





Original Article

Perception of medical students and interns toward orthopedics as a future career in Saudi Arabia

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ABSTRACT

Objectives: This study evaluated medical students' and interns' views on orthopedics as a career, focusing on the influence of mentors, rotations, and misconceptions around orthopedics.**Methods:** In November 2023, a cross-sectional study through an electronic questionnaire was conducted in Saudi Arabia. It was distributed to medical students and interns through social media, including WhatsApp group chats and broadcast lists, using relevant medical education hashtags.**Results:** Three hundred and ninety-three respondents agreed to participate, and their responses were included in the analysis. Females comprised 261 (66.4%) respondents. Interest in orthopedics as a career choice was indicated by 173 respondents (44%). One hundred and thirty participants (32.7%) were inspired in their first and second years of medical school. Nearly half of the participants (192; 48.9%) viewed the field positively. Mentors were identified by 50 respondents (12.7%) as pivotal in shaping their perspectives, while hospital training emerged as a significant influencer of medical students' perceptions of orthopedics with 112 participants (28%).**Conclusion:** Most medical students view orthopedics positively, seeing it as prestigious and are often inspired early in their studies. Mentorship and hospital rotations are crucial, significantly shaping their perceptions and emphasizing the field's rewards through practical experiences.**Keywords:** Gender bias, Medicine career perceptions, Mentorship impact, Orthopedics career, Saudi medical students

INTRODUCTION

Deciding on a career post-medical school is a personal, multifaceted journey influenced by multiple factors, including individual interests, ambitions, values, and the desire to make a meaningful impact on patients' lives. This critical moment signifies the culmination of extensive years of education and clinical training, establishing the path for a lifelong journey in the field of medicine.^[1] Many medical students remain uncertain about their future careers and are willing to explore different possibilities. This uncertainty often decreases with greater exposure to a particular career. This correlation is apparent in a study involving orthopedic residents.

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The majority (71%) noted that their exposure to the orthopedic rotation significantly impacted their career decision in this field when they were medical students.^[2] This can be attributed to the student being introduced to the medical specialties and having the opportunity to observe the work. Consequently, this enables them to assess if it matches their personal preferences, interests, and character traits, thereby guiding their choice of future career path. Regarding the perception of orthopedics, medical students often view it as a dynamic, procedure-focused field. This perception can influence each individual differently. There is a significantly lower number of female residents in orthopedics compared to their male counterparts^[3] – four times less, in fact. This disparity can be attributed to the perception among some female medical students that the field is physically demanding, which may influence their career decisions.^[4,5] Another factor that may affect medical student perception is stereotypes. A common stereotype in the medical field suggests that orthopedic surgery requires brute force and ignorance, which is not necessarily true. In fact, a study comparing the IQ scores of orthopedic surgeons and anesthesiologists found that orthopedic surgeons had a higher mean intelligence score.^[6] False stereotypes and perceptions about orthopedics pose a risk of discouraging medical students from considering specialization in this field. If students hold inaccurate beliefs, they may be hesitant to explore orthopedics, limiting their exposure to a specialty that could align with their interests and skills, potentially causing them to overlook a rewarding career path. Orthopedics encompasses both surgical and non-surgical approaches to treating patients. Misconceptions about this specialty may lead students to undervalue the importance of conservative treatments, physical therapy, and lifestyle modifications in managing musculoskeletal conditions. If these misconceptions influence students' specialty choices and they later realize the inaccuracies, it can result in career decision regret, impacting their psychological well-being and overall professional satisfaction.

Addressing and dismissing these stereotypes is crucial for ensuring that medical students and interns make informed and unbiased decisions about their career paths. Numerous studies have explored the factors influencing the selection of orthopedics as a prospective career path. Yet, none have thoroughly examined whether these factors are misinterpreted by medical students and interns. Therefore, due to the absence of comprehensive information within the global literature, this study aimed to investigate medical students' perceptions of orthopedics as a future career, focusing on the influence of mentors, rotations, and misconceptions around orthopedics.

MATERIALS AND METHODS

This is a cross-sectional study conducted in Saudi Arabia during November 2023. The targeted population was all

medical students and interns currently living in Saudi Arabia who agreed to participate in the survey. Of the surveys received, 393 respondents agreed to participate, and their responses were included in the analysis. The questionnaire content was reviewed by an orthopedic surgeon to ensure its pertinence, precision, and efficacy in capturing relevant data for the study. The questionnaire had 29 items, the first two sections starting with the demographic data (age, sex, marital status, region, and current year of study), followed by the interest in orthopedics as a future career, and the final section had multiple questions about the perception of orthopedics.

The questionnaire for this study was distributed through various social media platforms among medical students and interns. Specifically, it was shared on platforms such as WhatsApp, utilizing group chats and broadcast lists related to medical studies; X (Twitter), leveraging hashtags related to medical education. The study targeted medical students across Saudi Arabia [Figure 1]. The data was entered into Microsoft Excel 2016 (Microsoft Corporation, Redmond, Washington, United States). The statistical analysis was conducted using IBM Statistical Package for the Social Sciences Statistics for Windows, Version 25.0 (Released 2017; IBM Corp., Armonk, New York, United States). The Chi-square test was used to analyze the data. Statistical significance was defined as $P < 0.05$, with a confidence interval of 95%.

RESULTS

Characteristics of the study participants

The respondents were mostly Saudis 339 (86.3%). The majority were female, 261 (66.4%), and were single, 371 (94.4%). Most were in their third year of medical school, 116 (30%). One hundred and seventy-three respondents (44%) were interested in pursuing an orthopedic career [Table 1].

Perception of the study participants

Around three-quarters of the respondents (294; 74.8%) did, in fact, feel that orthopedics is a physically demanding specialty. The data reveal a sex bias, indicating that 40.7% (160) of participants believe that orthopedics is more suited for males, while only 1.8% (7) hold a similar view for females. Further, analysis differentiated by sex shows that approximately 70% of male respondents (92 out of 132) and 30% of female respondents (78 out of 261) perceive orthopedics as more suitable for males. Most of the sources that strongly influenced these perceptions were hospital training, with 28.5% (112 participants), and social media, 21.6% (85). As for the specialty challenge, most of them, 40.5% (159), rated "Three" – moderate

Table 1: Characteristics of the study participants.

Item	n	n %
Nationality		
Saudi	339	86.3
Non-Saudi	54	13.7
Sex		
Male	132	33.6
Female	261	66.4
Maternal status		
Single	371	94.4
Married	20	5.1
Divorced	2	0.5
Current year of study		
1 st (Prep year)	11	2.8
2 nd	83	21.1
3 rd	118	30.0
4 th	35	8.9
5 th	36	9.2
6 th	74	18.8
Intern	36	9.2
Interest in orthopedics		
Yes	173	44.0
No	220	56.0
Orthopedic surgeon relative		
Yes	57	14.5
No	336	85.5

n: Number of participants

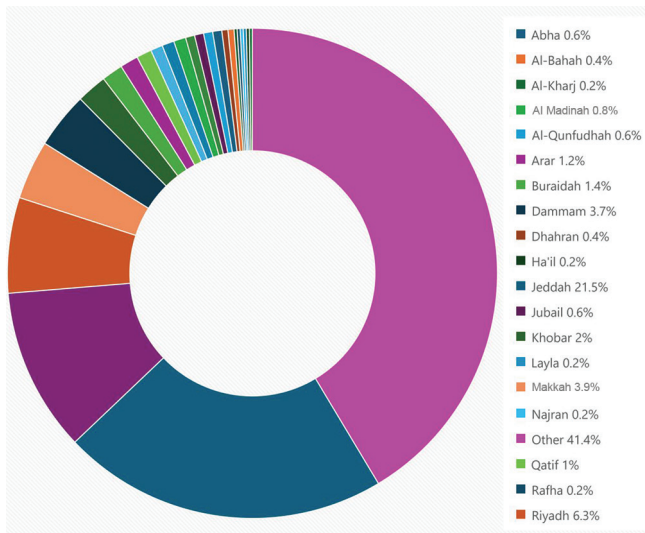


Figure 1: Distribution of study participants according to regions in Saudi Arabia.

for orthopedics out of five. In addition, mentors were identified by 50 respondents (12.7%) as pivotal in shaping their perspectives, while hospital training, noted by 112 participants (28%), emerged as a significant influencer of medical students' perceptions of orthopedics, highlighting the substantial impact of rotation.

Relationship between study participants' characteristics and their perception of orthopedics as a future career in Saudi Arabia

In our study, significant associations were observed between various factors and perceptions toward orthopedics among medical students in Saudi Arabia, notably, their views on sex discrimination and their sources of perception ($P = 0.027$ and $P = 0.034$, respectively). Sex was a significant factor in perceptions of discrimination, stereotypes, life-work balance, and post-residency income ($P = 0.003$, $P = 0.002$, $P = 0.012$, and $P < 0.001$, respectively). Relationships with orthopedic surgeons influenced research opportunities and perceptions of stereotypes ($P = 0.001$ and $P < 0.001$). These results suggest multifaceted influences on students' perceptions of orthopedics, highlighting the importance of educational year, personal interest, and sex in shaping these perspectives.

DISCUSSION

The study centered on understanding perceptions and stereotypes about orthopedics as a career among medical students and interns in Saudi Arabia. Some key results showed that the participants were predominantly Saudis (86.3%) and females (66.4%) across different academic years, with the 3rd year being the most represented (30%). Notably, 44% of the students showed an interest in orthopedics. There was no significant difference between males and females in this regard, unlike a study that was done in Nigeria, where the ratio of male interest in the specialty was more than double that in females.^[5] Conversely, there was a similar interest percentage (47%) to our study in a Japanese study.^[7] Meanwhile, 57.5% did not see sex discrimination in orthopedic residency, leaving a concerning 42.5% who did. Interestingly, a similar percentage (40.7%) felt that the field was more suited for males.

A substantial majority (74.8%) perceived orthopedics as physically demanding despite other studies showing that the majority of their participants said that it was not.^[5] The sources shaping these perceptions were primarily hospital training (28.5%) and social media platforms (21.6%), underlining their influence in shaping future awareness campaigns. About half of the students (48.9%) believed the orthopedic specialty to have a good reputation, and 41.7% thought it offered a satisfactory work-life balance. Around two-thirds of the participants (65.9%) recognized the field's substantial learning and academic opportunities. These percentages shed light on the various perceptions surrounding orthopedics, influencing students' decisions when considering it as a specialty [Table 2].

Delving deeper, the results revealed an intricate relationship between personal aspirations, societal norms, and medical career choices [Table 3]. The interest level in orthopedics (44%) suggests an influence of various factors, including sex perceptions and biases. The data reflect a significant perception

Table 2: Perception of the study participants toward orthopedics as a future career in Saudi Arabia.

Item	n	n %
When were you first inspired about orthopedic?		
Before medical school	102	26.0
1 st year at medical school (preparatory year)	54	13.7
2 nd year at medical school	76	19.3
3 rd year at medical school	51	13.0
4 th year at medical school	46	11.7
5 th year at medical school	44	11.2
6 th year at medical school	12	3.1
During internship	8	2.0
Do you think orthopedics is a physically demanding specialty?		
Yes	294	74.8
No	28	7.1
Not sure	71	18.1
What is your opinion about the gender suitability of orthopedics residency?		
Sex is not important	226	57.5
It is more suitable for males to specialize	160	40.7
It is more suitable for females to specialize	7	1.8
Which of the following is the source of perception about orthopedics?		
Mentor	50	12.7
Member of family	41	10.4
Friends	44	11.2
Hospital training	112	28.5
Social media	85	21.6
Other	61	15.5
How much is orthopedics challenging in your opinion out of five?		
One	8	2.0
Two	13	3.3
Three	159	40.5
Four	129	32.8
Five	84	21.4
What do you think about the availability of research opportunities in orthopedics?		
Good opportunities	174	44.3
Limited opportunities	102	26.0
Not sure	117	29.8
What negative perceptions or stereotypes do you believe exist regarding the field of orthopedics?		
There is a good reputation and prestige of the specialty	192	48.9
There is bad reputation of the specialty	69	17.6
Not sure	132	33.6
What do you think about the life-work balance in orthopedics?		
There is life-work balance	164	41.7
There is no life-work balance	117	29.8
Not sure	112	28.5
What do you think about the satisfaction rate in orthopedics?		
High satisfaction rate	102	26.0
Acceptable satisfaction rate	176	44.8
Low satisfaction rate	26	6.6
Not sure	89	22.6
What do you think about orthopedics?		
There is learning and academic opportunities	259	65.9
There are no learning and academic opportunities	38	9.7
Not sure	96	24.4
What is your opinion regarding the income following completion of orthopedic residency training?		
High income	184	46.8
Acceptable income	116	29.5
Low income	13	3.3
Not sure	80	20.4

(Contd...)

Table 2: (Continued).

Item	n	n %
What are your thoughts on the rate at which applicants are accepted into orthopedic residency programs?		
Difficult	153	38.9
Average	137	34.9
Easy	19	4.8
Not sure	84	21.4
What are your thoughts on the on-call responsibilities and scheduling for orthopedic residents?		
Acceptable on-call duty and call schedule	141	35.9
Unacceptable on-call duty and call schedule	93	23.7
Not sure	159	40.5
What is your opinion on the duration of orthopedic residency training?		
Lengthy	111	28.2
Acceptable length	165	42.0
Short duration	12	3.1
Not sure	105	26.7
What are your thoughts regarding emergency cases in the field of orthopedics?		
Good	229	58.3
Limited	73	18.6
Not sure	91	23.2
What are your thoughts regarding emergency cases in the field of orthopedics?		
There are too many emergency cases in orthopedic	282	71.8
There are not many emergency cases in orthopedic	43	10.9
Not sure	68	17.3
What are your thoughts on pursuing a subspecialty fellowship in the field of orthopedics?		
There are many subspecialty fellowships available in orthopedics	144	36.6
There are not many subspecialty fellowships available in orthopedics	77	19.6
Not sure	172	43.8
What is your opinion regarding the interest you have (lectures, books) in orthopedic knowledge?		
Interesting	195	49.6
Not interesting	120	30.5
Not sure	78	19.8
What do you think about the presence of interventional procedures in orthopedics?		
Excessive	123	31.3
Limited	92	23.4
None	18	4.6
Not sure	160	40.7
What are your thoughts on the duration of patient-physician relationships in the field of orthopedics?		
Lifetime relationship	153	38.9
One time relationship	124	31.6
Not sure	116	29.5
What do you think about the operation time in the field of orthopedics?		
Long operation hours	156	39.7
Average operation hours	143	36.4
Short operation hours	16	4.1
Not sure	78	19.8

n: Number of participants

that orthopedics is more suitable for males, which might indicate existing sex stereotypes in medical specialties. Such perceptions might affect the career choices among female medical students, as shown in another career study where 31 males preferred orthopedics, but only two females preferred the specialty.^[8]

The influence of the medical education stage on students' interests indicates that experiences and exposure during

training significantly impact career decisions. The perception of orthopedics as physically demanding in our study may discourage Saudi students from specializing in orthopedics. In another study, only 9.2% of their participants believed that orthopedic specialists have a bad work-life balance, showing a difference compared to 29.8% in our study, which shows a different stereotype in Saudi students.^[5] The influence of

Table 3: Relationship between characteristics of the study participants and their perception toward orthopedics as a future career in Saudi Arabia.

Perception toward orthopedics as a future career in Saudi Arabia	Demographic and individual characteristics of the participants					
	Nationality	Sex	Marital status	Current year of study	Interest in orthopedics	Orthopedic surgeon relative
When were you first inspired about orthopedics?	0.123	0.225	0.013*	0.000*	0.000*	0.545
Do you think orthopedics is a physically demanding specialty?	0.084	0.732	0.955	0.385	0.197	0.133
What is your opinion about the sex discrimination in orthopedic residency?	0.563	0.003*	0.941	0.027*	0.073	0.055
Which of the following is the source of perception about orthopedics?	0.004*	0.041*	0.139	0.034*	0.000*	0.267
How challenging is orthopedic specialty out of five?	0.817	0.467	0.130	0.556	0.051	0.718
What do you think about the availability of research opportunities in orthopedics?	0.405	0.136	0.315	0.303	0.027*	0.001*
What negative perceptions or stereotypes do you believe exist regarding the field of orthopedics?	0.148	0.002*	0.804	0.315	0.150	0.000*
What do you think about the life-work balance in orthopedics?	0.690	0.012*	0.897	0.543	0.087	0.007*
What do you think about the satisfaction rate in orthopedics?	0.129	0.090	0.614	0.456	0.051	0.000*
What do you think about orthopedics?	0.526	0.122	0.857	0.078	0.454	0.002*
What is your opinion regarding the income following completion of orthopedic residency training?	0.267	0.000*	0.420	0.543	0.013*	0.013*
What are your thoughts on the rate at which applicants are accepted into orthopedic residency programs?	0.273	0.005*	0.183	0.228	0.001*	0.000*
What are your thoughts on the on-call responsibilities and scheduling for orthopedic residents?	0.271	0.000*	0.896	0.352	0.180	0.005*
What is your opinion on the duration of orthopedic residency training?	0.763	0.031*	0.488	0.088	0.129	0.002*
What do you think about the career opportunities in the field of orthopedics?	0.156	0.086	0.771	0.030*	0.073	0.000*
What are your thoughts regarding emergency cases in the field of orthopedics?	0.590	0.007*	0.292	0.305	0.042*	0.063
What are your thoughts on pursuing a subspecialty fellowship in the field of orthopedics?	0.612	0.001*	0.911	0.021*	0.001*	0.000*
What is your opinion regarding the interest you have (lectures, books,) in orthopedic knowledge?	0.626	0.379	0.405	0.393	0.001*	0.000*
What do you think about the presence of interventional procedure in orthopedics?	0.560	0.022*	0.996	0.168	0.114	0.093
What are your thoughts on the duration of patient-physician relationships in the field of orthopedics?	0.001*	0.001*	0.647	0.000*	0.767	0.005*
What do you think about the operation time in the field of orthopedics?	0.017*	0.022*	0.747	0.227	0.105	0.003*

*Significant ($P < 0.05$)

social media platforms in shaping perceptions, especially in a culture with potential sex communication barriers, could explain the sex disparity in orthopedics.^[9]

The positive view of career opportunities and income potential in orthopedics might be attractive incentives, and this is supported by the results of another study, which found that income was more important in the career choice of orthopedic-interested students compared with non-orthopedic-interested students.^[10] We should keep in mind that perceptions of challenges such as

bad work-life balance and physical demand could deter interest.

This study offers a clearer understanding of factors influencing career choice, which is crucial for addressing workforce needs in healthcare. Medical institutions and health-care systems can strategize to mitigate potential shortages or imbalances by identifying what attracts or deters students from certain specialties. The study also highlights the importance of addressing sex-related stereotypes in orthopedics, which is crucial for promoting

sex equality in medicine. In addition, these insights can help medical schools refine their curricula and clinical rotations to provide more comprehensive exposure to orthopedics.

Limitations

The study focuses only on Saudi Arabia, which limits its applicability to global trends in medical education and career selection. Furthermore, one of the limitations of this study is that it did not delve deeper into investigating the misconceptions surrounding orthopedics. Specifically, no questions were added to the survey to explicitly explore the variety and impact of these misconceptions on the students' perception of orthopedics as a future career. This omission limits our understanding of how certain stereotypes, such as the belief in orthopedics' physical demands and its suitability for males over females, may deter students from considering this specialty, nor does it explore the individual motivations influencing career choices.

CONCLUSION

This study shows an overall positive perception of orthopedics as a future career, with substantial stereotypes toward the high physical demand that the job requires. There is a considerable number who still, to this day, think that orthopedics is more suitable for males than females.

Overall, this study highlights the need for medical schools to enhance the reputation of orthopedics by providing students with the resources and mentorship to understand orthopedics as a discipline of interest. The pattern of significance suggests that as students progress through their medical education, their perceptions of orthopedics become more determined.

This signifies that exposure to the field and educational interventions can either enhance or worsen the perception. The influence of mentors plays a pivotal role in shaping students' perceptions and guiding their career choices, underscoring the importance of mentorship in leading students toward a deeper understanding and appreciation of orthopedics as a rewarding career path. In addition, the experience gained from hospital rotations is highlighted as a significant factor in influencing medical students' views, demonstrating the profound impact these practical experiences which have on their perception of orthopedics.

Recommendations: Future research directions

Further research is necessary to understand the individual motivations behind choosing orthopedics as a career. In addition, comprehensive studies are needed to gain a global perspective on the perception of orthopedics and its implications for medical education and career choices.

AUTHORS' CONTRIBUTIONS

HAG and HMA designed the study protocol. AAA and MAA updated reference lists and wrote the manuscript draft. AMA and HA contributed to reviewing and proofreading the final manuscript. All authors have critically reviewed and approved the final draft and are responsible for the manuscript's content and similarity index.

ETHICAL APPROVAL

The research/study approved by the Institutional Review Board at King Faisal University, number ETHICS1766, dated December 27, 2023.

DECLARATION OF PATIENT CONSENT

Patient's consent not required as there are no patients in this study.

USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY FOR MANUSCRIPT PREPARATION

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

CONFLICTS OF INTEREST

There are no conflicting relationships or activities.

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