

Factors Influencing Sports Medicine as a Career Choice Among Orthopaedic Trainees in Saudi Arabia

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Investigation performed at King Saud University, Riyadh, Saudi Arabia

Background: Sports medicine is one of the most popular orthopaedic specialties, with more fellowship applicants than in any other subspecialty of orthopaedics.

Purpose: To investigate the factors influencing orthopaedic trainees to complete their fellowships and subsequently subspecialize in sports medicine in Saudi Arabia, as well as to compare the motivational factors of trainees planning to pursue sports medicine versus other orthopaedic specialties.

Study Design: Cross-sectional study.

Methods: An online anonymous questionnaire was distributed to 400 orthopaedic surgical trainees from 44 training centers (residency and fellowship training programs) across Saudi Arabia. The questionnaire identified trainees planning to select sports medicine as their career and the most influential factors affecting their choice; items exploring the influential factors were answered on a 5-point Likert-type scale. A comparison of responses was performed with candidates aiming to pursue other orthopaedic specialties. The chi-square or Fisher exact test was used to compare demographic parameters and the percentage of “agree” and “strongly agree” responses between trainees opting for sports medicine fellowships and those choosing other fellowships.

Results: Of the 400 potential participants, 250 orthopaedic trainees (response rate, 63%) completed the survey (201 [80%] male and 49 [20%] female). Sports medicine was the most coveted specialty among trainees, with 70 (28%) participants opting for it as their career choice. The most prominent factors for the decision included disease prognosis and surgical outcomes (90%), personal interest (87%), experience during residency training (83%), type of surgical skills (81%), disease pathology and patient population (77%), expected workload and lifestyle (73%), role model or mentor (70%), and patient volume and variety of cases (67%). Significant differences compared with trainees who preferred other orthopaedic specialties included role model/mentor impact (70% vs 54%), expected rate of income (60% vs 47%), and private sector job opportunities (64% vs 45%) ($P = .025, .034, \text{ and } .020$, respectively).

Conclusion: Study findings indicated that a significant percentage of orthopaedic trainees in Saudi Arabia choose to specialize in sports medicine. Role model/mentorship, private sector job opportunities, and expected rate of income were the most influential when compared with the motivations of trainees not choosing sports medicine.

Keywords: sports medicine; fellowship; residency; fellows; residents; trainees

Subspecializing in orthopaedics is a recent trend, as demonstrated by the rapid rise in fellowship programs.⁵ In the past decade, the proportion of practicing orthopaedic generalists has declined, while that of orthopaedic graduates attending fellowship training for subspecialized practitioners has increased.^{4,13,18} It has been observed that fellowship-trained surgeons account for a high percentage (78%) of performed procedures within their subspecialty.^{10,13} In particular, orthopaedic sports medicine fellowship-trained surgeons were reportedly responsible for

more than 70% of the procedures within the specialty of sports medicine.¹³ Furthermore, the operations executed by subspecialized, high-volume surgeons have been found to produce better outcomes than those completed by non-subspecialized surgeons.^{10,13}

Sports medicine is one of the most popular specialties in orthopaedics, offering the largest number of positions and having a larger number of applicants compared with other orthopaedic subspecialties.^{4,6,13,22,25,27,28} The trend to obtain a fellowship in sports medicine has risen despite its competitive nature.^{21,23} Several influential factors have resulted in increased specialization within orthopaedics, including lifestyle, on-call responsibilities, financial compensation, experiences in rotations as a resident,

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intellectual interest, a strong mentor, prestige, improved job prospects and income, surgical skill development, and employment marketability.^{4,12,14,17,28}

Educational and training-related incentives for attending sports medicine fellowships have a high impact on clinical decision making.²⁷ Butler et al⁴ found that trainees interested in sports, upper extremity, and arthroplasty placed significantly more importance on lifestyle. Furthermore, the only factor more important to them, as opposed to residents opting for other fields, was “life experience outside of medicine.”⁴ Notably, Oser et al²³ found that the dominant aspects considered by orthopaedic surgery trainees in selecting sports medicine fellowship programs were the variety and complexity of surgical exposure, operative autonomy, and program reputation.

In the past decade, there has been an increase in the number of orthopaedic surgeons subspecializing in sports medicine in Saudi Arabia. This could explain the increase in the publication of sports-related research in Saudi Arabia in the past 2 decades.¹¹ In our institution (King Saud University), there has been an increase in the number of applicants for the sports medicine fellowship program. We believe that knowledge about the factors that contribute toward such fellowship preferences can help in better planning, implementation, and distribution of various fellowship programs and better career counseling of orthopaedic trainees in Saudi Arabia.

The purpose of this study was to investigate the factors influencing orthopaedic surgeons to complete their fellowships and, subsequently, subspecialize in sports medicine in Saudi Arabia. We hypothesized that significant differences in factors influencing fellowship preferences would be present among orthopaedic trainees opting for sports medicine fellowships compared with those opting for other fellowships.

METHODS

The protocol for this study received institutional review board approval. Orthopaedic residents and fellows from 44 training centers across Saudi Arabia were involved in this cross-sectional, multicenter study. The inclusion criteria consisted of trainees planning to enroll or currently enrolled in a fellowship training program. The exclusion criteria constituted not planning to undergo fellowship training, being unsure about undergoing the fellowship training, or planning to work as an orthopaedic generalist. Orthopaedic trainees with active email accounts were

invited to participate in an online survey through Google Drive. The survey questionnaire is presented in Appendix Table A1.

The 27-item questionnaire comprised components related to different aspects of fellowship selection and prospective influencing factors. The first component included items on trainees' characteristics and preferred fellowship specialties, whereas the second component focused on influential factors that could affect their choices. These factors were categorized into 4 distinct themes: experience and training-related, work-related, subspecialty characteristics-related, and social factors. Items concerning the influential factors were answered via a 5-point Likert-type scale (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree), and 12 of them were closed questions with multiple possible answers. Survey questions were thematically grouped into 4 categories based on the above-named 4 factors.

The questionnaire was developed through the literature review method by orthopaedic experts and was finalized for its content through the Delphi method after mutual consensus.⁸ The questionnaire was finalized in 3 meetings, and the mean agreements per item were 93.4%, 90.3%, 89.5%, and 93% for experience and training-related, work-related, subspecialty characteristics-related, and social factors, respectively. Participation in the study was fully on a voluntary basis, and respondents were informed before answering the questionnaire that participation in the survey would be considered consent.

Statistical Analysis

SPSS software Version 23 (IBM Corp) was used for data entry and statistical analysis. Microsoft Excel was used for graphical illustration. Categorical variables were reported as absolute values and percentages and compared via chi-square or Fisher exact test. A post hoc analysis using the adjusted residual values was conducted to interpret a deeper inference on the factors influencing the association between 2 categorical variables. A 1-sample chi-square test was used to examine a single categorical variable.

The main assessment involved comparative analysis between participants who chose arthroscopy and sports medicine for their fellowship and those who selected another fellowship (arthroplasty, deformity, foot and ankle surgery, hand and upper extremity, orthopaedic oncology, pediatric orthopaedics, shoulder, spine surgery, and trauma). Statements in the 4 categories that received a

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Ethical approval for this study was obtained from King Saud University (reference No. E-21-5950).

response of strongly agree or agree were compared between the 2 participant groups. A further comparative analysis was performed between the study groups for each

influencing factor. All analyses were performed at a significance level of .05.

TABLE 1
Baseline Characteristics for the Overall Cohort^a

	Overall (N = 250)	Fellowship Choice		P
		Sports Medicine (n = 70)	Other (n = 180)	
Sex				.798
Male	201 (80)	57 (81)	144 (80)	
Female	49 (20)	13 (19)	36 (20)	
Education level				.300
Resident	216 (86)	63 (90)	153 (85)	
Fellow	34 (14)	7 (10)	27 (15)	

^aData are reported as n (%).

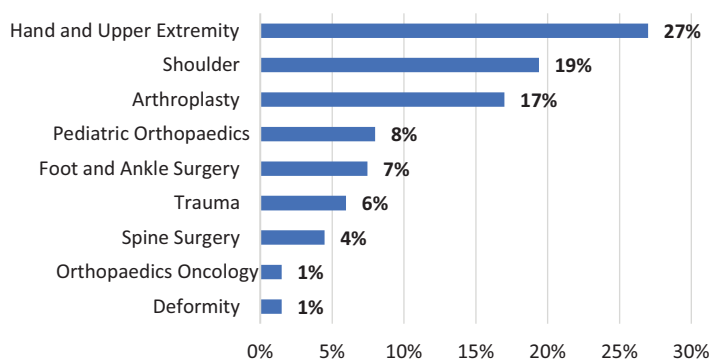


Figure 1. Future career plan for trainees who are planning to pursue a second specialty in addition to sports medicine.

RESULTS

Group Characteristics

The online questionnaire was distributed to 400 potential participants, and 250 participants completed it (response rate, 63%). Among them, 201 (80%) were men and 49 (20%) were women. Additionally, 216 (86%) were residents and 34 (14%) were fellows. The majority of participants (46.5%) decided on their specialty during the third year of residency. Sports medicine was the most selected specialty among trainees as a career, with 70 (28%) participants choosing it. Baseline characteristics are shown in Table 1.

Of the 70 trainees who chose sports medicine, 6 (9%) planned to pursue it as a sole career, and 64 (91%) planned to pursue other subspecialties along with sports medicine. The top 3 options for a second specialty were hand and upper extremity (27%), shoulder (19%), and arthroplasty (17%) (Figure 1).

Factors Influencing Sports Medicine as a Career Choice

Figure 2 summarizes the factors influencing sports medicine as a career choice. No significant differences were evident between trainees pursuing sports medicine versus other fellowships with respect to experience and training, subspecialty characteristics, or social factors; however, more participants choosing sports medicine indicated that work-related factors were highly influential in their choice (56% vs 49% for other fellowships; $P = .036$) (Figure 2).

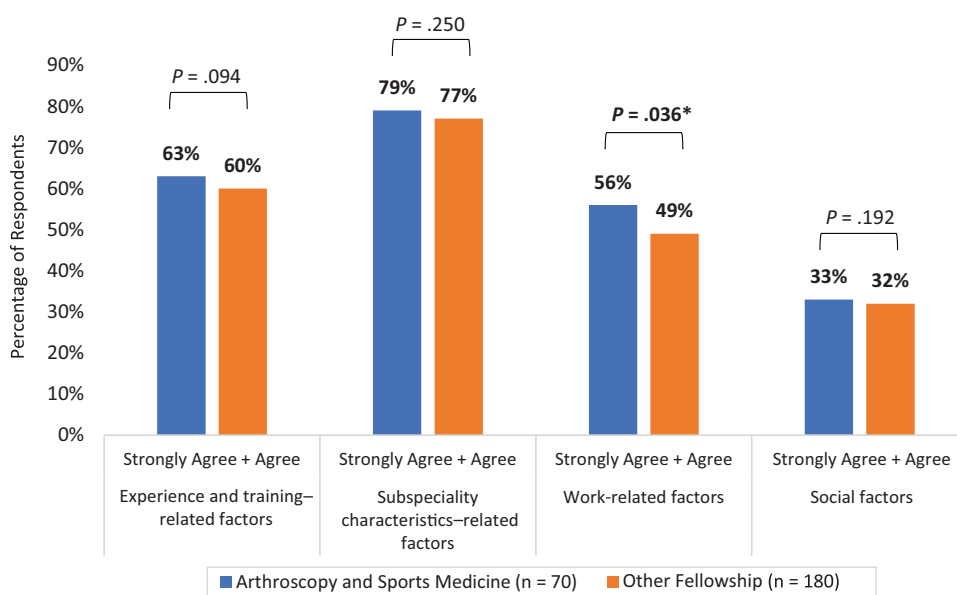


Figure 2. Results by study group on factors influencing choice of fellowship. *Statistically significant difference between groups ($P < .05$).

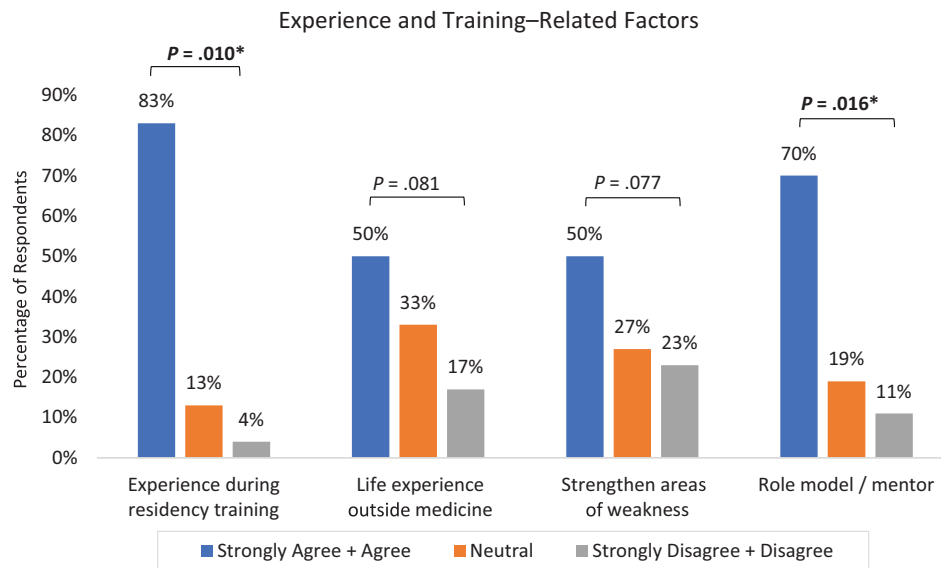


Figure 3. Experience and training–related factors influencing participants who choose to specialize in sports medicine ($n = 70$). *Statistically significant difference between strongly agree + agree and neutral or strongly disagree + disagree ($P < .05$).

Experience and Training–Related Factors

A significant number of participants (83%) strongly agreed or agreed that their experience in sports medicine during residency training affected their fellowship selection ($P = .01$) (Figure 3). Furthermore, 70% either strongly agreed or agreed that their mentor or role model during their residency training affected their career choice ($P = .016$) (Figure 3). When comparing the effect of experience and training–related factors on participants planning on not pursuing sports medicine, there was only a significant difference regarding the effect of role models or mentors (70% vs 54%; $P = .025$) (Table 2).

Subspecialty Characteristics–Related Factors

Most of the trainees (90%) strongly agreed or agreed that disease prognosis and surgical outcomes played a role in their decision ($P = .01$) (Figure 4). Furthermore, trainees either strongly agreed or agreed that they were motivated by the type of surgical skills practiced in sports medicine (81%; $P = .011$) (Figure 4), disease pathology and patient population (77%; $P = .011$), and patient volume and variety of cases (67%; $P = .017$) (Figure 4). However, none of these factors were significantly different when compared with trainees not interested in sports medicine (Table 2).

Work-Related Factors

Most trainees pursuing sports medicine were influenced by the expected workload, on-call responsibilities, lifestyle, and work balance (73%; $P = .018$). Additionally, a significant number strongly agreed that the hospital needs (64%), expected rate of income (60%), and private sector job opportunities (64%) were important in sports medicine selection ($P = .012$, $.026$, and $.024$, respectively) (Figure 5). When

these factors were examined in relation to trainees not choosing sports medicine as a career, the expected rate of income (60% vs 47%) and private sector job opportunities (64% vs 45%) were seen as the most significant motivators behind their choice of fellowship ($P = .034$ and $.020$, respectively) (Table 2).

Social Factors

Most of the trainees strongly agreed or agreed that their personal interests were the main drivers of choice (87%; $P = .019$). However, a significant number of trainees strongly disagreed or disagreed to prestige in society (49%), friends' advice (59%), or gender-attributable preference (50%) influencing their selection of sports medicine ($P = .023$, $.019$, and $.003$, respectively). Regarding the impact of social and family commitments, the participants were uncertain (Figure 6). Furthermore, there was no difference between those planning to pursue sports medicine and a nonsports specialty regarding all social factors (Table 2).

DISCUSSION

The findings of the current study suggest that sports medicine is the most coveted subspecialty among orthopaedic trainees (28%) in Saudi Arabia, which is consistent with previously published data from other regions.^{1,6,15,27,28} The design of this study was not limited to investigating influential factors. It also examined the effect of these factors on trainees uninterested in pursuing sports medicine as a career, to compare both groups and precisely identify the factors unique to sports medicine.

Many factors investigated in this study contribute to specialty selection, such as disease prognosis and surgical outcomes, personal interest, experience during residency

TABLE 2
Comparison Between Sports Medicine and Other Fellowship Groups Who Strongly Agreed or Agreed on Factors Influencing Their Fellowship Choice^a

Factors Influencing Fellowship Choice	Fellowship Choice		P
	Sports Medicine (n = 70)	Other (n = 180)	
Experience and training–related factors			
Experience during residency training	58 (83)	145 (81)	.317
Life experience outside medicine	35 (50)	83 (46)	.408
Strengthening in areas of weakness	35 (50)	105 (58)	.485
Role model/mentor	49 (70)	98 (54)	.025
Subspecialty characteristics–related factors			
Surgical skills practiced	59 (84)	141 (78)	.480
Patient volume and variety of cases	47 (67)	136 (76)	.382
Disease pathology and patient population	54 (77)	127 (71)	.640
Disease prognosis and surgical outcomes	63 (90)	150 (83)	.106
Work-related factors			
Institution/head of department	16 (23)	48 (27)	.264
Hospital needs	45 (64)	106 (59)	.256
Workload, on-call responsibilities, lifestyle, work balance	51 (73)	114 (63)	.610
Expected rate of income	42 (60)	85 (47)	.034
Private sector job opportunities	45 (64)	81 (45)	.020
Availability and guarantee of jobs	35 (50)	96 (53)	.192
Social factors			
Personal interest	61 (87)	143 (79)	.076
Social and family commitments	19 (27)	54 (30)	.201
Societal prestige	15 (21)	33 (18)	.090
Advice of family and friends	8 (11)	35 (19)	.188
Fact that you are a male/female	14 (20)	29 (16)	.159

^aData are reported as n (%). Boldface P values indicate a statistically significant difference between groups (P < .05; chi-square test).

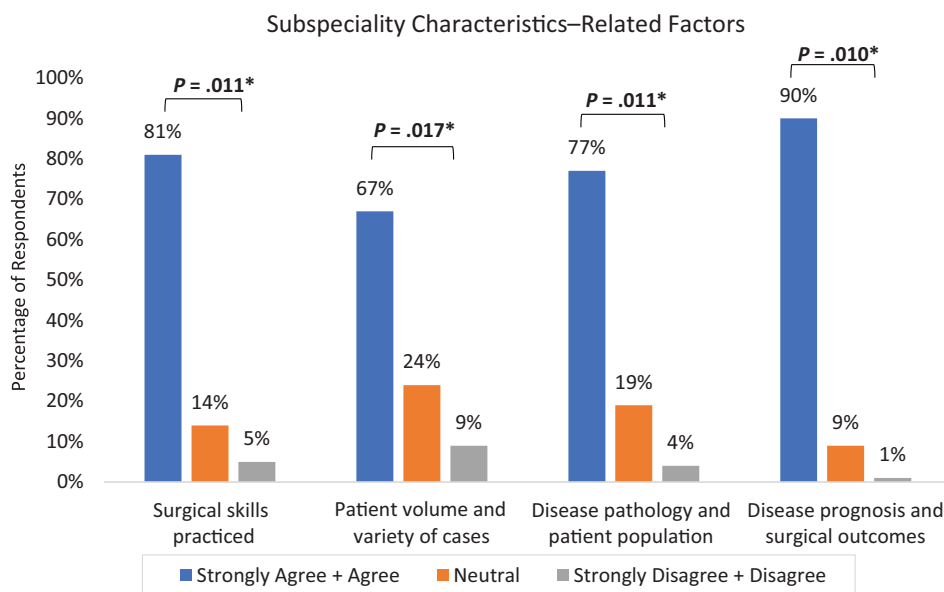


Figure 4. Subspecialty characteristics–related factors influencing participants who choose to specialize in sports medicine (n = 70). *Statistically significant difference between strongly agree + agree and neutral or strongly disagree + disagree (P < .05).

training, types of surgical skills practiced, workload, on-call responsibilities, lifestyle, and work-life balance. However, no significant differences were found when these elements were considered in relation to trainees who had oriented

themselves toward other subspecialties. While these factors did affect decision making, they were not unique to sports medicine. Our comparison between the 2 cohort groups (sports medicine vs other specialties) showed that only 3

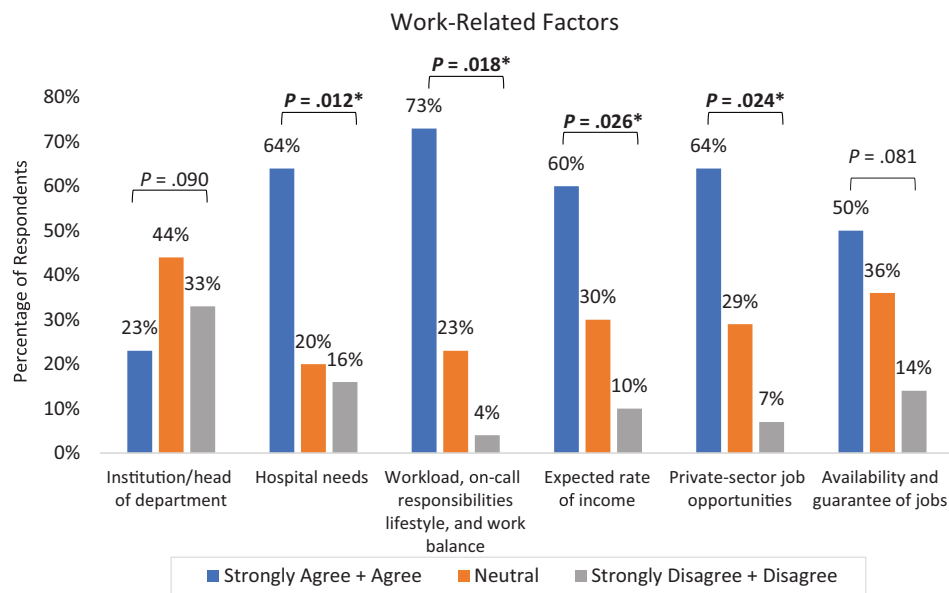


Figure 5. Work-related factors influencing participants who choose to specialize in sports medicine ($n = 70$). *Statistically significant difference between strongly agree + agree and neutral or strongly disagree + disagree ($P < .05$).

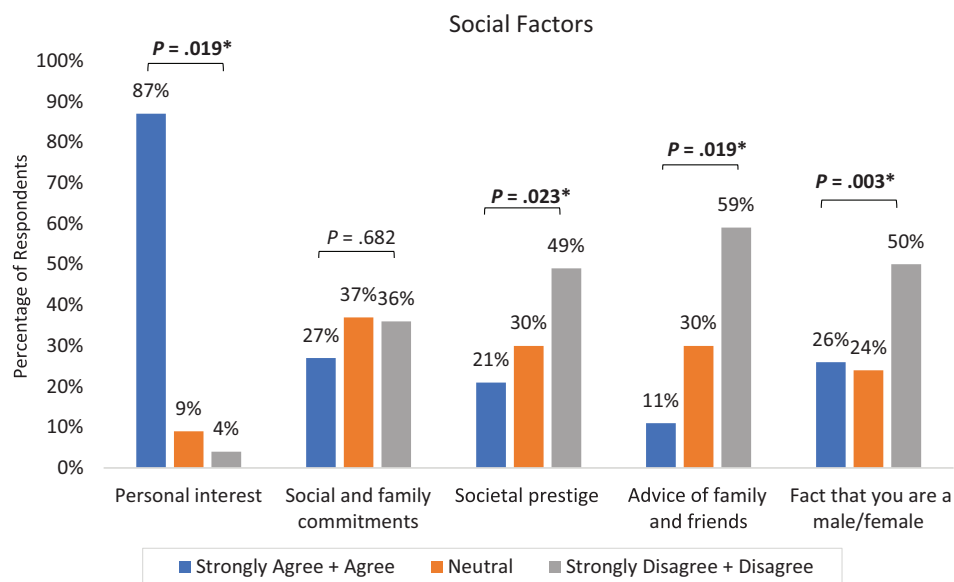


Figure 6. Social factors influencing participants who choose to specialize in sports medicine ($n = 70$). *Statistically significant difference between strongly agree + agree and neutral or strongly disagree + disagree ($P < .05$).

influential factors (role model/mentorship, increased private job opportunities, and expected income rate) were more impactful and specific to the selection of sports medicine as a career.

This study confirms the importance of mentorship and role models, which is in line with prior studies, in which the mentor was deemed influential in determining the subspecialty, enhancing performance, encouraging workforce engagement, and contributing to learning promotion.^{2,3,19} Additionally, in this study, positive financial incentives

such as expected income rate and increased job opportunities in the private sector were considered determining factors for those selecting sports medicine as compared with those who did not. This may potentially correlate with the increase in the general awareness among patients about the specialized field of sports medicine.¹⁶ As the patients seek care from specialized sports medicine orthopaedic surgeons, there is a consequent rise in the job opportunities and scope of the private sector workforce. The same would correlate with the increased incidence of sports injuries due

to increased participation of people in sports activities, even in elderly age groups.²⁴ In addition, several open procedures for joint and ligament surgeries have now been replaced by arthroscopic techniques, which not only have resulted in the development of interest among orthopaedic trainees toward sports medicine career but also have attracted patients.^{7,26} Last, a more recent emergence of sports medicine, especially with the advancement of surgical techniques, arthroscopy, rehabilitation measures, and favorable functional outcomes, potentially contributes to its development and sustainability in terms of income and private sector involvement.⁹ Gaskill et al¹² investigated the financial return of orthopaedic fellowship training by estimating the net present value, internal rate of return, and break-even points and found sports medicine to be one of the specialties yielding positive returns. Morrell et al²⁰ demonstrated an increase in job opportunities available for fellowship-trained orthopaedic surgeons as compared with non-fellowship trained counterparts.

Limitations

This analysis has some limitations. First, it is a cross-sectional and survey-based study; hence, it is subject to all the limitations inherent to this design. Second, the response rate was suboptimal (63%). Thus, this study's findings could under- or overrepresent some questions because of the nonresponse bias. Third, the factors influencing subspecialty choice could change during residency.⁴ Although most trainees decide their career in the third postgraduate year, they may change their minds and eventually not undertake sports medicine as they progress in their training levels and their exposure to other orthopaedic subspecialties increases. Fourth, a high proportion of survey participants (86%) were orthopaedic residents compared with those on fellowships (14%). The relative inexperience of the residents compared with fellowship trainees could potentially affect their career decisions. This disproportion correlates with the uncertainty among 91% of sports medicine group participants who planned to pursue other subspecialties along with sports medicine. Last, the study analyzes the sports medicine preferences among orthopaedic trainees of 1 geographical region, and there can be potential variations in the responses worldwide. Future studies should be conducted on those enrolled in sports medicine fellowship or those who practice it as a sole career for testing the validity of the factors discussed here. Additionally, studies covering different geographic regions would help to better understand the pattern of influential factors in sports medicine globally.

CONCLUSION

Sports medicine is the most coveted specialty among orthopaedic trainees in Saudi Arabia. Financial incentives, role models, and mentorship were found to be the most influential determinants in its selection when compared with other orthopaedic subspecialties. Furthermore, other orthopaedic subspecialties were rarely selected because

sports medicine was so largely favored by the trainees. This information can have useful implications for residency training design, mentorship structuring, and career counseling. Further evidence from different geographical regions would help in better understanding the patterns of factors that influence sports medicine selection across the globe.

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APPENDIX

Table A1
Questionnaire on Fellowship-Influencing Factors

Questions	Responses*				
	1	2	3	4	5
Experience and training-related factors					
Has your experience in your preferred subspecialty during the residency training affected your selection of your planned fellowship?					
Has life experience outside the medicine affected your choice of your planned fellowship?					
Are you planning to strengthen an area of weakness by choosing your planned fellowship?					
Has a role model/mentor you worked with during your residency training affected your choice of fellowship?					
Subspecialty characteristics-related factors					
Has the type of surgical skills practiced in the subspecialty you chose played a role in selecting your fellowship?					
Have patient volume and variety of cases expected to be seen in the chosen subspecialty played any role in your decision?					
Have the disease pathology and type of patient population expected to be seen in your chosen subspecialty played a role in your fellowship selection decision?					
Have the disease prognosis and surgical outcomes observed in the subspecialty you selected played a role in picking your fellowship?					
Work-related factors					
Has your institution/head of department had any role in deciding what will be your fellowship?					
Do your hospital needs affect your fellowship choice?					
Have the expected workload, call responsibilities, lifestyle, and work balance affected your choice of fellowship?					
Has the expected rate of income affected your choice of fellowship?					
Did the private sectors job opportunities affect your choice of fellowship?					
Has the idea of availability and the guarantee of jobs after finishing your fellowship affected your choice of fellowship?					
Social factors					
Has your personal interest in the subspecialty you chose played a role in picking up this fellowship?					
Have your social and family commitments affected your choice of fellowship?					
Did prestige in society affect your choice of fellowship?					
Have family and friends' advice affected your choice of your planned fellowship?					
Has the fact that you are a male/female affected your choice of fellowship?					

*1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree.