Cardiology as A Career Choice for Medical Students in Saudi Arabia: A Cross-Sectional Study

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ABSTRACT

The planning of the healthcare workforce depends on the knowledge of the students' preferences for specialties and the factors that affect such preferences. This research aims to identify the various factors influencing cardiology interest among medical students in Saudi Arabia, shedding light on potential barriers and motivators. This is an online cross-sectional survey study that was conducted in Saudi Arabia in January 2025. Social media platforms such as WhatsApp, X, and Instagram were utilized to recruit the study participants. The questionnaire tool for this research was developed based on extensive literature review. The study included a total of 454 participants. A significant majority (n= 348, 76.7%) had prior exposure to cardiology, primarily preclinical years of medical school (n= 182, 52.3%). Clinical exposure to cardiology varied, with 107 students (30.7%) experiencing 2-7 days, while 83 (23.9%) had no clinical exposure. Medical students' preferences towards cardiology were influenced by high research opportunities (n= 399, 86.7%), having a relative as a cardiologist (n= 392, 85.2%), and job market opportunities (n= 374, 81.3%). The analysis of factors influencing interest in cardiology as a specialty showed greater exposure to cardiology during medical school through lectures and examination was strongly associated with increased interest, with an OR of 27.82 (95% CI: 3.55-217.91, p =0.002) for those exposed to more than eight sessions. Clinical exposure, though less impactful, showed a trend towards significance for students with 8-14 days of experience (OR =0.39, 95% CI: 0.15-1.00, p=0.05). This finding highlights the need for greater development of structural cardiac teaching and relevant clinical exposure in medical schools. Clarifying misunderstandings and enhancing mentorship programs could motivate more students to pursue cardiology. With the rising number of cardiovascular disease cases in Saudi Arabia, a rising interest in this profession is essential to cater to the increasing demand for cardiologists and to fortify the healthcare system.

Keywords: Cardiology; Career; Medical student; Profession; Saudi Arabia

INTRODUCTION

Cardiovascular diseases and their associated complications demonstrated substantial burden during the past years[1,2]. Furthermore, previous literature demonstrated limited knowledge concerning this type of diseases among the general public[3]. The planning of the healthcare workforce depends on the knowledge of the students' preferences for specialties and the factors that affect such preferences. In the area of cardiology, a number of research works have been conducted and identified certain trends: including the fascination with the disease process of the heart, the ability to intervene and provide treatment, and the status of the sub-specialty. Also, the presence of strong role models or early clinical exposure has been identified as key factors that influence career decisions.

Understanding student preferences for specialties and the driving factors for such preferences is imperative for healthcare workforce planning. Several studies have been described in the literature, particularly in cardiology research area, which characterized some specific trends: interest in the disease process in the heart, ability to intervene and provide treatment and the status of the subspecialty. Additionally, exposure to strong role models or early clinical experience are strong determinants of one's career path. Choosing a medical specialty is one of the most important decisions future healthcare providers will make. With the rapid advancement of medical science, medical knowledge has expanded so much that it is nearly impossible for a single physician to master the full breadth of knowledge[4]. This has allowed more specialization, allowing doctors to narrow their expertise in one area of medicine[5]. Before committing to a specialty, a careful consideration of multiple factors, including practical working conditions, lifestyle, administrative tasks, and possible financial outcomes is necessary[6]. Cardiology is one of the very few medical specialties that is unique among multiple specialties due to exceptional rewards that comes along with high challenges[6]. As cardiovascular diseases become more widespread around the world, cardiology has risen to establish itself as a bedrock of global health systems. This applies to Saudi Arabia as well, and the increasing frequency of cardiac diseases indicates that the specialty is gaining in value in the country[7]. Despite the critical demand for cardiologists, medical students' interest in the specialty is inconsistent. Factors influencing this interest may include exposure at academies, clinical practice, and perceived complexity and rewarding nature of the specialty. Previous studies show that students' learning experiences strongly predict their interest in specialties[8]. This research aims to identify the various factors influencing cardiology interest among medical students in Saudi Arabia, shedding light on potential barriers and motivators.

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METHODS

Study design: This is an online cross-sectional survey study that was conducted in Saudi Arabia in January 2025.

Study population and sampling procedure: Convenience sampling technique was utilized to recruit the study participants. Medical students who are currently studying medicine formed the study population. The inclusion criteria were medical students, males or females, and currently in their third year of study or higher. Participants who do not meet the inclusion criteria or who refused to provide their consent were excluded.Social media platforms such as WhatsApp, X, and Instagram were utilized to recruit the study participants. The study aim and objectives were highlighted in the invitation letter of the survey. The participants were informed that the completion of the survey is considered an informed consent. The study participants were informed that their data will not be shared with anyone. Besides, the study findings will be presented anonymized.

Questionnaire tool: The questionnaire tool for this research was developed based on extensive literature review. The first section comprised on participants demographic characteristics including the age, gender, university, year of study, whether they have had any prior exposure to cardiology during (internal medicine rotation/ course, elective course, cardiology lectures/examinations etc.), when was their first exposure to cardiology, their exposure to cardiology during medical school (lectures/examinations), and their exposure to cardiology as clinical exposure in clinics/hospitals. The second section asked examined participants' perceptions of cardiology as role, challenges, and career prospects. The third section examined factors influencing medical students' interest in cardiology as a specialty.

Ethical approval: Ethical approval for this study was obtained from the Imam Mohammad Ibn Saud Islamic University's institutional review board (IRB).

Statistical analysis: Descriptive statistics summarized the demographic characteristics as frequencies and percentages for categorical variables. The mean and the standard deviation were utilized to present continuous data. Logistic regression analysis was conducted to assess the potential factors associated with cardiology interest as specialty as dependent variable, the cutoff point was considered as 27 which is the 50 percentiles of the scale. The odds ratios (OR) and 95% confidence interval (CI) were presented. Statistical significance was determined using a p-value threshold of 0.05. All analyses were conducted using SPSS version 29.

RESULTS

The study included a total of 454 participants, with a majority being females (n= 277, 61.0%) and 177 males (39.0%). The medical students were from various universities, the highest representation from Batterjee Medical college (n= 74, 16.1%) and Taif University (n= 57, 12.4%). In term of academic level, most students were their third year (n= 142, 31.3%), followed by fifth year students (n= 115, 25.3%) and fourth year students (n= 101, 22.2%). A significant majority (n= 348, 76.7%) had prior exposure to cardiology, primarily preclinical years of medical school (n= 182, 52.3%). Clinical exposure to cardiology varied, with 107 students (30.7%) experiencing 2-7 days, while 83 (23.9%) had no clinical exposure.

A significant portion (n= 149, 32.8%) strongly agreed that cardiology physicians play an integral role in Saudi Arabia's health care system, while 107 (23.6%) strongly disagreed. Regarding job satisfaction, 159 students (35.0%) remained neutral about whether cardiologists enjoy their work, while 40 (8.8%) strongly agreed. In term of financial prospect, 128 students (28.2%) agreed that cardiology provides a decent income, whereas (n= 81,17.8%) strongly disagreed. The complexity of cardiology was acknowledged, with 123 (27.1%) agreeing that it is a difficult specialty. Interest in the field was balanced, with 98 (21.6%) strongly agreeing that cardiology is interesting, while 77 (17.0%) strongly disagreed (Table 1).

Medical students' preferences towards cardiology were influenced by various factors. High research opportunities (n= 399, 86.7%), having a relative as a cardiologist (n= 392, 85.2%), and job market opportunities (n= 374, 81.3%) were major motivators. However, some factors discouraged students, including a long training period (192, 41.7%), the difficult of the field (n= 161, 35.0%) (Table 2), and lack of clinical exposure (n= 150, 32.6%). Regarding future career consideration, job market availability (n= 420, 91.3%), having relative in cardiology (n= 430, 93.5%), and clinical mentorship (n= 411, 8.3%) were strong influencer, Table 3.

The analysis of factors influencing interest in cardiology as a specialty showed greater exposure to cardiology during medical school through lectures and examination was strongly associated with increased interest, with an OR of 27.82 (95% CI: 3.55-217.91, p =0.002) for those exposed to more than eight sessions. Clinical exposure, though less impactful, showed a trend towards significance for students with 8-14 days of experience (OR =0.39, 95% CI: 0.15-1.00, p=0.05), Table 4.

DISCUSSION

This study provides important information on factors affecting the decision of medical students in Saudi Arabia to choose Cardiology as a specialty The results reflect the significance of early and continuing exposure to cardiology in medical school, along with the influence of clinical mentorship in shaping tentative students career objectives. The main motivators included research opportunities, having a family member in cardiology, and job market applicability, while barriers such as long training length, perceived difficulty of the specialty, and lack of clinical exposure lowered student interest. These findings align with previous literature exploring factors influencing specialty selection among medical students worldwide. This study provides one of the first results intercalating the association of exposure to cardiology to eventual specialty choice, one of the most important findings was that students who attended more than 8 cardiology related sessions were significantly more likely to express such an interest (OR = 27.82, p = 0.002). This finding is consistent with previous research showing that early and repeated exposure to a specialty influences career choices[9]. It should be noted that medical students with more exposure to cardiology in clinical practice are more likely to choose it as a career, supporting the idea of shaping career decisions through exposure[10]. In addition, although clinical exposure had less influence than didactic exposure, there was a trend towards significance, particularly among those with 8–14 days of clinical exposure (OR = 0.39, 95% CI: 0.15–1.00, p = 0.05). Similar to our findings, a previous study reported increased students' interests through hands-on clinical experience during cardiology rotations[11].

The impact of specialty exposure on career choices is well known in medical education. This study supports that notion and highlights the need for organized cardiology-related curriculum[12]. Studies have shown that exposing students to subspecialties (eg, interventional cardiology, electrophysiology) early on significantly increases interest and retention in the field of cardiovascular care. This kind of exposure not only highlights the breadth of opportunities

Table 1. Demographic characteristics and cardiology exposure among the medicine students

Demographic characteristics		N	%
Age (years) ± standard deviation	22.5 ±1.73		
Gender	Female	277	61.0%
	Male	177	39.0%
University	Imam Muhammad bin Saud Islamic University (Riyadh)	27	5.9%
	King Saud University (Riyadh)	10	2.2%
	King Abdulaziz University (Jeddah)	26	5.7%
	Umm Al-Qura University (Makkah)	21	4.6%
	King Faisal University (Al-Ahsa)	16	3.5%
	Imam Abdulrahman Bin Faisal University (Dammam)	14	3.1%
	Qassim University (Buraidah)	30	6.5%
	Taif University (Taif)	57	12.4%
	King Khalid University (Abha)	13	2.8%
	Jazan University (Jazan)	50	10.9%
	Najran University (Najran)	8	1.7%
	Al-Baha University (Al-Baha)	4	0.9%
	Hail University (Hail)	31	6.8%
	Tabuk University (Tabuk)	3	0.7%
	Northern Borders University (Arar)	2	0.4%
	Prince Sultan University (Riyadh)	1	0.2%
	Dar Al Uloom University (Riyadh)	2	0.4%
	Princess Nourah bint Abdulrahman University (Riyadh)	4	0.9%
	Batterjee Medical college (Jeddah)	74	16.1%
	Shaqra collage of medicine (Riyadh)	5	1.1%
	Taibah University (Madinah Munawwarah)	11	2.4%
	King Saud bin Abdulaziz University for health sciences (Riyadh)	6	1.3%
	Other	44	9.6%
Year of study	Third Year	142	31.3%
	Fourth Year	101	22.2%
	Fifth Year	115	25.3%
	Internship	57	12.6%
	Residency	39	8.6%
Have you had any prior exposure to cardiology during (internal medicine rotation/course, elective course, cardiology lectures/examinations etc...) ?	No	106	23.3%
	Yes	348	76.7%
When was your first exposure to cardiology?	Before medical school	41	11.8%
	Preclinical years of medical school	182	52.3%
	Clinical years of medical school	107	30.7%
	Internship	18	5.2%
Your exposure to cardiology during medical school (lectures/examinations) is roughly:	None	28	8.0%
	<1	45	12.9%
	1-4	75	21.6%
	4-8	68	19.5%
	>8	132	37.9%
Your exposure to cardiology as clinical exposure in clinics/hospitals is roughly	None	83	23.9%
	One day	86	24.7%
	2-7	107	30.7%
	8-14	35	10.1%
	>14	37	10.6%

Table 2. Medical Students' Perceptions of Cardiology: Role, Challenges, and Career Prospects

Scale your beliefs towards the following statements	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Cardiology physicians play an integral part in Saudi Arabia is healthcare system	107 (23.6%)	34 (7.5%)	75 (16.5%)	89 (19.6%)	149 (32.8%)
Cardiology's physicians enjoy their work	84 (18.5%)	64 (14.1%)	159 (35.0%)	107 (23.6%)	40 (8.8%)
Cardiology provides physicians with decent income to live well	81 (17.8%)	61 (13.4%)	120 (26.4%)	128 (28.2%)	64 (14.1%)
Cardiology physicians' work is complex and difficult	85 (18.7%)	59 (13.0%)	109 (24.0%)	123 (27.1%)	78 (17.2%)
Cardiology physicians' work is interesting	77 (17.0%)	65 (14.3%)	109 (24.0%)	105 (23.1%)	98 (21.6%)
Limited technical examinations and interventions	93 (20.5%)	94 (20.7%)	163 (35.9%)	72 (15.9%)	32 (7.0%)
Saudi Arabia has a very serious shortage of cardiology physicians	89 (19.6%)	56 (12.3%)	177 (39.0%)	87 (19.2%)	45 (9.9%)
Lack of diversity of pathology	94 (20.7%)	83 (18.3%)	160 (35.2%)	82 (18.1%)	35 (7.7%)

Table 3. Factors influencing medical students' interest in cardiology as a specialty.

Factors influencing medical students' interest in cardiology		No		Yes	
		N	%	N	%
Which factors made you inclined to pursue cardiology as a specialty?	Lower stress specialty/workload	371	80.7%	89	19.3%
	Previous cardiology teaching	323	70.2%	137	29.8%
	Inspirational cardiologist	287	62.4%	173	37.6%
	Clinical rotation/experience with the patient	302	65.7%	158	34.3%
	Less working hours for more free time	368	80.0%	92	20.0%
	Potential experience with a family member or friend	367	79.8%	93	20.2%
	Continuity of care	363	78.9%	97	21.1%
	Research opportunity	371	80.7%	89	19.3%
	Relative is a cardiologist physician	392	85.2%	68	14.8%
	Research experience	399	86.7%	61	13.3%
	More opportunity in the job market or in fellowship training	374	81.3%	86	18.7%
	High income potentials	343	74.6%	117	25.4%
Which factors made you hesitant to pursue cardiology as a specialty?	Advice from practicing doctor	381	82.8%	79	17.2%
	Cardiology field is boring	354	77.0%	106	23.0%
	Cardiology field is difficult	299	65.0%	161	35.0%
	Preferred as an early subject	411	89.3%	49	10.7%
	Concerns at blurring of roles between doctors and other specialty	391	85.0%	69	15.0%
	Perceptions that research is necessary	406	88.3%	54	11.7%
	Long length of training period	268	58.3%	192	41.7%
	Low-income potentials	382	83.0%	78	17.0%
	Poor non-inspirational teaching	383	83.3%	77	16.7%
	Lack of clinical exposure	310	67.4%	150	32.6%
	Lack of knowledge about the subject	315	68.5%	145	31.5%
What influenced you to think of cardiology as a future career?	Work hours and lifestyle	387	84.1%	73	15.9%
	Family/friends is suffering from a cardiology disease	369	80.2%	91	19.8%
	Research experience	391	85.0%	69	15.0%
	Clinical rotation/experience with a patient	384	83.5%	76	16.5%
	From a cardiology lecture	383	83.3%	77	16.7%
	Clinical mentor or doctor	411	89.3%	49	10.7%
	Income potentials	405	88.0%	55	12.0%
	Job market or availability in fellowship training	420	91.3%	40	8.7%
	Relative is a cardiology physician	430	93.5%	30	6.5%
	Research opportunity	460	100.0%	0	0.0%

Table 4. Factors affecting interest of cardiology as a specialist: a multiple logistic regression

Variable		OR (%95 CI)	P value
Age	Age	1.05 (0.85-1.29)	0.647
Gender	Female	Reference	
	Male	0.86 (0.53-1.40)	0.550
Year of study	Third Year	Reference	
	Fourth Year	1.06 (0.53-2.13)	0.864
	Fifth Year	0.82 (0.36-1.84)	0.626
	Internship	0.96 (0.32-2.88)	0.948
	Residency	1.29 (0.39-4.31)	0.677
When was your first exposure to cardiology?	Before medical school	Reference	
	Preclinical years of medical school	0.85 (0.41-1.78)	0.675
	Clinical years of medical school	0.65 (0.29-1.47)	0.297
	Internship	0.40 (0.11-1.47)	0.168
Your exposure to cardiology during medical school (lectures/ examinations) is roughly:	None	Reference	
	<1	9.31 (1.11-78.09)	0.040
	1-4	15.78 (1.98-125.64)	0.009
	4-8	21.53 (2.69-172.07)	0.004
	>8	27.82 (3.55-217.91)	0.002
Your exposure to cardiology as clinical exposure in clinics/hospitals is roughly:	None	Reference	
	One day	0.96 (0.48-1.92)	0.903
	2-7	0.78 (0.39-1.56)	0.477
	8-14	0.39 (0.15-1.00)	0.051
	>14	0.87 (0.35-2.16)	0.771
	Constant	0.02 (0.00-0.00)	0.117

available within cardiology, it also enables students to appreciate the specialty's dynamism. Strong motivators included having a relative in cardiology (85.2%), high research potential (86.7%), and future job market prospects (81.3%). These features are reflective of wider global trends where research opportunity, mentorship, and job security are significant factors in specialty selection[13]. As for why students were deterred from pursuing cardiology, the long training duration (41.7%) as well as the perceived difficulty of the field (35.0%) and a lack of clinical exposure (32.6%) were the most common reasons identified. These challenges highlight the need for curricular changes that strengthen mentorship and early exposure programs to minimize concerns regarding the challenges in the field. Additionally, evidence suggests that well-designed mentorship programs can significantly shift students' preference for specializations by providing them with more practical advice and insight[14]. Also, motivation and engagement of the medical students can be enhanced through cooperative learning environments with practicing cardiologists[15,16]. Another contributing factor to students' career considerations included their perceptions of the role of the cardiologist and services within the Saudi Arabian healthcare system. A minority (23.6%) disagreed or strongly disagreed with the statement that cardiologists perform an essential role, but a substantial proportion (32.8%) strongly agreed. These results highlight awareness of the growing demand for cardiologists, particularly as the region faces an increasing cardiovascular disease burden[17].

Another unanticipated finding was the absence of influence of gender on the interest, which could mirror the growing gender diversity in the Saudi medical schools. This is in accordance with a previous study showing that gender differences in specialty choice are less pronounced in particular medical specialties[18]. While most of studies, male medical students display a higher interest in cardiology as compared to females students[19]. The differences may be due to changing gender roles in the healthcare professions over the years and different ways of teaching medicine in different geographic locations and cultures. The absence of any significant gender split in our study might mirror the transformation observed in gender equity in the Saudi medical profession, indicating that the continuous promotion of this type of gender equity should be reflected in the planning of future workforce. Gender disparity in specialty selection is slowly vanishing because of increasing gender diversity initiatives in countries previously studied[20,21]. Although this study provides valuable insights into the factors that influence medical students' interest in a career in cardiology, it has several major limitations. First, the cross-sectional nature makes it difficult to establish causative links between cardiology exposure and desire for cardiology careers. Second, the sample was drawn across a single region which may restrict the generalizability of these findings outside of other locations or countries. Third, exposure and interest self-reported data may be subject to recall bias. Moreover, the study did not elaborate on the impact of cultural or social factors that would play a significant role in choosing specialties in Saudi Arabia. Future research could address these limitations through longitudinal designs, extending geographical scope, and/or qualitative methods to better understand students' decision-making processes.

CONCLUSION

Our study highlights the impact of academic as well as extramural experience on interest towards cardiology among medical students in Saudi Arabia. Exposure to cardiology-related knowledge early and often, especially through lectures and examinations, greatly increased students' interest in the specialty. Clinical exposure was also crucial, especially for those who had

moderate practical experience. Motivators like the prospect of doing research, having a relative working in cardiology, and good job market availability were highlighted, while barriers including the long training duration and perceived difficulty demotivated students. This finding highlights the need for greater development of structural cardiac teaching and relevant clinical exposure in medical schools. Clarifying misunderstandings and enhancing mentorship programs could motivate more students to pursue cardiology. With the rising number of cardiovascular disease cases in Saudi Arabia, a rising interest in this profession is essential to cater to the increasing demand for cardiologists and to fortify the healthcare system.

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