WFC) in the Western Asia region.<sup>[6]</sup> However, from the past twenty years, it has been observed that there has been a steady decline in the number of physician-scientists and medical schools have witnessed a

drop of 25%.<sup>[7, 8]</sup> This could be indicative of the fact that the environments of learning within medical schools are not quite favorable to basic and clinical research.<sup>[9]</sup> Though there are medical schools that do provide instructions about research methodologies within their curriculum, it becomes very much

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necessary to assess the way medical students respond to such strategies for advancing their medical education. It is also known that all information about the attitudes of medical students' attitudes and knowledge has its origins from industrialized nations largely.<sup>[10]</sup>

The government in the KSA encouraged evidence-based education, as well as policymakers in the medical community.<sup>[11]</sup> It is also a well-known fact developing a positive attitude is a key component of contemporary medical education.<sup>[12-14]</sup> Nonetheless, there is scant information about knowledge, attitude, and barriers of medical students towards health research<sup>[15, 16]</sup>. In the kingdom of Saudi Arabia, some authors<sup>[17-19]</sup> attempted to find the perceptions, barriers towards research among university students. Findings from the study conducted by Amin *et al.*,<sup>[17]</sup> revealed attitude scores that were moderately high in terms of research but scores about knowledge were relatively low. The results from the study by Noorelahi *et al.*,<sup>[19]</sup> revealed a statistically substantial variation in terms of the practice of medical research amongst male and female students and found that the number of female students engaging in medical research was comparatively higher than male students. Most of the studies in the KSA that assessed the knowledge and attitude of students towards health research were done in single college settings such as medical, dental, and so on. To the best of the available review of literature, there are very much limited published studies available from KSA that cover entire health science, college students, especially from northern Saudi Arabia.

Health college students are future health care professionals and assessment of their knowledge, attitude and the perceived barrier will help us to plan for the policy on the need for appropriate training programs to the extent which they need.<sup>[20]</sup> Eventually, this will lead to an increase in the number of research studies related to health science and they will deliver health care to the public more effectively and scientifically. Thus, health care delivery at primary health centers can be effectively delivered to the public.<sup>[21]</sup>

## Objectives

This study was planned with the objectives to assess knowledge, attitude, and barriers towards health research and its associated factors among health college students of Jouf University, Saudi Arabia and to determine the correlation between knowledge, attitude, and barrier.

## METHODOLOGY:

A cross-sectional study design was done among health college students of Jouf University from November 2019 to April 2020. All the health colleges under the aegis of Jouf University were included in this study. To be specific, four health colleges under the Jouf University were included which comprised of College of Medicine, College of Dentistry, College of Pharmacy, and College of Applied

medical sciences. There were 2536 registered students in all the health colleges for the academic year of 2019-20.

## Sample size estimation and Sampling method:

The sample size was calculated based on the formula  $n = z^2 pq/e^2$ . The study sample size(n) was calculated with 5% margin of error(e), 95% confidence interval(z) and 80% power. Since this is the first of this kind of study in this region, as a rule of thumb we have taken a population proportion(p) of 50% to estimate sample size. After applying the above values and adjusted to a finite population of 2536, the estimated sample size was 336. The required number of students from each college were calculated by probability proportional to size (PPS). A systematic random method was applied to select the required number of study participants from each college. This method was applied based on the university identification number of students.

## Inclusion and exclusion criteria:

Research-related activities in health colleges of Jouf University generally commenced from the 3<sup>rd</sup> year onwards. Considering this, the present study included undergraduate health college students who were studying in the 3<sup>rd</sup> year and above. Those students who were currently pursuing the 1<sup>st</sup> and 2<sup>nd</sup> year of their college education and those who were not willing to participate were excluded from this study.

## Ethical approval:

The Local Committee of Bioethics (LCBE) of Jouf University, Ministry of Education, Saudi Arabia has issued ethical clearance to conduct this study (approval no: 22-03/41).

## Data collection instrument and procedures

After the necessary approval from the required authorities, the data collection process was initiated. The data was collected by using a paper format, structured self-administered questionnaire, which was adapted from previously published studies.<sup>[17, 22, 23]</sup> The adapted questionnaire was checked for content and face validity with the experts. A pilot study was carried out with 30 students to look for reliability and it was found that the Cronbach's alpha score of knowledge questions was 0.748, of attitude questions, was 0.791, and 0.814 for barriers questions. Before administering the questionnaire, the selected students were contacted and briefed about the study. The data for this study were collected after obtaining written informed consent from the participant. An attempt was made three times in a week to contact the selected participants. A student, who was not willing to participate or who could not be contacted despite three attempts was considered as non-respondent.

Data collection Pro-forma: It consisted of four sections as follows:

1. Socio-demographic details such as age, gender, year of education, college type, and residential status. The

students were asked about their perceived status of smartphone addictions.

2. Knowledge of the study participants related to health research: eight multiple choice type questions. The correct answer was scored as one and the wrong answer was scored as zero.
3. Attitude towards health research: this section had 20 questions that constituted both positive and negative items. This was a Likert scale response that ranged from strongly agree to strongly disagree. For positive items, strongly agree were scored as five, and strongly disagree were scored as one. On the other hand, for negative items, strongly disagree were scored as five, and strongly agree were scored as one.
4. Perceived barrier: It had 10 questions related to possible perceived barriers. Students were asked to choose from three choices. The score was given as one for agree, two for not sure and three for disagree. Low total barrier scores indicated high barriers perceived by the students.

Computation and categorization of knowledge and attitude score: Total scores of knowledge and attitude were computed and categorized as follows: 75% and above of the highest possible scores were high, 50 to 74% of the highest possible score was medium and less than 50% of the total highest possible score were considered as a low category. For the barrier category, 75% and above of the highest possible scores were low, 50 to 74% of the highest possible score was medium and less than 50% of the total highest possible score was considered as a high category.

### Data analysis

The Statistical Package for Social Sciences (SPSS) software version 20 was used for data entry and analysis. Descriptive statistics variables were presented as frequency, percentage, mean and standard deviation (SD) were used for quantitative variables. The Kurtosis and Skewness values of the data met the normality assumption. Independent t-test and one-way analysis of variance (ANOVA) were applied to identify the difference in mean knowledge, attitude, and barriers towards health research among different categories of the study population. A p-value of less than 0.05 was considered statistically significant. The correlation coefficient (r) value was calculated by Pearson's correlation test to find the relationship between scores of knowledge, attitude, and barriers. All the statistical tests were used in this research were two-tailed.

### RESULTS

The present study was conducted among different health colleges of Jouf University from northern Saudi Arabia. The total number of participants who completed the questionnaire were 277, with a response rate of 82.4%.

The socio-demographic characteristics of the study population are presented in Table 1. Of the sample studied, nearly half (49.8%) were in the age group of fewer than 23 years with the mean age of  $22.64 \pm 1.17$ . The majority (62.5%)

respondents were males, and 47.3% of participants were perceived to have a smartphone addiction.

Of the sample studied, nearly half (49.5%) of students had a poor score in knowledge and a very low proportion (11.9%) had a high knowledge score. In the attitude category, nearly one-third (33.2%) had a high score and 36.5% of participants had a high score in the barrier category. The mean scores of knowledge, attitude, and barriers among the study populations were  $3.65 \pm 1.54$ ,  $67.78 \pm 13.38$ ,  $15.86 \pm 3.10$ , respectively. (Table 2).

In the present study, more than half of the participants had agreed that they had barriers as per most of the listed barriers to health research. The most common barriers faced by participants was lack of time due to overburden with other educational activities (66.1%) followed by lack of good research ideas (65.0) and poor collaboration between departments and research centers (60.6%) (Table 3).

Table 4 presents the factors associated with knowledge, attitude, and barriers among the study population. In the present study, the knowledge score was significantly lower among the students who were living alone ( $3.08 \pm 1.41$ ,  $p = 0.001$ ) and who were perceived to have smartphone addiction ( $3.43 \pm 1.49$ ,  $p = 0.044$ ). With regards to the attitude category, a significantly higher score was found in medical college students ( $71.75 \pm 11.59$ ,  $p = 0.001$ ) and in the barrier category, a significantly lower score was found among males ( $15.55 \pm 2.97$ ,  $p = 0.035$ ).

The present study results (Table 5) show a significant but weak correlation between attitude towards health research and barriers perceived by the study participants ( $r = 0.256$ ,  $p < 0.001$ ). No association was found between knowledge and attitude in this study ( $r = 0.009$ ,  $p = 0.876$ ). Similarly, there was no significant correlation between knowledge and barriers towards health research among study participants ( $r = 0.050$ ,  $p = 0.410$ ).

### DISCUSSION

Research, evidence, and scientific report form the base for good health policies as stated by the World Health Organization (WHO). The above statement by the WHO emphasizes the importance of research in the field of health sciences to achieve its constitutional objective of "highest possible level of health for all".<sup>[1]</sup> This cross-sectional study was conducted among health college students that were aimed to assess the knowledge, attitude, and barriers toward health research.

Our present study revealed that nearly half (49.5%) of the students had poor knowledge and only 11.9% had high knowledge scores towards health research with the mean ( $\pm$ SD) score of  $3.65 (\pm 1.54)$  out of 8. A similar finding where the mean score was  $(3.6 \pm 1.7)$  was reported through a study conducted by Amin *et al.*,<sup>[17]</sup> across three diverse Arab universities involving medical students. In contrast to the

present study, a study done in Malaysia has found a slightly lower (39.1%) proportion of students who had poor knowledge.<sup>[22]</sup> This mild variation in knowledge could be due to differences in study settings such as the inclusion of colleges. The present study included all the health colleges under Jouf University but, in the study by Kyaw Soe *et al.*,<sup>[22]</sup> only two colleges had been included. The mean score of knowledge in this study was significantly lower among the students who were living alone ( $p < 0.001$ ) and who perceived they were addicted to a smartphone ( $p = 0.044$ ). It is worth mentioning here that the prevalence of smartphone addiction is high among university students and most of the time they were using a smartphone for non-academic purposes,<sup>[24, 25]</sup> hence they may not be using the smartphone for obtaining scientific knowledge towards health research. Also, it was found by some authors that living alone is one of the associated factors for smartphone addiction and vice-versa.<sup>[26]</sup> The present study did not find any association between knowledge and other socio-demographic variables such as gender and so on. Similar to our study, there were no gender differences were observed by some of the authors in the KSA and other parts of the world.<sup>[22, 27, 28]</sup> In contrast to our study, few studies done in India and Iran have found that knowledge scores significantly varied among different years and level of education.<sup>[23, 29]</sup> These differences from the current study could be due to study settings, sample size, and the tools of assessment.

Of the sample studied, the present study found that around one-third (33.2%) of health college students had a high attitude towards health research. These differences in the high category between knowledge and attitude (11.9% vs 33.2%) from the present study imply that attaining a positive attitude towards health research not only depends on scientific knowledge; but rather it relies on non-scientific factors such as peers' attitude, health magazines and so on. The mean ( $\pm$ SD) of attitude score was significantly higher among medical college students than other health college students ( $p = 0.001$ ). The present study observed no other variables such as age groups, gender, year of education were significantly associated with attitude scores. These findings are similar to several authors.<sup>[17, 23, 27]</sup> In contrast to the present study, a study done amongst medical science students in Iran have found a significant difference between genders ( $p = 0.01$ ) on the attitude towards research.<sup>[23]</sup> Another study was done in Taibah college, KSA by Noorelahi, Soubhanneyaz, and Kasim<sup>[19]</sup> has found contrasting results regarding the mean and year of education. In their study, they found a significant association between years of education. This difference could be due to their study setting, which was done only on medical college students.

The present study found that around 40% of students perceived high barriers and 57.0% had moderate barriers for health research. The most common barriers agreed by students were lack of time due to being overburdened with other educational activities (66.1%), lack of good research

ideas (65.0%), and poor collaboration between the departments conducting research and other research centers (60.6%). Some studies around the world<sup>[17, 19, 23, 28, 29]</sup> also reported high barriers among different health college students for engaging in research. In the present study, the barrier score was significantly lower among male students than females ( $p = 0.035$ ) (low barrier score indicated more barriers perceived by students). The present study findings are similar to a study done in Taibah college, KSA by Noorelahi, Soubhanneyaz, & Kasim, where they found gender differences in most of the barrier categories.<sup>[19]</sup> Interestingly, most of the studies done in regions other than KSA have found no association between gender and barriers to health research. This striking difference in gender differences in KSA may be due to prevailing cultural restrictions and local customs.

This study found there is a positive correlation between attitude towards health research and barriers among the study population ( $r = 0.256$ ,  $p < 0.001$ ), and no other significant correlation was observed. These observed results were similar to a study done by Kyaw Soe *et al* in Malaysia.<sup>[22]</sup> In their study, they found a positive correlation between attitudes and barriers among medical and dental college students. This result emphasizes the importance of further increasing the attitude of the students towards health research, this will further lead to decreased barriers faced by the students (high barriers score indicates low barriers perceived by the students). In addition to the non-scientific knowledge of the students towards research, scientific knowledge also needs to be increased, which will lead to a further increase in their attitude and decrease the barriers faced by the students.

Despite the best effort and standard methodology used in this research, few limitations need to be considered while interpreting the results of this study. Firstly, the study design is a cross-section and that identifies the association between variables, not the causations and its direction. Secondly, self-selection bias, those students who responded to this survey may be more familiar with health research than those who did not respond. Finally, this research was conducted across health colleges within Jouf University. This research could have been enhanced further by including health colleges from other universities in the KSA.

## CONCLUSION AND IMPLICATIONS

Health college students included within the present study showed inadequate scientific knowledge and moderate to high attitude towards health research. They also perceived several barriers to doing the research. To improve their scientific knowledge and attitude towards research, the universities can also integrate and arrange additional summer research training programs for the students, in which students can get trained in research-based knowledge without hindrance to other academic activities. The barriers need to be addressed immediately to improve the undergraduate health college students' research activities by organizing

proper guidance, mentorships and by forming activity clubs for students living alone which would keep their minds engaged creatively rather than being engrossed with their smartphones. All these measures may increase the number of quality research in health science and address the need for more evidence-based practicing health care professionals for a better public health care system.

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Supplementary files: (Tables)

**Table 1: Socio-demographic characteristics of study population (n = 277)**

Variable	Frequency	Percent
Age (mean ± SD)	22.64 ± 1.17	
Less than 23 years	138	49.8
23 – 24 years	118	42.6
Above 24 years	21	7.6
Gender		
Male	173	62.5
Female	104	37.5
College type		
Medical	87	31.4
Dental	64	23.1
Pharmacy	65	23.5
Applied	61	22.0
Year of education		
3 <sup>rd</sup>	109	39.4
4 <sup>th</sup>	118	42.6
5 <sup>th</sup>	50	18.1
Living status		
Living alone	83	30.0
Living with family	194	70.0
Perceived status of smartphone addiction		
Yes	131	47.3
No	81	29.2
Do not know	65	23.5

**Table 2: Knowledge, attitude and perceived barriers towards health research of study participants (n = 277)**

Category	Frequency	Percent
Knowledge		
High	33	11.9
Medium	107	38.6
Poor	137	49.5
Overall mean ± SD	3.65±1.54	
Attitude		
High	92	33.2
Medium	158	57.0
Poor	27	9.7
Overall mean ± SD	67.78±13.38	
Barrier		
High	101	36.5
Moderate	168	60.6
Poor	8	2.9

Overall mean  $\pm$  SD

15.86 $\pm$ 3.10

**Table 3: Perceived barriers to health research (n=277)**

Barrier	Agree	Not sure	Disagree
Lack of time due to overburden with other educational activities	183(66.1)	75(27.1)	19(6.9)
Lack of knowledge and skills	160(57.8)	80(28.9)	37(13.4)
Priority is given to other education activities by the university than research	138(49.8)	99(35.7)	40(14.4)
Lack of good research ideas	180(65.0)	63(22.7)	34(12.3)
Lack of facilities	151(54.5)	84(30.3)	42(15.2)
Poor attention is given to a creative and innovative researcher	148(53.4)	81(29.2)	48(17.3)
Lack of research funding	154(55.6)	79(28.5)	44(15.9)
Poor collaboration between departments and research centers	168(60.6)	73(26.4)	36(13.0)
Inappropriate or insufficient guidance for writing	129(46.6)	93(33.6)	55(19.9)
Lack of appropriate databases	137(49.5)	94(33.9)	46(16.6)

**Table 4: Comparison of the mean ( $\pm$  SD) of study participants for socio-demographic characteristics**

Variables	Knowledge		Attitude		Barriers	
	Mean (SD)	p value	Mean (SD)	p value	Mean (SD)	p-value
Age category*						
Less than 23 years	3.51(1.59)		67.13(13.55)		16.16(3.12)	
23 – 24 years	3.79(1.40)	0.344	69.16(13.53)	0.218	15.51(2.98)	0.247
Above 24 years	3.76(1.89)		64.24(10.68)		15.86(3.60)	
Gender**						
Male	3.62(1.51)		67.74(13.56)		15.55(2.97)	
Female	3.70(1.58)	0.662	67.84(13.13)	0.954	16.37(3.26)	0.035***
College type*						
Medical	3.93(1.54)		71.75(11.59)		15.69(3.21)	
Dental	3.59(1.69)		63.70(10.96)		16.42(3.35)	
Pharmacy	3.43(1.51)	0.201	65.00(14.38)	0.001***	15.82(3.29)	0.400
Applied	3.54(1.36)		69.34(15.24)		15.56(2.39)	
Year of education*						
3 <sup>rd</sup>	3.61(1.44)		66.52(13.29)		16.38(3.33)	
4 <sup>th</sup>	3.60(1.52)		68.02(13.11)		15.57(2.87)	
5 <sup>th</sup>	3.86(1.77)	0.566	69.94(14.11)	0.317	15.42(3.02)	0.079
Living status**						
Living alone	3.08(1.41)		67.28(12.30)		15.61(2.80)	
Living with family	3.89(1.53)	<0.001***	67.99(13.83)	0.685	15.90(3.22)	0.392
Perceived status of smartphone addiction*						
Yes	3.43(1.49)		66.66(13.14)		15.99(3.15)	
No	3.96(1.54)		68.70(13.71)		15.73(2.91)	
Do not know	3.71(1.58)	0.044***	68.88(13.45)	0.712	15.75(3.27)	0.796

\* One-way Analysis of Variance (ANOVA), \*\* Independent t-test \*\*\*Statistically significant at the level of 0.05 (two-tailed)

**Table 5:** The correlation between knowledge, attitude, and barriers toward health research among study participants.

Variable	r*/p value
Knowledge – Attitude	0.009/0.876
Knowledge – Barriers	0.050/0.410
Attitude – Barriers	0.256/<0.001**

\*Pearson's correlation coefficient, \*\*Significant at the level of 0.01 (two-tailed)