The journey of orthopaedic surgery from residency to fellowship: A cross-sectional study in the Gulf Cooperation Council countries

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Objectives: Becoming an Orthopaedic Surgeon is a challenge worldwide. This study attempted to determine the level of training at which orthopaedic surgery is chosen as a career by residents and graduates of Gulf Cooperation Council (GCC) countries. The reasons for choosing this surgical speciality and barriers faced by residents were also explored.

Methods: In this cross-sectional study, a questionnaire was electronically distributed to all GCC orthopaedic surgery residents. All currently enrolled residents and fellows in orthopaedic surgery programmes in KSA, Oman, Kuwait, and Bahrain were invited. Exclusion

Abstract

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Introduction

Clinical specialities, whether medical or surgical, have set several years for the undifferentiated, newly graduated physician to become a full-fledged fellowship-trained physician ready for practice in the clinical arena. In the Gulf Cooperation Council (GCC) Countries, a fresh graduate needs to complete one year of internship rotating through major specialties and electives, while applying to their specialty of choice. Once application processes, selection exams, and interviews are done, interns start their residency training. We recommend increasing the number of orthopaedic surgery subspecialty fellowships, as well as the number of fellowship seats in training programmes. The well-being of orthopaedic surgery residents should also be given consideration.

Keywords: Bahrain; GCC orthopaedic programmes; Kuwait; Oman; KSA

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Results: A total of 275 out of 569 residents responded, a response rate of 48.33%. More than half of the participants (54.5%) chose orthopaedic surgery during their undergraduate studies. Personal interest ranked number one at 61.09%, while parental pressure was found to be the least important reason (0.36%). The majority (88.0%) agreed that orthopaedic surgery was physically demanding, whereas 33.1% wanted to quit orthopaedic surgery. The interest of residents for future subspecialties was mostly in paediatric orthopaedics and sports medicine, as suggested by 16.4% and 16.0%, respectively.

Conclusion: This study showed an alarming number of residents who wanted to quit orthopaedic surgery. The challenges residents faced were burnout, lack of time, limited exposure to teaching hospitals, and limited seats for subspeciality training. We recommend increasing the number of orthopaedic surgery subspecialty fellowships, as well as the number of fellowship seats in training programmes. The well-being of orthopaedic surgery residents should also be given consideration.

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view of factors that are similar and not similar in the training system. They looked at working hours, training patterns, surgeries performed, and the number of years that training entails. The UK had the top number of years of training but the least number of weekly working hours (48), compared to Australia and the United States (US), which had the longest (80 h) hours in training. Shakir et al. debated whether this construct of low hours and long years is beneficial to residents and their families, compared to the shorter duration and longer working hours in the other countries mentioned above.

A study by Alhaqwi AI et al. explored this before highlighting some obstacles in KSA, but no studies have explored this issue GCC-wide. All these questions are worth asking, which is precisely the aim of the authors in this article. This study aims to evaluate the level of training at which junior doctors decide to pursue orthopaedic surgery and the reasons they choose it as a career. It explores their choice of subspecialty and looks at challenges and obstacles residents face during their training. To the best of our knowledge, there has been no study in GCC countries that addresses the above objectives.

Materials and Methods

This is a cross-sectional study based on a questionnaire designed electronically and distributed individually using a web link in October 2017. The population targeted in this survey comprised current residents and fellows. The questionnaire was created through Google forms (Appendix 1) and distributed to residents and fellows registered in orthopaedic accredited programmes, as well as those who had graduated and completed training in the period from 2013 to 2016. We excluded individuals who were not registered, had newly joined, or were in PGY 1 owing to their lack of exposure, which could potentially reflect on the reliability of results. The eligible population who met our study criteria consisted of 569 orthopaedic surgeons in training. We received 275 anonymous responses (48.33% response rate), all of which met the inclusion criteria and were included in the study.

The survey addressed four broad categories. The first category concerned demographic data. The second category explored reasons for choosing orthopaedic surgery. The third category addressed the stage at which residents decided to choose orthopaedic surgery and the reasons associated with it. For example did they choose to become orthopaedic surgeons as medical students, interns, or after working and what were their reasons such as prestige, parental pressure, or self-enthusiasm to achieve. The questions then continued to explore the impact of such a decision on their lives and families, revolving around stress, burnout, exhaustion, sleep deprivation, and positive or negative boost in self-esteem. Burnout was combined with exhaustion as asked by the authors in the questionnaire. Because measuring burnout itself requires another quantitative study, it was assumed that burnout, while a subjective term, can mean different things to different people; there is a universal understanding of reaching one’s limit and feeling overwhelmed beyond one’s capacity. The last category was about fellowship selection, their subspeciality of choice, and what influenced them in their selections. The estimated time to complete the survey was 6–8 min. Two orthopaedic programme directors, three independent biostatisticians, a chief resident, and psychiatrists reviewed the questionnaire for biases, language ease, and clarity. A pilot study was conducted, feedback was collected, minor changes were made, and the final form was drafted and used.

Ethical approval was obtained from the Taibah University Research Ethical Board committee. Everyone who completed the survey consented to participate at the beginning of the survey. They were informed that participation was voluntary and were given the option to decline. All participants consented to participate. Frequent reminders were set up once every two weeks through WhatsApp and email. Our questionnaire was designed using Google forms (Google Inc.). Data collected were then migrated to a CSV file, which was used and analysed with Statistical Package for the Social Sciences program (SPSS), version 22.0 (IBM, Armonk, New York, USA) for descriptive statistics.

Results

The demographic data including the breakdown of responders across gender, response rate, level of residency, and GCC countries including Kuwait, Oman, and KSA (which includes Bahrain) under the Saudi Commission for Health Specialties (SCFHS) are mentioned in Table 1.

The majority (150, 54.50%) of GCC residents decided to enter orthopaedic surgery during their undergraduate studies, while 36 (13.1%) entered after completing the internship, as shown in Figure 1. Moreover, 168 (61.09%) out of 275 participants chose orthopaedic surgery based on their personal interest, 76 (27.63%) chose it because of the

| Table 1: Summary of biographical and associated data. |
|------------------------------------------------------|
| Biographical data                                    | N (%)             |
| Gender                                               |                   |
| Male                                                 | 237 (86.2)        |
| Female                                               | 38 (13.8)         |
| Response rate out of the total targeted population (569) |                   |
| Male (total population size = 521)                   | 237 (45.5%)       |
| Female (total population size = 48)                  | 38 (79.2%)        |
| Qualifying board (275)                               |                   |
| Saudi Commission for Health Specialties (including Bahrain) | 218 (79.3)      |
| Oman Medical Specialty Board                        | 28 (10.2)         |
| Kuwait Institute for Medical Specializations          | 29 (10.5)         |
| Residency training year (275)                        |                   |
| R2                                                   | 61 (22.2)         |
| R3                                                   | 35 (12.7)         |
| R4                                                   | 43 (15.6)         |
| R5                                                   | 36 (13.1)         |
| Board legible                                        | 29 (10.5)         |
| Board certified                                      | 71 (25.8)         |
| Marital status                                       |                   |
| Single                                               | 98 (35.6)         |
| Married                                              | 171 (62.2)        |
| Divorced                                             | 6 (2.2)           |
| Children, if any                                     |                   |
| Yes                                                  | 138 (50.2)        |
| No                                                   | 137 (49.8)        |
Figure 1: Timing of residents’ decisions to join Orthopaedic Surgery Programmes.

Reasons for Joining Orthopedic Surgery Programs among GCC residents

- Personal interest: 39%
- Influenced by a well-known surgeon: 12.10%
- Influenced by TV show: 2.70%
- For the challenge: 27%
- Parental pressure: 0.40%
- Having an Orthopedic Doctor in the family: 3.10%
- Due to the hospital and city resident was placed in: 4.30%
- Because this specialization was available at the...: 5.90%
- Futuristic view on labor market: 15.60%
- Prestige among friends: 9.40%
- Prestige among family members: 8.20%
- Financial Reasons: 16.40%
- Rotation during Internship: 36.70%

Figure 2: Reasons for Joining Orthopaedic Surgery Programmes among GCC residents, in which more than one response was acceptable.

Figure 3: Percentages of residents and their sponsors.
challenge orthopaedic surgery provides, and 46 (16.72%) of residents chose orthopaedics for financial reasons. The residents were less likely to choose orthopaedics under parental pressure 1 (0.36%), as shown in Figure 2, which depicts the possibility of selecting more than one choice in the questionnaire.

The individual Ministries of Health (MOH) of each country in the GCC sponsored a total of 159 (57.80%) residents, while 60 (21.8%) had military/armed forces/national guard sponsorship of their countries, and 31 (11.3%) were affiliated with universities. Self-sponsored accounted for 4 (1.5%), as shown in Figure 3.

A clear majority of 242 (88%) responders agreed that orthopaedic surgery is physically demanding, and 211 (76.7%) reported they were sleeping fewer hours since they joined the programme. Residents who experienced burnout and exhaustion were 190 (69.1%). Most of the participants—214 (77.8%)—answered that their programme had even affected their personal lives in one form or another. There had been some negative impact on 88 (32%) of the participating residents at some point during their residencies.

Ninety-one percent (33.1%) thought of quitting or discontinuing the orthopaedic programme, and 130 (47.3%) of them would not advise their family members to take up orthopaedics as a speciality.

The participants were more likely to choose paediatric orthopaedic and sports medicine (45 (16.4%) and 44 (16%), respectively) for their future careers, while some (38 (13.8%))

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**Percentage of Residents Interested in Subspecialities**

![Percentage of Residents Interested in Subspecialities](image1)

**Figure 4:** Percentages of current residents interested in subspecialities.

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**Orthopedic Fellowships Joined by Graduated Residents**

![Orthopedic Fellowships Joined by Graduated Residents](image2)

**Figure 5:** Number and percentages of residents who joined orthopaedic fellowship programmes.
expressed interest in arthroplasty (Figure 4). Thirty (10.9%) participants were undecided about their future fellowship plans. However, most of the participants chose their subspeciality based on the need for the speciality in their country and the variety of cases seen (see Figure 5).

A total of 127 (46.2%) participants graduated, but only 39 (30.7%) of them joined a fellowship programme after graduation from an orthopaedic residency programme. About 15 of them (38.5%) joined a paediatric orthopaedic fellowship. This percentage is high compared to the current residents’ choice of subspeciality. Among 39 graduates, nine graduates (23.1%) joined the arthroplasty fellowship.

Discussion

The decision to enter the realm of orthopaedic surgery for the majority of GCC orthopaedic residents participating in this study was taken while they were still university students. This shows the importance of proper early exposure to different specialties, which contributes to career choice while medical students are still deciding their future interests. For instance, our participants’ own personal interests in the orthopaedic field were pivotal for joining the orthopaedic surgery programme, and a quarter of our participants stated they chose orthopaedic surgery because of “the challenge” it provides. This would not have existed if they had not been exposed to orthopaedics before. Financial reasons, as well as their futuristic views of the market, also appear to be influential but to a lesser extent, with parental pressure proving to have the least effect on their decisions. A similar question was asked in a Canadian survey by Strelzow et al.7 which reported that collegiality among residents, strong mentoring programmes, orthopaedic surgery being the ‘right fit’, and current resident satisfaction were the highest-ranking factors for why medical students and residents chose orthopaedics.

On the other hand, this passion is not always long-lasting. About one third (91 out of 275 (33.1%)) of the participants considered quitting orthopaedics. PGY3, 10 out 35 (28.5%) being the lowest and Board Legible 13 out of 28 (46.4%) being the highest. The remainder of the participants wanted to quit, and their percentage is shown in Table 2.

Alshammari et al.7 explored barriers affecting female orthopaedic surgeons in the Gulf region. The authors reported that some of the barriers were gender inequality at the workspace, less support from programme directors, burnout, and exhaustion. Aufsés et al.5 investigated the number of surgeons who dropped out of their chosen categorical surgical residencies. Their sample size was 63 male surgeons, of whom 17% dropped out. Of the 78 female surgeons, 25% dropped out, with lifestyle issues being the major factor in this decision. This shows that young surgeons find training physically tiring and are victims of burnout and exhaustion. A large majority in our study (88.0%) admitted that orthopaedics is a physically tiring speciality and that they were sleeping fewer hours since they started the programme (76.7%); 69.2% of the participants experienced burnout and exhaustion.

The number of postgraduate surgical training years and average working hours are similar to those of North America and Australia. The average logged working hours in the GCC orthopaedic residency programmes are 80 h per week. However, in the UK, it takes about eight years to reach a qualifying level; yet, unlike in the GCC, they have restrictions on the number of working hours (48 h per week). Bohm et al.9 reported an average 60–80-h workload for the first two years of residency in the US. These figures steadily decline to 49 h per week when residents reach their 5th year. The study concluded that there was no correlation between Orthopaedic In-training Examination (OITE) scores and increased duty hours. There was, however, a positive correlation between senior resident operating room hours and technical skills scores recorded by faculty assessment. A systematic review noted that the progressive reduction of working hours for doctors-in-training due to restrictions in working hours (48–56 h per week) implemented by North America, the UK, and the European Union has not adversely affected patient care in the US, as illustrated by Moonesinghe et al.10 This generates some questions worth investigating. Should the GCC construct a less time-consuming training schedule with longer training years? Would GCC residents be more enthusiastic about this chance as opposed to the current one? Could this be the answer to less burnout and exhausted residents? Could it improve satisfaction and decrease the percentage of those wishing to quit the programme? Should we adopt the UK system, or should we adopt something in the middle; a six-year programme with a more relaxed number of working hours and more elective rotations in areas such as research, or orthopaedic rotations the resident can select to plan future subspecialization.

It is important to note that 229 (83.3%) confirmed that there had been a positive surge in their self-esteem since they became residents, and orthopaedics had a definitive positive impact on the lives of 221 (80.4%) participants. This is an interesting finding, as it was noted earlier that 91 (33.1%) participants wanted to quit orthopaedic surgery. Residents go through phases of ups and downs in their training depending on the difficulty of rotations, workload, and tough rotations while taking examinations. Perhaps this explains why some residents wanted to quit but changed their minds later or why some residents started with positive energy but later decided to quit. It is extremely important for trainers and residency directors to understand and keep in mind the level and stage of residents when evaluating them.

A survey conducted by Dailey et al.11 across the US, Canada, and Puerto Rico reported that the majority of fellowships taken immediately after graduation were in sports medicine, followed by hand surgery and spine surgery.
In contrast, in a recent study conducted by Bakarman et al.\textsuperscript{12} for Saudi orthopaedic residents and graduates, they noted that most of them opted for fellowships in paediatric orthopaedic surgery and foot and ankle surgery. Interestingly, in our study, which was GCC-wide, the highest percentage also pooled in the field of paediatric orthopaedic surgery.

There are very few fellowship posts in the GCC region, and they are currently available in Riyadh, KSA, only. The Riyadh training institutes offer a relatively small albeit diverse number of fellowship posts in paediatric orthopaedic surgery, musculoskeletal oncology, arthroplasty, sports medicine, and spine and trauma. Saudi residents report that the educational system is already overcrowded, and the number of GCC residents who began fellowships after graduation is low, owing to the lack of fellowship opportunities in GCC countries. Not only is the number of fellowship opportunities low but some available fellowships are not even accredited by the SCHS.

GCC graduates face different challenges compared to graduates from other parts of the world. North American, British, and EU graduates primarily need to pass their board exams and the requirements set by their board to qualify and complete their residency and fellowship programmes. GCC graduates need to pass their own board exams, oral exams, viva voce, and OSCEs, and they also need to sit through international exams and pass with high averages to get a seat for international fellowships. Exams such as the Membership of the Royal College of Surgeons (MRCS) examination, Medical Council of Canada Evaluating Examination (MCCEE), United States Medical Licensing Examination (USMLE), and so on.

Some North American programmes offer fellowships as part of their residency package, whereas in the GCC this is nonexistent. If this can be initiated, it will make residents' career paths easier.

Limitations

The study is the first of its kind in the region, and hence we did not have a comparative platform. Our response rate was only 48.33%, despite our generous response period, reminders, and easy access survey, which was distributed through the WhatsApp application, a widely used application by residents in the GCC, as well as through emails.

Recommendations

We strongly recommend that the GCC training programmes investigate the factors that attract applicants to orthopaedic surgery in the GCC countries. There should be a region-wide survey that aims to discover subspeciality deficits and generate solutions to cover them if found. There is also a need to increase the number of fellowships offered in the region to accommodate the number of postgraduates in the GCC orthopaedic programmes, to compensate for population demands and reduced chances of fellowships abroad.

We recommend that residency directors frequently look at and update the curricula, which must be competency-based. Also, they should consider programmes with more working hours and short residency periods, fewer working hours with extended residency periods, or perhaps a combination of both. We recommend that SCHS look at similar issues in other programmes also, to identify the reasons for burnout and exhaustion. This could answer the question of why we found a high percentage of board legible surgeons wanting to quit, a high burnout rate, and one third of residents in training wanting to quit orthopaedics. We recommend that residency directors implement an exhaustion prevention policy to identify and care for residents at risk. Frequent sessions of time-management, exercise, and healthy lifestyle should be encouraged, perhaps along with an approachable wellness unit that could guide residents who are vulnerable and at risk. Another recommendation for residents at risk is to take time off or to look into their rotation schedules if they find them hectic, alternating less demanding rotations with more demanding rotations.

Conclusion

The highest-ranking reasons among factors influencing the choice of a career in orthopaedics were early exposure, personal interest, “the challenge” of orthopaedics, and futuristic views of the labour market. It was also noted that long working hours and a lack of free time were the most common denominators when reporting negative views of their residency programmes. There was a high percentage of participants wanting to quit orthopaedic surgery.

There is an evident issue of fewer seats for local subspeciality applications. With accumulating graduates of orthopaedic surgery each year, the challenge is for new graduates to obtain a seat.

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Conflict of interest

The authors have no conflict of interest to declare.

Ethical approval

None declared.

Authors’ contributions

All authors participated in conceiving and designing the study, reviewing the literature, and collecting and analysing the data. MOS, AFK, and ANA prepared the manuscript. Authors testify that all persons designated as authors qualify for authorship and have checked the article for plagiarism. If plagiarism is detected, all authors will be held equally responsible and will bear the resulting sanctions imposed by the journal thereafter. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.
Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jtumed.2019.02.005.

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