Factors influencing high school students' decision in applying to Medical School

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Abstract

Background: Many factors influence high school students' future profession choices, which differ by culture and other variables such as the students' background, social differences, and financial status, all of which culminate in a student pursuing their higher education in a single field. As a result, the factors that influenced that choice must be addressed in order to achieve better outcomes for both the educational programs and the health system.

Methods: A cross-sectional study was conducted in Riyadh city among high school students. Sociodemographic characteristics, preferred study specialties, GPA, and performances were obtained using a self-administered questionnaire.

Results: The age of the students was between 16-19 years old. Most selected specialties were medicine, followed by engineering, information technology and Nursing, however, Pharmacy was in the least selected specialty. Findings showed that the top perceived barrier was the high aptitude score required for entry into medicine (23.3%); another group of the students (23.1%) indicated that the English Language competency test/skills were the second obstacle. Offering health care and motivation were the most important factor for the majority of students. The majority had remarkably agreed or strongly agreed to the humanitarian context about studying medicine (90.4%).

Conclusion: A higher percentage of high school students choose to attend medical school, with the primary obstacles to admission being the high aptitude score required for admission, followed by English language competency examinations. Finally, there is a considerable disparity between genders when it comes to medical school preferences and reasons.

Keywords: Medicine, medical student, Saudi Arabia, healthcare, medical schools

Introduction

High school is one of the most crucial times in everyone's life in which one of the most important decisions has to be made. Choosing the future career for high school students is influenced by many factors that vary from culture to culture based on variables including the student's background, social differences and financial status which collectively end with a student pursuing their higher education in a single field. Therefore the factors that influenced that choice need to be classified to have better outcomes. A Study named "Factors Inducing Career Choice: Comparative Study of Five Leading Professions in Pakistan" have found that students consider growth opportunities, occupational charm, societal inspiration and self-esteem as the most influencing factors for a career choice [1]. In another study which done in Canada, students found there are factors that help them in career planning such as the impact of parents and teachers, taking information from programs that introduce the field to them, interviewing those who work in different fields and having a discussion with them, are helpful in making their decision [2]. In addition, Medicine is considered one of the most wanted specialties that high school students wishto apply for. Students in general find it an honorable profession with high social status. In addition, a study that was done in 2015, showed the passion of working in a team and interest in people were the main reasons for starting to study medicine [3]. Another study found Family influence, personal interests, self-efficacy, and economic aspects exerted great influence on the selection of career [4].

According to a study named "Factors Influencing High School Students' Career Aspirations" high school students have multiple factors changing their implication for future career choice, suggests major variation in term of socioeconomical status, self-efficacy, interest and outcome expectation, and also mentions the role of school counselor for mentoring students towards their ambition [5].

The school council role is far beyond encouragement and excitation; in fact students could use the help to change their study behavior along with enhancing their weak points. However, there is a lack of studies which investigate the factors that play a major role in choosing medicine as a future career for high school students in Saudi Arabia. Therefore, in this study we are aiming to explore the factors that influence high school students to enter medical school in Riyadh, Saudi Arabia.

This study also aimed to assess the factors that influence the decision of those choosing medical school as a future career alongside the motives and obstacles from the student's point of view.

Methods

A. Selection and criteria

In this research, a cross-sectional study was conducted in Riyadh among high school students in 2019-2020. The selection of high schools was done by first, dividing Riyadh city into four areas; North , South , East and West. Then we randomly selected schools from each of these areas with a minimum of two schools (one representing male students and the other one representing female students) to obtain information, and knowledge about the factors that influence the decision of high school students to enter medical school. The research aims to gain insight into the factors that help students to enter medical school and the elements that affect their choice.

The survey was directed towards male and female students in Riyadh schools. We sent the questionnaire to the principals of the selected high schools who ensured the participation of their students. The group of students who participated in the survey were senior high school students.

B. Tools Used

1. Sociodemographic characteristics: We divided the students according to the following sociodemographic characteristics Sex, Age (16-19 or 20-22 years), Nationality, Type of school and High school GPA as shown in Table 1.
2. The High school students' top three preferred study specialties: The high school students were asked to select out of a list of majors the first, second, and third top preferred specialty they would like to study as shown in Table 2.
3. The High school students perceived challenges and facilitating factors for choosing medicine as a study specialty/major as shown in Table 3.
4. The High school students perceived motives and attitudes toward choosing medicine as a first preferred major as shown in Table 4.

C. Statistical Data Analysis:

The Means and Standard Deviations were used to describe the continuously measured variables, and the frequencies and percentages were used to describe the categorically measured variables. The histograms were used to assess the Normality of the continuous variables and the Kolmogorov-Smirnov statistical test of Normality. The Chi-squared test of independence was used to determine the correlations between the high school students' sociodemographic factors with their perceived challenges in studying medicine and the association between their GPA and other relevant factors. The Multivariate Logistic Binary Regression Analysis was used to assess the combined and individual associations between student's sociodemographic and achievement factors with their odds of selecting medicine as a first choice of study. The correlations between these factors with the outcome variable were expressed as an adjusted Odds Ratio with 95% confidence Interval. The statistical significance level was considered at 0.050 level. The SPSS IBM v21 Program was used for the data analysis and the Excel program for creating figures and depictions.

D. Ethics:

The Medical Research Ethical Committee at Al Imam Mohamed Ibn Saud Islamic University approval was obtained prior to the conduction of the research. Participants signed an informed consent form which explained the purpose of the study and the rights of the participant for confidentiality and withdrawal at any time without any obligation towards the study team. Participant's anonymity was assured by assigning each participant with a code number for analysis only.

Results

Eight hundred and four high school students residing in the Saudi Capital, Riyadh City, responded to the survey. The findings came from the analysis of their sociodemographic characteristics. Table 1 suggests that most of the respondent students, (52.1%) were males, and 47.9% were female high school students. The age of the students was distributed as follows: 93.1% of the students were aged between 16-19 years old, and the remainder 6.9% were aged between 20-22 years and most of the students, (94.3%) were Saudi Nationals, and only 5.7% of them were Non-Saudi's residing in the country. Concerning the type of schools where these students had studied, most of them, 78.1%, had studied in public schools, and 21.9% studied at Private Schools. Asked to indicate their School GPA score, 9.6% of the students had a GPA<80%, another 25.8% had a high school GPA between 80%-90%, and most of them, (64.6%) had a GPA > 90%.

The Students Preferred Study Fields:

The high school students were asked to select out of a list of majors the first, second, and third top preferred specialty they would like to study; the multiple response dichotomies analysis was used to describe the students selections. With regard to the first favoured specialty the yielded analysis suggested that the top five selected items were medicine, followed by other specialties, engineering then information technology and Nursing However, the bottom-most selected specialties were: Arabic language, media and communication, education and Pharmacy then Islamic studies, as Table 2. illustrates.

Table-1: The High school student's sociodemographic characteristics. N=804.

	Frequency (%)
Sex	
Female	404 (47.9)
Male	440 (52.1)
Age	
16 - 19 years	786 (93.1)
20 - 22 years	58 (6.9)
Nationality	
Non-Saudi	48 (5.7)
Saudi	796 (94.3)
Type of school	
Private school	185 (21.9)
Public school	659 (78.1)
High School GPA	
<80%	81 (9.6)
Between 80%-90%	218 (25.8)
>90%	545 (64.6)

Table-2: The High school student top three preferred study specialties. N=804.

Table-2: The High school student top three preferred study specialties. N=804.

	Frequency (%)
Medicine	191 (22.6)
Other specialties	184 (21.8)
Engineering	144 (17.1)
Information technology	97 (11.5)
Nursing	45 (5.3)
Languages and translation	41 (4.9)
Dentistry	33 (3.9)
Applied health sciences	30 (3.6)
Islamic studies	30 (3.6)
Pharmacy	19 (2.3)
Education	17 (2)
Media and communication	12 (1.4)
Arabic language	1 (0.1)

Table-3: The High school students perceived challenges and facilitating factors for choosing medicine as a study specialty/major. N=844

	Frequency	%
What challenges and obstacles might prevent you from entering the medical specialty?		
The required high score of Aptitude Test	197	23.3
The competency in English language skills	195	23.1
The required high GPA	126	14.9
The long duration of studying	115	13.6
The high score necessary for the Achievement Test	87	10.3
Other (please specify)	73	8.6
Competitive specialty	36	4.3
Passing the interview	15	1.8
Did you choose medicine among the top three choices		
No	468	55.5
Yes	376	44.5
If medicine was a top choice, is it your own decision to choose medicine, n=315		
No	9	2.9
Yes	306	97.1
Q.10 Did anyone of your family encourage you to choose this specialty? , n=314		
No	204	65
Yes	110	35
Which member in your family influenced you to choose your specialty? , n=209		
All family members	46	22
Brothers	15	7.2
Parents	135	64.6
Sisters	13	6.2

The students were asked to select all that applied to them out of a list of challenges and obstacles that prevented them from choosing medicine as a speciality. The multiple response dichotomies analysis findings showed that the top perceived barrier was the high aptitude score required for entry into medicine as a major according to 23.3% of the students; another 23.1% of the high school students indicated that the English Language competency test/skills were the second obstacle; the third from the top perceived barriers to study medicine according to the students was the High required GPA score according to 14.9% of the students, then the long duration of study according to another 13.6% of the high school students. Also 10.3% of the students advised the high achievements test score was another obstacle to entry to the College of Medicine, however 8.6% of the students provided other reasons (likenot being interested in studying medicine, dislike and fear of medicine as well as the difficulty of the major itself), but a few (4.3%) of the students advised that medicine was a competitive primary and 1.8% of them had trouble with passing the interview.

Asked to indicate with (o/ es) whether they had selected medicine as a top preferred study choice, 97.1% of the high school students agreed. Only 2.9% disagreed, but 35% of them advised that a family member had encouraged them to choose medicine. When asked to indicate the family member who was most influential in their choice of medicine, 22% of the students advised it was all their family members who encouraged them. Another 7.2% were motivated by a brother, and 6.2%, by a sister. Most of them, however, 64.6%, were inspired by their parents.

Table-4: The High school students' perceived motives and attitudes toward choosing medicine as a first preferred major. N=315 Students

	Mean (SD)	Disagree n (%)	Undecided n (%)	Agree n (%)
Is high income is the most important factor that influences your choice of medical specialty?	3.10 (1.19)	106 (33.7%)	93 (29.5)	116 (36.8)
Helping and healing sick people is the most critical factor that influenced your choice of medical specialty.	4.46 (0.75)	7 (2.2)	23 (7.4)	285 (90.4)
Community respect and social value is the most critical factor that most influenced your choice of medical specialty.	3.98 (1.1)	25 (11.1)	51 (16.2)	229 (72.7)
Future guarantee of job availability is the most important factor that influenced your choice of medical specialty?	3.83 (1.13)	45 (14.2)	50 (15.9)	220 (69.9)
Because I am an excellent student and high achiever, I like to enter the most competitive specialty, such as the medical field?	3.62 (1.17)	65 (20.6)	59 (18.8)	191 (60.6)

To explore the high school students' attitudes toward medicine, the students who preferred medicine as a top /first major of the study were asked to respond to five indicators that measured their attitudes toward medicine, measured with a Likert-like agreement scale (1= strongly disagree to 5= strongly agree). The resulting descriptive analysis findings of their responses to these attitude indicators are listed in Table 4. To explain the main findings from the analysis, the high school students collective mean agreement with "Is high income the most important factor that influences your choice of medical specialty?" was measured with 3.10 out of 5 agreement points, which indicates the students were in general between undecided to agreeing on the economic motive to study medicine as a highly paid job in general. Still, it is evident from the descriptive analysis that most high school students, 36.8%, had agreed or strongly agreed that the high income was the main motive to select medicine as a specialty. Many of them, too, 33.7% disagreed, and 29.5% were undecided. Also, the high school students overall mean in agreement to whether "Helping and healing of sick people is the most important factor that influenced your choice of medical specialty?" was rated with 4.46 out of 5 points, which indicates a high collective agreement by those students that helping sick patients was another motive to study medicine; the majority of the students (90.4%) had remarkably agreed or strongly agreed to this humanitarian context about studying medicine.

Also, the high school students had agreed with 3.98 points out of 5 on whether "Community respect and social value is the most important factor that most influenced your choice of medical specialty?" which indicates that the high school students had collectively been undecided as to agreeing on the prestigious role of physicians in society as a career. Nonetheless, most of the students, (72.2%), had agreed/strongly agreed that the community respect for the physician's role was another good reason to study medicine/select medicine as a major of study. Not only so, but also most of the high school students, 69.9 % had agreed that the "future guarantee of job availability is the most important factor that influenced your choice of medical specialty?" was a motive to study medicine. The overall mean agreement of the high school students on the availability of job was rated with 3.83 out of 5 Likert agreement points, suggestive of a comprehensive agreement in general that finding a vacancy after graduation could be one of the reasons why those students thought of specializing in medicine in general. However, the high school students overall agreement to "Because I am an excellent student and high achiever, I like to enter the most competitive specialty, such as the medical field? " was rated with 3.62 agreement points out of 5, which is between undecided to agreeing in general, however most of the students (60.6%) had agreed that their high achievement was another ulterior/underlying drive to specialize in such a competitive study field like medicine.

Table-5: Bivariate comparison between male and female students regarding their study majors choices and attitudes toward medicine

	Female	Male	test statistic	p-value
1st choice				
			χ2	
Medicine	100 (24.8)	91 (20.7)	(12)=78.66	<0.001
Other specialties	98 (24.3)	86 (19.5)		
Engineering	35 (8.7)	109 (24.8)		
Information technology	27 (6.7)	70 (15.9)		
Nursing	30 (7.4)	15 (3.4)		
Languages and translation	27 (6.7)	14 (3.2)		
Dentistry	18 (4.5)	15 (3.4)		
Applied health sciences	20 (5)	10 (2.3)		
Islamic studies	18 (4.5)	12 (2.7)		
Pharmacy	11 (2.7)	8 (1.8)		
Education	12 (3)	5 (1.1)		
Media and communication	7 (1.7)	5 (1.1)		
Arabic language	1 (0.2)	0		
Attitudes toward medicine				
Is high income is the biggest factor that influences your choice of medical specialty? Mean (SD) Likert-agreement scale	2.82 (1.17)	3.36 (1.15)	t(313)=4.03	<0.001
Helping and healing sick people are the most important factors that influenced your choice of medical specialty? Mean (SD) Likert-agreement scale	4.62 (0.602)	4.27 (0.88)	t(313)=4.17	<0.001
Community respect and social value is the most important factor that most influenced your choice of medical specialty. Mean (SD) Likert-agreement scale	3.79 (1.13)	4.24 (0.92)	t(313)=3.84	<0.001
Future guarantee of job availability is the most important factor that influenced your choice of medical specialty. Mean (SD) Likert-agreement scale	3.63 (1.15)	4.10 (1.10)	t(313)=3.53	<0.001
Because I am an excellent student and high achiever, I like to enter the most competitive specialty, such as the medical field. Mean (SD) Likert-agreement scale	3.40 (1.15)	3.90 (1.12)	t(313)=3.84	<0.001

To better understand the differences between male and female high school students on their preference of medicine and attitudes /motives to studying medicine, the analysis went further by comparing the male and female high school students responses to the analysis results. Toelucidate , the analysis findings suggested that there was a statistically significant association between the students preference to majors and their sex according to a Likelihood Ratio Adjusted chi-squared test of independence; the analysis findings suggested that the male students were found be significantly more inclined to select medicine as a first major, p<0.001, likewise the females were significantly more predicted to select medicine. Also the females were found to be less inclined to choose information technology than males, but they (females) preferred Nursing significantly more as a first preferred major as well.

The analysis findings suggested that the male students had agreed significantly more on the role of high income for medicine as a motive to select medicine as a major than females, p<0.001 according to an independent samples t-test, but female students had agreed significantly that helping and healing sick patients was a good motive for them to study medicine more than the male students, p<0.001 according to another independent samples t-test. The male students perceived community respect as a motive to study medicine significantly higher than females, p<0.001. The overall mean agreement given to community respect to choose medicine by males exceeded that agreement significantly by the females however, according to an independent samples t-test. Future guarantee to a job as a motive to select medicine as a study major was agreed significantly higher by the male high school students than females, p<0.001. Besides, the male students had agreed substantially more to the high achievement and challenges in medicine as another motive to specialize in medicine than the females, according to an independent samples t-test.

Table-6: Multivariate Logistic Binary Regression Analysis of the predictors of the high school students' top preference for medicine. N=844.

	Multivariate Odds Ratio	adjusted	95% C. I for O.R		p-value
			Lower	Upper	
Age of the student>20 years	1.054		.525	2.119	.882
Sex= Male	0.780		.554	1.096	.152
Nationality= Saudi	.478		.245	.932	.030
GPA<80%-reference					<0.001
GPA=80-90%	1.637		0.742	3.611	.223
GPA>90%	3.477		1.677	7.209	.001
Other challenges	.307		.133	.706	.005
Parental influence/encouragement	3.664		2.441	5.499	<0.001
Constant	.195				.014

DV= medicine is the first top choice of study (No/Yes) -q1

The Multivariate Logistic Binary Regression Analysis was used to assess the combined and individual associations between the high school students sociodemographic and academic achievement factors with their preference to medicine as an ultimate selection. The resulting findings in table 7a showed that the age of the students did not converge significantly on their importance to medicine as a study field, (p=0.882), also the student's sex did not correlate significantly, (p=0.152), with their odds of preferring medicine as a study field accounting for other predictors in the analysis. However, the Saudi students compared to Non-Saudi students were found to be significantly less (0.478 times less, or 52.2% times less) predicted to opt for medicine as a favoured major on average, by accounting for the other predictors in the analysis. Also, the analysis model suggested that the students with a GPA between 80%-90% did not differ significantly with regards to their preference to medicine as a study field p=0.223 however, those students with a GPA>90% were found to be statistically significantly more predicted (3.48 times higher) to prefer medicine as a major than those with a GPA<80% on average, p=0.001, in Figure A. It is clear that as the students GPA had risen from below 80% to 80%-90% then higher than 90%, their mean predicted probability of preferring medicine tended to increase incrementally too regardless of the parental influence.

Also, the high school students who had other concerns and challenges to study medicine (like fear of medicine, dislike of medicine as significant and being less interested in medicine in general) were found to be significantly less predicted (75% times less) to prefer medicine compared to those who did not have such concerns on average, p=0.005. Not only so but also the students who were encouraged by their parents to major in medicine were found to be significantly more predicted (3.67 times higher) to prefer medicine compared to those not encouraged by their parents on average, (see figure-A). It is clear that students with various GPA level tended to prefer medicine more with their parental encouragement across all the levels of the students GPA categories, or levels.

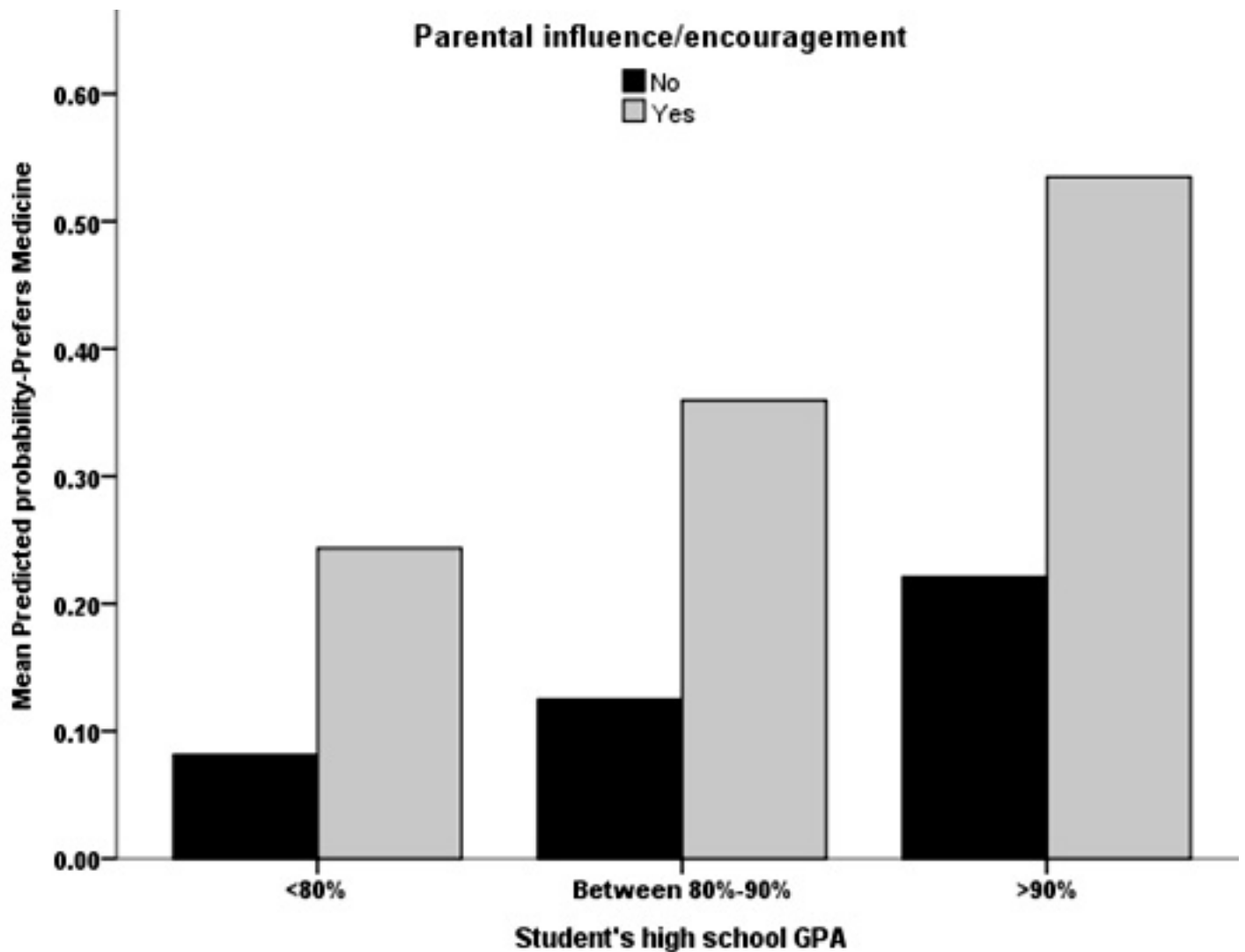## Parental influence/encouragement
■ No
□ Yes

Figure-A: The association between the students high school GPA with their preference to medicine as study field with subgroup analysis of parental encouragement

Discussion

The aim of this study was to explore the factors that influence students of high school to choose medicine as their future specialty in Riyadh region, Saudi Arabia.

In this study, medical school was the most popular college of interest for students where 22.6 % of high-school students chose medical college as interested college followed by other colleges including engineering, information technology and nursing. Moreover, it was found that 55.5 % of high-school students chose medical school as one of the first three choices and 97.1 % of them reported that it is their own decision to choose medicine and 35 % reported that family encouraged them to choose this specialty, mostly by parents. Another study conducted by Ausman J., among high-school students in the United Arab Emirates, found that only 36.8 % of them chose medical school as their own interesting College however, interestingly, only 12.5 % of students who chose medical school reported that this was their own desire while 43.6 % said it was because of choices of parents and them,

where the study was found to have a significant impact of parents on their children' desire for choosing medical school [6]. Moreover, in the study of Kunanitthaworn N , among a group of medical school students in Thailand, the authors found that 64.2 % of students reported that their choices of medical school was their personal choice and 11.1 % of them against their parents desires [7].

Among high-school students, the main barrier for entering medical school was the high aptitude score required for entry into medicine followed by English language competency tests and high required GPA score needed for the college as well as the long duration of the study in this college. On the other hand, helping and healing sick people was the main reason that motivated high-school students toward choosing medical school as future college followed by community respect and social value which is associated with being a physician, and future guarantee of job availability, with low interest of having a high income or their perception about their ability toachieve. In the study of Wouters A, among high-school students in Netherlands, the authors found that the desire to help people and a

scientific interest were the main motivators for high-school students to choose medical school as their future college [8]. Moreover, in a study conducted by Heikkila T, among Finnish junior physicians, the authors found that interest, vocation and a wide range of professional opportunities were the main motivators of these students to choose medical school where the authors suggested that these motivations suggested that respondents would still have chosen medicine as a profession [9]. Furthermore, in a study conducted by Zayabalaradjane Z, among high-school students, the authors found that the motivations by parents and the predicted respect that they would get in the society were the main motivations for them to enroll in medical school [10]. The importance of understanding the main motivators of students to choose medical school represented encouragement of these factors and selecting the most preferred students for these college where many studies showed that selecting of students who are more satisfied and have high encouragement and interest in medical school for different reasons would most probably lead to longer careers and better quality of care that they will provide to their patients [9,11,12]

Moreover, we tried to better understand the differences between male and female high school students on their preference of medicine and attitudes /motives to study medicine. The results of this study showed that there was a statistically significant association between the student's preference for majors and their sex where females were found to have a higher tendency to choose medical school as first choices, than males in comparison with other specialties. Furthermore, we found a significant difference between the two genders considering the main motivators leading to choosing of medical school where males are more interested in the role of high income for medicine as a motive to select medicine as a major college while female students had agreed significantly more that helping and healing sick patients was a good motive for them to study medicine. Consistent with our study, we found that many previous studies found that men and those from urban background are mostly motivated by better financial status and expanding their training, than care [13–15]. The role of gender in affecting the motivations to enter medical schools may be understood using the path model which found that gender is positively correlated with family support which is considered a significant factor in choosing medical schools where females tend to be closer to other family members rather than males [16–18]. Other factors affecting students' choices included students' GPA in which we found that students with a GPA>90% were found to be statistically significantly more predicted (3.48 times higher) to prefer medicine as a major than those with a GPA<80%, on average. This could be explained by students' perception that high GPA of entering medicine school is considered a barrier for them.

This study had some limitations. One of these limitations is depending on a self-reported questionnaire which may lead to some personal bias where some participants may answer the questions in the way of making them appear better which could explain the high percentage of students who reported that the choice of medicalschool is their own desire, over other previous studies. Moreover, the depending on closed-questions may restrict the students form explaining their own barriers or motivators which may not be found in answers provided to them.

Conclusion

In conclusion, we found that there is a higher percentage of high-school students who prefer to enter medical school where the main barriers for entering it include the high aptitude score required for entry into medical school followed by English language competency tests. Moreover, the main motivating factors for students include helping and healing sick people, community respect and social value which is associated with being a physician. Finally, there is significant difference between genders considering the preference and motivations to choose medicine school.

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