Original Article

# The determining factors of medical students in considering a specialty as a future career path: A cross-sectional multinational study in the Middle East

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## Abstract

**Background and Aims:** Throughout their years of study, undergraduate medical students are expected to gain broad comprehension of all medical specialties. After acquiring an undergraduate degree, the decision to choose a specialty is critical for every student's life as it determines the rest of their career path. This study aims to determine factors influencing medical students' choices between various specialties in different countries in the Middle East and North Africa. **Subjects and Methods:** A cross-sectional study was conducted in March 2022 targeting medical students from the Middle East and North African countries. A questionnaire was used to collect data from the students, which consisted of four sections. Ethical approval was obtained from the Unit of Biomedical Ethics Research Committee at King Abdulaziz University. Participation was voluntary and anonymous. For statistical analysis, IBM Statistical Package for the Social Sciences (SPSS) Statistics for Windows (Version 21.0; IBM Corp., Armonk, NY, USA) was used. Categorical variables were presented using numbers, associated frequencies, and percentages (%). Categorical variables were correlated using the Chi-square test. One-way analysis of variance (ANOVA) test was used to compare the means of three or more independent groups. Logistic regression, odds ratio (OR), and 95% confidence interval (CI) were used to identify the factors associated with specialty selection. $P < 0.05$ was considered statistically significant. **Results:** A total of 1109 students responded to the questionnaire. Participants' gender characteristics showed that there were 672 (60.6%) females and 437 (39.4%) males. Among them, 127 were in their second year, 180 in their third year, 362 in their fourth year, 85 in their fifth year, 37 in their sixth year, and 108 were interns. The median age of the participants was 22.0 years (mean = 22.09 ± 2.891). There were 473 (42.6%) students who were undecided about their future medical specialty. Income (759, 68.4%) and career prospects (723, 65.2%) were the most preferred factors in their decision to pursue a future medical specialization. **Conclusions:** In conclusion, medical and surgical specialties have been identified as the preferred future career path. It was discovered that student's decision-making is influenced by income, career prospects, and the sense of competency needed to choose a future medical specialty. Future research would be more revealing.

**Keywords:** Influencing factor, medical student, postgraduate specialty, specialty choice, undergraduate medical education

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**Received:** 31-08-2022 **Revised:** 14-12-2022
**Accepted:** 03-05-2023 **Published:** 21-11-2023

**Access this article online**

Quick Response Code:

**Website:** http://journals.lww.com/JFMPC

**DOI:** 10.4103/jfmpc.jfmpc_1742_22



**How to cite this article:** Alyazidi AS, Gaddoury MA, Alotibi FA, Aljehani KM, Ahmed RA, Alhudaifi SA, *et al.* The determining factors of medical students in considering a specialty as a future career path: A cross-sectional multinational study in the Middle East. J Family Med Prim Care 2023;12:2622-34.

## Introduction

The journey in medical education begins with exposure to all the fields' subjects. Throughout the academic years of study, students are expected to gain broad comprehension of all medical specialties. To name a few, internal medicine, general surgery, obstetrics and gynecology (Ob/Gyn), and pediatrics. After acquiring an undergraduate degree, the decision to choose a specialty is critical for every student's life as it determines their future career path. Hence, it will not only involve what medical field they will study after their undergraduate degree, but also what they will practice probably for the rest of their lives. Multiple factors have been found to influence the career path chosen by medical students, and for the majority of them, it is a continuous process.[1] For instance, the choices of medical students for their postgraduate careers are fundamentally affected by the awareness of policymakers on students' avoidance of certain specialties. In the case of choosing surgery, for instance, several studies suggested that the number of medical students choosing this specialty as their postgraduate career is declining in several places around the world.[2-6] On this note, the present study's findings will be useful in guiding policymakers' desire to encourage more medical graduates to choose specialties that are currently underrepresented in the workforce, resulting in a more balanced distribution of specialist physicians.[7] Furthermore, lack of knowledge regarding the factors that may need to be considered before choosing a specialty, as well as hesitancy and uncertainty as to whether it is the proper specialty or otherwise could lead to a change of specialty in the middle of a residency program, resulting in financial, logistical, and time losses.[1,8] Most studies revealed that the decision to choose a specialty is influenced mainly by personal factors (PEF; public perception and prestige, instructor impact, family/outside influences, personal preference, personal development, money and financial worries, personal philosophy, decision-making time, undergraduate experience, negative impressions, and gender issues) and professional factors (PRF; residency and training concerns, working hours, work setting, extracurricular activities, work culture, and colleagues). These two factors are among the most important influencing factors for choosing a medical specialty.[1,7,9,10] According to a survey in Turkey, the ability to diagnose and treat disease and the willingness to help people were ranked as the most important factors in determining a specialty.[11] Moreover, a previous study in the USA showed that no single factor impacts a student's decision to choose a primary care compared to a non-primary care specialty.[12] Previous work globally has primarily focused on stating the primary factors that medical students consider when choosing their medical specialty in a specific region, rather than comparing demographic differences and noteworthy factors among multinational students that have not been addressed before, including their religion, nationality, place of study, age, year of study, monthly household income, current grade point average (GPA), marital status, language of study, family conditions, and other demographic and personal characteristics. In addition, the importance of the presented study lies in the absence of any literature discussing the influencing factors in choosing a medical specialty in the Middle East and North Africa (MENA) region and to what extent it differs from one country to another. The present study was performed on a border-crossing multinational scale from January 2022 to March 2022. This study aims to determine the factors affecting medical students' choices between various specialties among different countries in the MENA region and identify the PEF and PRF.

## Subjects and Methods

### Study design/setting

A cross-sectional analytical study was conducted in March 2022, targeting medical students from multiple MENA countries. Data were collected using an electronic, self-administered questionnaire through Google Forms. The study was conducted in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline for cross-sectional studies. The study adhered to the World Medical Association Declaration of Helsinki.

### Population and sampling

The targeted population included undergraduate medical students at various academic levels, including internship years in the following countries: Saudi Arabia, Yemen, Sudan, Lebanon, Oman, Egypt, and others. Only undergraduate medical students in these countries, regardless of their nationality and ethnicity, were included in this study. The sample size was calculated using the sample calculator software developed by Raosoft Inc (Seattle, WA, USA). The sample ensured a 95% confidence interval (CI) with a margin of error of <0.05. A questionnaire consisted of 20 questions and was titled "The Determining Factors of Medical Students in Considering a Specialty as a Future Career Path: A Cross-sectional Multinational Study in the Middle East." It was distributed using the cluster sampling method. A single medical college was chosen randomly in each country. The questionnaire was sent using a Google Form link to the batch leaders and was distributed among their batch WhatsApp groups.

### Data collection tool

The questionnaire consisted of five sections. Section 1 included a consent statement whereby the study participants acknowledged that their information would be utilized for research purposes and confirmed to be within the targeted population. Section 2 identified personal and demographic data, which included year of birth, gender, nationality, place of study, religion, current year of study, language of study, GPA, marital status, having a parent or a sibling who is a medical physician, number of family members, and monthly household income. Section 3 aimed to evaluate factors considered influential when choosing a specialty using the PRF, which were used to assess the professional score (PRS), and PEF, which were used to assess the personal score (PES). The factors assessed were income, workload, career prospect, advice from a practicing doctor(s), lack of local experts in the field, length and difficulty of the training period, challenging nature of the field, work-related hazards,

continuous care and extent of patient contact, presence of night call, social prestige, personal experience, number and type of patients served, advice from parents or family, advice from friends or seniors, less working hours for more free time, less work pressure and better quality of time, possession of required competency, academic or teaching opportunities, participation in research, and ability to immigrate. The factors were validated by Chew *et al.*,[9] Grasreiner *et al.*,[10] and Chang *et al.*[7] Section 4 determined the preferred future career specialty, which included: internal medicine (including cardiology, gastroenterology, and infectious diseases), surgery (including general surgery, neurosurgery, vascular surgery, and urology), orthopedic surgery, plastic surgery, pediatrics, Ob/Gyn, neurology, ophthalmology, otorhinolaryngology (ENT), dermatology, emergency medicine, anesthesiology, psychiatry, family medicine, preventive medicine, public health, radiology, laboratory medicine, basic science, and still undecided. The classification was based on the study's objectives and previous literature classification.[10] Section 5 aimed to evaluate the participants' specialty-related activity by asking if they attended a lecture or workshop related to their chosen specialty, took an elective clinical training related to their chosen specialty, volunteered or enrolled in any extracurricular/social activities related to their chosen specialty, spoke to a practicing doctor who works in their desired field, or if they had participated in any research activity related to the specialty they chose. The questionnaire was pretested among 30 students to ensure the questions' clarity, accuracy, and consistency. The pretested group of students included students within the study's targeted population. The scientific team assessed the pretest group's consistency and understanding of the completed questionnaires.

## Statistical analysis

Data analysis was performed using Statistical Package for the Social Sciences (SPSS) version 21 (IBM Corp. released 2011, IBM SPSS Statistics for Windows, version 21.0; IBM Corp., Armonk, NY, USA). Frequencies and percentages (%) were used to describe categorical variables, while mean and standard deviation were used to describe continuous variables. One-way analysis of variance (ANOVA) test was used to compare the means of three or more independent groups. Logistic regression, odds ratio (OR), and 95% CI were used to identify the factors associated with specialty selection. $P < 0.05$ was considered statistically significant.

## Ethical consideration

The study received ethical approval from the Unit of Biomedical Ethics Research Committee at King Abdulaziz University with a reference number of 63-22. Participation was voluntary and anonymous. All potential participants were informed about the aim of the study before participation and were able to withdraw at any point during their participation. Moreover, through the invitation to participate in the study, an online written consent was taken from each participant. Collaborators adhered to the ethical requirements of their institute.

# Results

## Demographic characteristics and response rate

Demographic characteristics of the participating medical students according to their nationality are presented in Table 1 and illustrated in Figure 1. From all the countries we included in the study, 1109 students responded to the questionnaire, all of which were included. Participants with missing data were excluded from the study. Participants' gender characteristics showed that there were 672 (60.6%) females and 437 (39.4%) males. Furthermore, the participants' academic years were divided into seven academic years, with 210 medical students in their first year, 127 in their second year, 180 in their third year, 362 in their fourth year, 85 in their fifth year, 37 in their sixth year, and 108 were interns. The median age of the participants was 22.0 years (mean = 22.09 ± 2.891). Only 86 (7.8%) of the participants had a single or both parents who were medical doctors, whereas 239 (21.6%) had a sibling who was a medical doctor [Figure 2].

**Table 1: Demographic characteristics of the participants presented as frequency (%)**

| Demographic characteristics | Male (*n*=437) | Female (*n*=672) | Total (*n*=1109) |
|---|---|---|---|
| Nationality | | | |
| Saudi Arabia | 158 (36.2%) | 279 (41.5%) | 437 (39.4%) |
| Sudan | 61 (14.0%) | 154 (22.9%) | 215 (19.4%) |
| Egypt | 44 (10.1%) | 61 (9.1%) | 105 (9.5%) |
| Lebanon | 52 (11.9%) | 72 (10.7%) | 124 (11.2%) |
| Yemen | 70 (16.0%) | 53 (7.9%) | 123 (11.1%) |
| Oman | 27 (6.2%) | 36 (5.4%) | 63 (5.7%) |
| Jordan | 4 (0.9%) | 1 (0.1%) | 5 (0.5%) |
| Algeria | 2 (0.5%) | | 2 (0.2%) |
| Palestine | 0 (0.0%) | 3 (0.4%) | 3 (0.3%) |
| Syria | 16 (3.7%) | 4 (0.6%) | 20 (1.8%) |
| Somalia | 2 (0.5%) | | 2 (0.2%) |
| Religion | | | |
| Muslim | 379 (86.7%) | 591 (87.9%) | 970 (87.5%) |
| Non-Muslim | 58 (13.3%) | 81 (12.1%) | 139 (12.5%) |
| Current year of study | | | |
| First year | 32 (7.3%) | 178 (26.5%) | 210 (18.9%) |
| Second year | 44 (10.1%) | 83 (12.4%) | 127 (11.5%) |
| Third year | 65 (14.9%) | 115 (17.1%) | 180 (16.2%) |
| Fourth year | 175 (40.0%) | 187 (27.8%) | 362 (32.6%) |
| Fifth year | 44 (10.1%) | 41 (6.1%) | 85 (7.7%) |
| Sixth year | 16 (3.7%) | 21 (3.1%) | 37 (3.3%) |
| Internship | 61 (14.0%) | 47 (7.0%) | 109 (9.7%) |
| Age (years) | | | |
| <23 | 305 (69.8%) | 561 (83.5%) | 866 (78.1%) |
| 23–25 | 94 (21.5%) | 88 (13.1%) | 182 (16.4%) |
| >26 | 38 (8.7%) | 23 (3.4%) | 61 (5.5%) |
| Current GPA | | | |
| A or A+ | 174 (39.8%) | 307 (45.7%) | 481 (43.4%) |
| B or B+ | 186 (42.6%) | 259 (38.5%) | 445 (40.1%) |
| C or C+ | 18 (4.1%) | 25 (3.7%) | 43 (3.9%) |
| D or D+ | 59 (13.5%) | 81 (12.1%) | 140 (12.6%) |
| Parents' occupation | | | |
| Doctor | 39 (8.9%) | 47 (7.0%) | |
| Other | 398 (91.9%) | 625 (93.0)% | |

GPA = grade point average

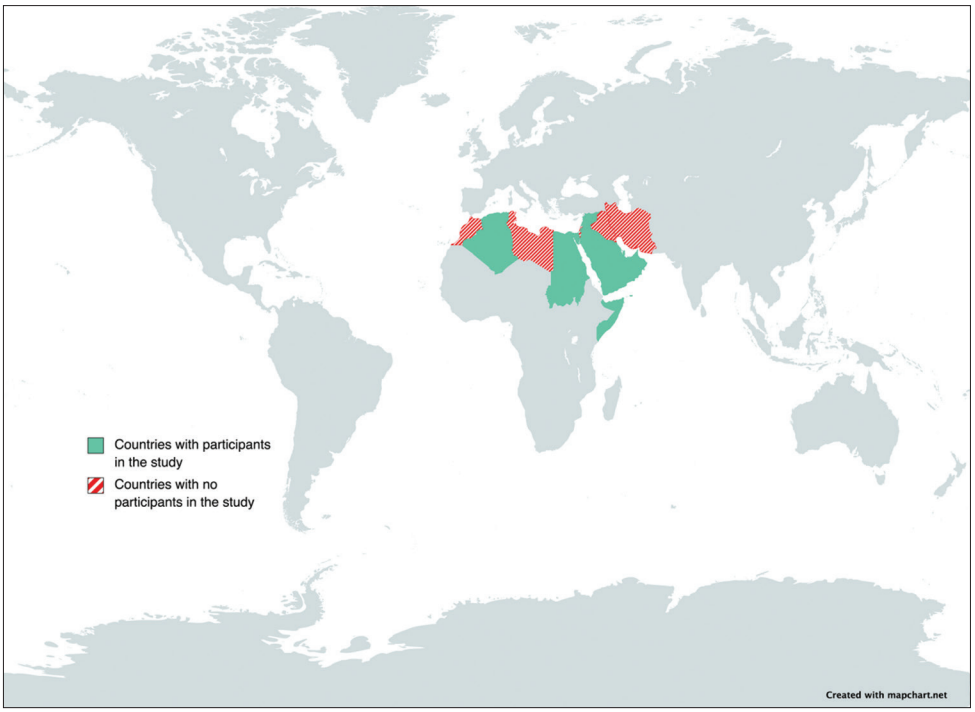


**Figure 1:** World map according to the participants' country of study. Map projection was set according to Gall's stereographic cylindrical projection

## Choice of specialty

Out of the 1109 respondents, 473 (42.6%) were undecided about their future medical specialty. Surgical specialties were the most chosen after undecided and others. Also, it was chosen by (232, 58%) females more frequently than by males (168, 42%). Moreover, internal medicine specialties were chosen by females (100, 64.1%) more frequently than males (56, 35.9%). Surgical specializations were selected by 46 (21.4%) Sudanese students, which was above internal medicine specialties that were chosen by 30 (14%) Sudanese students. Also, Yemeni students favored surgical specialties (34, 27.6%) over internal medicine specialties (15, 12.2%). Saudi students were the only ones to choose psychiatry as a specialty, with 33 (75%) females and just 11 (25%) males choosing it.

## Factors influencing the choice of specialty

Regarding the factors that would impact a student's decision on their future medical specialization, we surveyed participants about certain factors that would influence their decision. Income (759, 68.4%), career prospects (723, 65.2%), and the possession of competency (531, 47.9%) were the most preferred factors in their decision to pursue a future medical specialization. The presence of a work-related hazard (138, 12.4%) and no night calls (167, 15.1%) were the least preferred factors. Other data are presented in Table 2**.**

## Medicine

Medical students choosing medical specialty had a significant relationship with income (OR 1.993, 95% CI 1.246–3.186, $P = 0.004$), length and difficulty of training (OR 2.211, 95% CI 1.295–3.776, $P = 0.004$), workload (OR 2.465, 95% CI 1.1488–4.084, $P = 0.000$), no night calls (OR 2.889, 95% CI 1.481–5.635, $P = 0.002$), social prestige (OR 1.501, 95% CI 1.032–2.183, $P = 0.033$), advice from parents or family (OR 1.924, 95% CI 1.131–3.274, $P = 0.016$), advice from friends or seniors (OR 3.344, 95% CI 1.583–7.065, $P = 0.002$), less working hours for more free time (OR 3.035, 95% CI 1.509–6.104, $P = 0.002$), and less working pressure for more free time (OR 1.846, 95% CI 1.038–3.283, $P = 0.037$). Other factors like lack of experts ($P = 0.056$), advice from practicing doctor ($P = 0.469$), personal experience ($P = 0.521$), and participation in research ($P = 0.081$) were statistically insignificant. Other values are detailed in Table 3.

## Surgery

Professional associated factors, such as workload (OR 1.824, 95% CI 1.223–2.719, $P = 0.003$), career prospects (OR 1.496, 95% CI 1.054–2.122, $P = 0.024$), advice from a practicing doctor (OR 1.771, 95% CI 1.210–2.502, $P = 0.003$), and no night calls (OR 1.461, 95% CI 1.046–2.040, $P = 0.026$) were significant. On the other hand, personal variables such as number and type of patients served (OR 1.764, 95% CI 1.122–2.773, $P = 0.014$), less working hours for more free time (OR 1.912, 95% CI 1.195–3.061, $P = 0.007$), and being able to immigrate (OR 2.639, 95% CI 1.804–3.862, $P = 0.000$) were also significant. However, income ($P = 0.973$), length and difficulty of training ($P = 0.360$), very challenging nature of the field ($P = 0.726$), social prestige ($P = 0.815$), and possession of company needed ($P = 0.157$) were not statically significant. Other values are detailed in Table 3.

## Undecided and other

In the group of participants who were undecided and those who chose ot her specialties including psychiatric, preventive,

**Table 2: Specialty preference according to the gender and country of study variables**

| Specialty | Male (*n*=437) | Female (*n*=672) | Saudi Arabia (*n*=437) | Sudan (*n*=215) | Lebanon (*n*=124) | Yemen (*n*=123) | Others (*n*=210) |
|---|---|---|---|---|---|---|---|
| Medicine | | | | | | | |
| Internal medicine | 51 (11.7%) | 71 (10.6%) | 67 (15.3%) | 30 (14.0%) | 4 (3.2%) | 15 (12.2%) | 6 (0.9%) |
| Pediatrics | 2 (0.5%) | 14 (2.1%) | 16 (3.7%) | | | | |
| Neurology | | | | | | | |
| Dermatology | | | | | | | |
| Emergency | | | | | | | |
| Family Medicine | 3 (0.7%) | 15 (2.2%) | 18 (4.1%) | | | | |
| Surgery | | | | | | | |
| General surgery | 130 (29.7%) | 177 (26.3%) | 134 (30.7%) | 46 (21.4%) | 24 (19.4%) | 34 (27.6%) | 69 (32.8%) |
| Plastic surgery | 2 (0.5%) | 4 (0.6%) | 6 (1.4%) | | | | |
| Orthopedic surgery | | | | | | | |
| Ob/Gyn | 22 (5.0%) | 39 (5.8%) | 61 (14.0%) | | | | |
| ENT | 9 (2.1%) | 8 (1.2%) | 17 (3.9%) | | | | |
| Anesthesiology | 5 (1.1%) | 4 (0.6%) | 9 (2.1%) | | | | |
| Psychiatry | | | | | | | |
| Psychiatry | 11 (2.5%) | 33 (4.9%) | 44 (10.1%) | | | | |
| Diagnostic | | | | | | | |
| Radiology | 4 (0.9%) | 3 (0.4%) | 7 (1.6%) | | | | |
| Laboratory medicine | | | | | | | |
| Preventive | | | | | | | |
| Public health | 3 (0.7%) | 3 (0.4%) | 6 (1.4%) | | | | |
| Preventive medicine | 4 (0.9%) | 4 (0.6%) | 8 (1.8%) | | | | |
| Basic | | | | | | | |
| Basic sciences | | 2 (0.3%) | 2 (0.5%) | | | | |
| Undecided | | | | | | | |
| Undecided | 190 (43.5%) | 283 (42.1%) | 36 (8.2%) | 139 (64.7%) | 96 (77.4%) | 74 (60.2%) | 128 (50.9%) |
| Other | 1 (0.2%) | 12 (1.8%) | 6 (1.4%) | | | | 7 (3.3%) |

**Table 3: Frequency of influencing factors**

| Influencing factors | Yes | No |
|---|---|---|
| Income | 759 (68.4%) | 350 (31.6%) |
| Workload | 377 (34.0%) | 732 (66.0%) |
| Career prospects | 723 (65.2%) | 386 (34.8%) |
| Advice from practicing doctor | 291 (26.2%) | 818 (73.8%) |
| Lack of experts | 322 (29.0%) | 787 (71.0%) |
| Length and difficulty of training period | 329 (29.7%) | 780 (70.3%) |
| Very challenging nature of this field | 275 (24.8%) | 834 (75.2%) |
| Work-related hazards | 138 (12.4%) | 971 (87.6%) |
| Continuous care and extent of patients' contact | 187 (16.9%) | 922 (83.1%) |
| No night calls | 167 (15.1%) | 942 (84.9%) |
| Social prestige | 261 (23.6%) | 846 (76.4%) |
| Personal experience | 310 (28.0%) | 799 (72.0%) |
| Number and type of patients served | 194 (17.5%) | 913 (82.5%) |
| Advice from parents/family | 336 (30.3%) | 773 (69.7%) |
| Advice from friends/seniors | 236 (21.3%) | 873 (78.7%) |
| Less working hours to spend time with family | 272 (24.5%) | 837 (75.5%) |
| Less work pressure and better quality of life | 348 (31.4%) | 759 (68.6%) |
| Possession of competency needed | 531 (47.9%) | 578 (52.1%) |
| Academic or teaching opportunity | 220 (19.8%) | 889 (80.2%) |
| Participation in research | 271 (24.4%) | 838 (75.6%) |
| To be able to immigrate | 305 (27.5%) | 804 (72.5%) |

and diagnostic specialties, advice from practicing doctor (OR 0.636, 95% CI 0.485–0.834, $P = 0.001$), length and difficulty (OR 1.365, 95% CI 1.054–1.768, $P = 0.018$), work-related hazards (OR 2.274, 95% CI 1.352–3.824, $P = 0.002$), no night calls (OR 0.647, 95% CI 0.463–0.904, $P = 0.010$), number and type of patients (OR 0.687, 95% CI 0.502–0.940, $P = 0.018$), possession of competency needed (OR 1.414, 95% CI 1.014–1.971, $P = 0.041$), and being able to immigrate (OR 2.518, 95% CI 1.711–3.705, $P = 0.000$) were the significant factors. Other values are detailed in Table 3.

## Univariate analysis

On conducting a univariate analysis [Table 4], males were found to have a higher mean professional score (PRS) (3.28 ± 1.8 standard deviation [SD]) than females (3.18 ± 2.0 SD), whereas the personal and knowledge scores of females (3.08 ± 2.2 SD and 1.91 ± 1.5 SD, respectively) were higher than those of males (2.78 ± 2.1 SD and 1.91 ± 1.5 SD, respectively). Moreover, students with an average GPA of A or A + self-reported a lower knowledge score (1.74 ± 1.3 SD) than those with an average GPA of D or D+ (1.81 ± 1.4 SD). With a $P$ value of 0.118, females had a higher mean total score (8.2 ± 3.9 SD) than males (7.8 ± 3.9 SD). The ANOVA test was used to examine the association between the scores and the average GPA. There was a statistically significant relationship between the professional score

**Table 4: Logistic regression for influencing factors and preferred specialties**

| | Influencing factors | *P* | Crude odds ratio | 95% confidence interval | | *P* | Adjusted odds ratio | 95% confidence interval | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Lower value | Upper value | | | Lower value | Upper value |
| Medicine | Income | 0.149 | 0.771 | 0.541 | 1.098 | 0.004 | 1.993 | 1.246 | 3.186 |
| | Workload | 0.204 | 1.254 | 0.884 | 1.779 | 0.000 | 2.465 | 1.488 | 4.084 |
| | Career prospects | 0.899 | 0.977 | 0.686 | 1.393 | 0.013 | 1.754 | 1.126 | 2.732 |
| | Advice from practicing doctor | 0.440 | 0.856 | 0.576 | 1.271 | 0.469 | 0.826 | 0.491 | 1.387 |
| | Lack of experts | 0.050 | 0.671 | 0.450 | 1.002 | 0.056 | 0.601 | 0.356 | 1.012 |
| | Length and difficulty | 0.002 | 0.521 | 0.342 | 0.793 | 0.004 | 2.211 | 1.295 | 3.776 |
| | Very challenging nature | 0.461 | 0.859 | 0.574 | 1.287 | 0.938 | 1.021 | 0.607 | 1.716 |
| | Work-related hazards | 0.712 | 0.905 | 0.534 | 1.534 | 0.291 | 1.439 | 0.733 | 2.825 |
| | Continuous care of the patients | 0.221 | 0.737 | 0.452 | 1.203 | 0.934 | 1.026 | 0.555 | 1.899 |
| | No night calls | 0.545 | 1.152 | 0.729 | 1.820 | 0.002 | 2.889 | 1.481 | 5.636 |
| | Social prestige | 0.033 | 1.501 | 1.032 | 2.183 | 0.122 | 1.469 | 0.903 | 2.390 |
| | Personal experience | 0.940 | 1.015 | 0.696 | 1.478 | 0.521 | 1.173 | 0.720 | 1.910 |
| | Number and type of patients | 0.324 | 0.789 | 0.492 | 1.265 | 0.406 | 0.764 | 0.406 | 1.440 |
| | Advice from parents/family | 0.744 | 1.063 | 0.737 | 1.531 | 0.016 | 1.924 | 1.131 | 3.274 |
| | Advice from friends/seniors | 0.003 | 0.470 | 0.284 | 0.778 | 0.002 | 3.344 | 1.583 | 7.065 |
| | Less working hours for more free time | 0.024 | 0.605 | 0.390 | 0.939 | 0.002 | 3.035 | 1.509 | 6.104 |
| | Less working pressure | 0.009 | 0.590 | 0.395 | 0.879 | 0.037 | 1.846 | 1.038 | 3.283 |
| | Possession of competency needed | 0.690 | 1.071 | 0.764 | 1.503 | 0.566 | 1.132 | 0.741 | 1.731 |
| | Academic or teaching opportunity | 0.991 | 1.002 | 0.656 | 1.532 | 0.298 | 0.733 | 0.409 | 1.315 |
| | Participation in research | 0.237 | 1.256 | 0.860 | 1.836 | 0.081 | 1.595 | 0.944 | 2.694 |
| | To be able to immigrate | 0.126 | 0.732 | 0.490 | 1.093 | 0.726 | 0.913 | 0.550 | 1.517 |
| Surgery | Income | 0.710 | 0.951 | 0.731 | 1.238 | 0.973 | 0.994 | 0.692 | 1.427 |
| | Workload | 0.114 | 0.810 | 0.623 | 1.052 | 0.003 | 1.824 | 1.223 | 2.719 |
| | Career prospects | 0.716 | 0.953 | 0.737 | 1.233 | 0.024 | 1.496 | 1.054 | 2.122 |
| | Advice from practicing doctor | 0.000 | 1.737 | 1.322 | 2.283 | 0.003 | 1.771 | 1.210 | 2.592 |
| | Lack of experts | 0.768 | 0.960 | 0.732 | 1.259 | 0.952 | 1.011 | 0.704 | 1.452 |
| | Length and difficulty | 0.820 | 0.969 | 0.741 | 1.268 | 0.360 | 1.189 | 0.821 | 1.722 |
| | Very challenging nature | 0.906 | 1.017 | 0.766 | 1.351 | 0.726 | 1.076 | 0.716 | 1.616 |
| | Work-related hazards | 0.274 | 0.809 | 0.552 | 1.184 | 0.001 | 2.483 | 1.435 | 4.296 |
| | Continuous care of the parents | 0.054 | 1.370 | 0.994 | 1.886 | 0.962 | 0.989 | 0.623 | 1.569 |
| | No night calls | 0.026 | 1.461 | 1.046 | 2.040 | 0.525 | 0.857 | 0.533 | 1.379 |
| | Social prestige | 0.891 | 1.020 | 0.765 | 1.362 | 0.815 | 1.048 | 0.711 | 1.544 |
| | Personal experience | 0.276 | 0.858 | 0.651 | 1.131 | 0.043 | 0.680 | 0.468 | 0.988 |
| | Number and type of patients | 0.002 | 1.657 | 1.210 | 2.268 | 0.014 | 1.764 | 1.122 | 2.773 |
| | Advice from parents/family | 0.073 | 0.780 | 0.595 | 1.023 | 0.210 | 0.768 | 0.509 | 1.160 |
| | Advice from friends/seniors | 0.553 | 1.094 | 0.813 | 1.473 | 0.109 | 1.439 | 0.922 | 2.245 |
| | Less working hours for more free time | 0.030 | 1.362 | 1.029 | 1.802 | 0.007 | 1.912 | 1.195 | 3.061 |
| | Less working pressure | 0.011 | 1.403 | 1.081 | 1.822 | 0.928 | 0.981 | 0.639 | 1.504 |
| | Possession of competency needed | 0.092 | 1.235 | 0.966 | 1.579 | 0.157 | 1.274 | 0.911 | 1.782 |
| | Academic or teaching opportunity | 0.401 | 0.875 | 0.641 | 1.195 | 1.000 | 1.000 | 0.637 | 1.571 |
| | Participation in research | 0.855 | 1.027 | 0.772 | 1.365 | 0.376 | 0.836 | 0.563 | 1.243 |
| | To be able to immigrate | 0.000 | 2.313 | 1.766 | 3.030 | 0.000 | 2.639 | 1.804 | 3.862 |
| Psychiatry | Income | 0.001 | 0.368 | 0.200 | 0.675 | 0.013 | 7.024 | 1.508 | 32.730 |
| | Workload | 0.337 | 0.719 | 0.366 | 1.413 | 0.135 | 0.277 | 0.051 | 1.494 |
| | Career prospects | 0.001 | 0.354 | 0.191 | 0.653 | 0.141 | 0.265 | 0.045 | 1.556 |
| | Advice from practicing doctor | 0.052 | 0.432 | 0.181 | 1.033 | 0.025 | 0.104 | 0.014 | 0.751 |
| | Lack of experts | 0.793 | 0.913 | 0.464 | 1.796 | 0.116 | 3.609 | 0.727 | 17.914 |
| | Length and difficulty | 0.019 | 2.039 | 1.110 | 3.745 | 0.000 | 0.000 | 0.000 | - |
| | Very challenging nature | 0.496 | 0.772 | 0.366 | 1.628 | 0.148 | 0.152 | 0.012 | 1.952 |
| | Work-related hazards | 0.249 | 0.504 | 0.154 | 1.650 | 0.006 | 0.012 | 0.000 | 0.289 |
| | Continuous care of the parents | 0.002 | - | - | - | 0.989 | 0.000 | 0.000 | . |
| | No night calls | 0.484 | 0.715 | 0.278 | 1.840 | 0.022 | 0.076 | 0.008 | 0.691 |
| | Social prestige | 0.619 | 0.828 | 0.392 | 1.745 | 0.304 | 0.431 | 0.087 | 2.146 |

*Contd...*

**Table 4: Contd...**

| | Influencing factors | *P* | Crude odds ratio | 95% confidence interval | | *P* | Adjusted odds ratio | 95% confidence interval | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Lower value | Upper value | | | Lower value | Upper value |
| | Personal experience | 0.258 | 0.653 | 0.310 | 1.374 | 0.027 | 0.084 | 0.009 | 0.750 |
| | Number and type of patients | 0.489 | 0.735 | 0.306 | 1.763 | 0.393 | 2.607 | 0.289 | 23.480 |
| | Advice from parents/family | 0.000 | - | - | - | 0.984 | 0.000 | 0.000 | . |
| | Advice from friends/seniors | 0.000 | - | - | - | 0.985 | 0.000 | 0.000 | . |
| | Less working hours for more free time | 0.318 | 0.674 | 0.310 | 1.469 | 0.444 | 0.413 | 0.043 | 3.966 |
| | Less working pressure | 0.348 | 0.718 | 0.359 | 1.438 | 0.272 | 0.264 | 0.024 | 2.845 |
| | Possession of competency needed | 0.005 | 0.395 | 0.201 | 0.774 | 0.074 | 0.225 | 0.044 | 1.154 |
| | Academic or teaching opportunity | 0.150 | 0.507 | 0.197 | 1.301 | 0.037 | 0.090 | 0.009 | 0.868 |
| | Participation in research | 0.245 | 1.467 | 0.766 | 2.810 | 0.001 | 0.011 | 0.001 | 0.158 |
| | To be able to immigrate | 0.285 | 0.668 | 0.317 | 1.407 | 0.314 | 0.402 | 0.069 | 2.364 |
| Preventive | Income | 0.247 | 2.795 | 0.622 | 12.557 | 0.864 | - | - | - |
| | Workload | 0.007 | 4.959 | 1.545 | 15.919 | 0.911 | 0.000 | 0.000 | - |
| | Career prospects | 0.576 | 0.709 | 0.244 | 2.057 | 0.854 | 0.000 | 0.000 | - |
| | Advice from practicing doctor | 1.000 | 0.764 | 0.212 | 2.759 | 0.849 | 0.000 | 0.000 | - |
| | Lack of experts | 0.768 | 0.663 | 0.184 | 2.394 | 0.916 | 0.000 | 0.000 | - |
| | Length and difficulty | 0.570 | 1.322 | 0.440 | 3.975 | 0.852 | 0.000 | 0.000 | - |
| | Very challenging nature | 0.027 | - | - | - | 0.898 | - | - | - |
| | Work-related hazards | 0.004 | 5.472 | 1.869 | 16.016 | 0.855 | 0.958 | 0.000 | - |
| | Continuous care of the parents | 0.716 | 1.350 | 0.373 | 4.888 | 0.934 | 0.000 | 0.000 | - |
| | No night calls | 0.247 | 2.287 | 0.709 | 7.379 | 0.860 | 31.197 | - | - |
| | Social prestige | 0.339 | 1.816 | 0.603 | 5.468 | 0.963 | 0.208 | - | - |
| | Personal experience | 0.372 | 0.426 | 0.095 | 1.914 | 1.000 | 0.000 | - | - |
| | Number and type of patients | 0.722 | 1.288 | 0.356 | 4.661 | 0.836 | - | - | - |
| | Advice from parents/family | 0.571 | 0.624 | 0.173 | 2.252 | 0.985 | 0.000 | 0.000 | - |
| | Advice from friends/seniors | 1.000 | 1.009 | 0.279 | 3.646 | 0.916 | - | - | - |
| | Less working hours for more free time | 0.002 | 5.694 | 1.892 | 17.140 | 0.844 | - | - | - |
| | Less working pressure | 0.002 | 5.584 | 1.739 | 17.932 | 0.936 | - | - | - |
| | Possession of competency needed | 0.076 | 2.754 | 0.859 | 8.835 | 0.874 | 0.000 | 0.000 | - |
| | Academic or teaching opportunity | 0.169 | 2.274 | 0.754 | 6.854 | 0.892 | 0.000 | 0.000 | - |
| | Participation in research | 0.537 | 0.512 | 0.114 | 2.301 | 0.982 | - | - | - |
| | To be able to immigrate | 0.769 | 0.716 | 0.198 | 2.585 | 0.991 | - | - | - |
| Diagnostic | Income | 0.105 | - | - | - | 0.995 | - | - | - |
| | Workload | 1.000 | 0.775 | 0.150 | 4.016 | 0.992 | - | - | - |
| | Career prospects | 0.700 | 0.710 | 0.158 | 3.190 | 0.996 | - | - | - |
| | Advice from practicing doctor | 1.000 | 1.125 | 0.217 | 5.832 | 0.998 | - | - | - |
| | Lack of experts | 0.680 | 0.406 | 0.049 | 3.382 | 0.998 | - | - | - |
| | Length and difficulty | 0.111 | - | - | - | 0.995 | - | - | - |
| | Very challenging nature | 0.686 | 1.215 | 0.234 | 6.296 | 0.996 | - | - | - |
| | Work-related hazards | 1.000 | 1.174 | 0.140 | 9.825 | 1.000 | - | - | - |
| | Continuous care of the parents | 1.000 | 0.821 | 0.098 | 6.858 | 0.998 | - | - | - |
| | No night calls | 0.074 | 4.290 | 0.951 | 19.343 | 0.999 | - | - | - |
| | Social prestige | 0.671 | 1.299 | 0.251 | 6.734 | 1.000 | - | - | - |
| | Personal experience | 1.000 | 1.031 | 0.199 | 5.343 | 0.995 | - | - | - |
| | Number and type of patients | 0.002 | 12.050 | 2.321 | 62.576 | 0.985 | - | - | - |
| | Advice from parents/family | 0.682 | 0.382 | 0.046 | 3.182 | 0.991 | - | - | - |
| | Advice from friends/seniors | 0.645 | 1.484 | 0.286 | 7.696 | 0.989 | - | - | - |
| | Less working hours for more free time | 0.372 | 2.322 | 0.517 | 10.443 | 0.996 | - | - | - |
| | Less working pressure | 0.685 | 1.641 | 0.365 | 7.373 | 0.999 | - | - | - |
| | Possession of competency needed | 0.455 | 0.433 | 0.084 | 2.243 | 0.993 | - | - | - |
| | Academic or teaching opportunity | 1.000 | 0.672 | 0.080 | 5.611 | 0.996 | - | - | - |
| | Participation in research | 0.681 | 1.239 | 0.239 | 6.421 | 0.998 | - | - | - |
| | To be able to immigrate | 1.000 | 1.055 | 0.204 | 5.466 | 0.997 | - | - | - |
| Undecided and others | Income | 0.033 | 1.323 | 1.023 | 1.713 | 0.091 | 1.429 | 0.945 | 2.162 |
| | Workload | 0.629 | 1.064 | 0.828 | 1.366 | 0.252 | 1.301 | 0.829 | 2.041 |

*Contd...*

**Table 4: Contd...**

| Influencing factors | *P* | Crude odds ratio | 95% confidence interval | | *P* | Adjusted odds ratio | 95% confidence interval | |
|---|---|---|---|---|---|---|---|---|
| | | | Lower value | Upper value | | | Lower value | Upper value |
| Career prospects | 0.054 | 1.279 | 0.995 | 1.644 | 0.435 | 1.178 | 0.781 | 1.777 |
| Advice from practicing doctor | 0.011 | 0.701 | 0.532 | 0.922 | 0.372 | 0.818 | 0.525 | 1.273 |
| Lack of experts | 0.034 | 1.325 | 1.021 | 1.719 | 0.221 | 1.287 | 0.859 | 1.928 |
| Length and difficulty | 0.089 | 1.251 | 0.966 | 1.621 | 0.585 | 1.131 | 0.728 | 1.756 |
| Very challenging nature | 0.234 | 1.181 | 0.898 | 1.552 | 0.946 | 1.016 | 0.635 | 1.626 |
| Work-related hazards | 0.311 | 1.203 | 0.841 | 1.719 | 0.004 | 2.405 | 1.329 | 4.350 |
| Continuous care of the parents | 0.865 | 1.028 | 0.749 | 1.410 | 0.167 | 1.469 | 0.852 | 2.536 |
| No night calls | 0.004 | 0.601 | 0.425 | 0.849 | 0.014 | 2.118 | 1.166 | 3.848 |
| Social prestige | 0.098 | 0.788 | 0.594 | 1.046 | 0.294 | 0.791 | 0.510 | 1.226 |
| Personal experience | 0.101 | 1.246 | 0.958 | 1.621 | 0.305 | 1.254 | 0.813 | 1.935 |
| Number and type of patients | 0.004 | 0.622 | 0.450 | 0.859 | 0.026 | 1.896 | 1.078 | 3.336 |
| Advice from parents/family | 0.000 | 1.587 | 1.226 | 2.054 | 0.328 | 1.258 | 0.794 | 1.994 |
| Advice from friends/seniors | 0.006 | 1.496 | 1.121 | 1.997 | 0.187 | 1.403 | 0.848 | 2.321 |
| Less working hours for more free time | 0.311 | 0.867 | 0.657 | 1.143 | 0.825 | 0.940 | 0.544 | 1.625 |
| Less working pressure | 0.310 | 0.876 | 0.677 | 1.132 | 0.120 | 1.499 | 0.900 | 2.497 |
| Possession of competency needed | 0.292 | 0.880 | 0.694 | 1.116 | 0.037 | 1.492 | 1.024 | 2.173 |
| Academic or teaching opportunity | 0.317 | 10.163 | 0.865 | 1.564 | 0.766 | 1.084 | 0.639 | 1.837 |
| Participation in research | 0.169 | 0.823 | 0.623 | 1.087 | 0.311 | 0.786 | 0.494 | 1.253 |
| To be able to immigrate | 0.000 | 0.550 | 0.417 | 0.724 | 0.000 | 3.102 | 2.019 | 4.763 |

Gender, place of study, religion, current year of study, current GPA, marital status, parents' and siblings' occupations were used to compute the adjusted OR using logistic regression. We included these variables because we believe they are the most likely to affect respondents' decisions

and the average GPA ($P = 0.025$). Nonetheless, other scores had no significant association.

## Discussion

In the present multinational study, Middle Eastern medical students' preferences for specialty selection and the factors influencing their decision have been explored and analyzed. The present study findings demonstrated that medical students choosing their future specialty is a complex step during their medical career and is influenced by multiple demographic characteristics, attitudes, social impact, and predetermined expectations. The importance of choosing a future specialty is due to the fact that this decision will define their career in the future. Therefore, it is considered preliminary and unrealistic to investigate specialty preference using only a single or few factors. As a result, 21 prevalidated[9] recurrent factors affecting medical students' job choices were discovered. In general, studies determined that the influencing factors were governed by the personality and characteristics of the students, while other studies suggested that their choices are primarily influenced by their exposure during their medical years.[13-15] Therefore, our study focused predominantly on assessing the PEF and PRF. This study includes a higher percentage of females (60.5%). Medicine is gradually becoming more feminized globally.[16-18] Surprisingly, in the current study, which investigated eastern conservative countries, the finding of increasing feminized power in the medical field was consistent with the global literature. Specialties that men once dominated are now disproportionately filled by women.[19] Gender had a significant impact on profession choice in our study, and the future of pediatricians, gynecologists, and family medicine is suggested to be dominated by females. On the contrary, males were more likely to pursue a surgical specialty. This was also evident in the literature findings, which showed that men were more likely than women to choose a surgical career (27% compared to 10%, respectively, $P = 0.01$).[20] The reason for gender differences existing in medical career paths is that women physicians' job choices reflect their need to balance work and family responsibilities, reducing any potential role conflicts created by the demands of their work and family roles. According to the studies conducted on medical students in the UK and the USA, women students expected family obligations to impede their career plans, whereas male students were less influenced by such worries.[21] Further studies which investigated the preferred specialty in other countries in the Middle East also concluded that surgery – along with medicine – is among the most attractive specialties for male medical students.[22] However, the gender gap related to different branches of surgery has been observed to decline in different parts of the world. A study that assessed changes in workforce gender distribution in the field of otolaryngology concluded that earlier practice years had a significantly higher number of female otolaryngologists, indicating that progress has been made in closing the gender gap in this area.[23] The current findings further suggest stakeholders' need for more gender-based investigations and gender policy and programming. Another study conducted in Jeddah, Saudi Arabia, revealed the persisting discrepancies based on gender in the surgical field in Saudi Arabia. Therefore, gender discrimination continues to be an issue in different surgical subspecialties, especially in Saudi Arabia, and this issue needs a detailed and independent investigation.[24] We identified income, personal incentives, career-related reasons, and work–life balance as factors influencing postgraduate medical specialty choices. The selection of a postgraduate specialty was heavily influenced by personal

features of future life planning and traits associated with a certain specialty. The main influences on specialty choice in our study were income (68.4%), career prospect (65.2%), and possession of competency needed in the selected specialty (47.9%). Of the chosen specialties, promising career prospects, heavy workload, and a good reputation were among the attributes commonly linked to surgery. Kiolbassa *et al.*[25] found those who choose surgery are more concerned about their job prospects and reputation than students who choose other fields. According to Khader *et al.*,[26] male students who preferred surgery were primarily affected by variables such as prestige and income; however, female students did not place a significant value on these characteristics. Our findings revealed that income and workload were the most important factors in Saudi, Sudanese, and Yemeni students' decisions to choose medicine as a specialty ($P = 0.004$ and $P = 0.000$, respectively). Similarly, in Iraq, it was found that personal interest and higher income were the most influential factors in students' decisions.[24] Due to the potential for these students to be recruited in medical specialties with a resident shortage, the group of undecided students is of great importance. According to Knox *et al.*,[27] the percentage of indecisive students could decrease with professional career counseling during medical school. Moreover, the end of each clinical curriculum is an ideal opportunity to conduct career counseling, which can be done individually or in a group setting, particularly for minority, disadvantaged, and first-generation medical students.[28] According to our study, medical specialties were the second most popular choice for medical students after surgical specialties, but in contrast, they were dominated by females. This result was similar to the findings of multiple studies from different geographic regions.[29-32] On the contrary, medical specialties were the first selection among different groups of medical students in other studies.[9,10,33,34] We believe this variation is due to the divergent number of populations between the studies, which influenced what specialty came first. However, after all, medical specialties remain the leading choice for females in most of these studies.[9,10,33,34] We found that the main factor underlying the selection of medical specialties was workload ($P = 0.000$). The balance between lifestyle and workload has been significant, which is considered an essential factor.[22,35] Nonetheless, a study carried out in 16 different schools revealed that 50% of the students responded that medical specialties (internal medicine) would be their main consideration. Moreover, they chose other specialties because they believed that medical specialties were recognized as being more challenging for residents and more stringent of time and workload as a career in residency.[36] From our point of view, there is a misunderstanding among medical students regarding how challenging a specialty can be especially when they compare the reduced workload of consultant to the heavy workload of fresh graduates from the same specialty. However, having a clearer view on how challenging a medical specialty can decrease the turnover from one residency program to another. Also, factors like income had a substantial value in this study, similar to Turkish students who predominantly preferred financial factors.[37] However, the leading cause in Jordan was intellectual content.[26] Our observations showed that length and difficulty impacted students' selection. However, Colorado Health Science Center performed a study which illustrated that internal medicine residents experienced burnout due to the length and hardships of the program.[38] Furthermore, surgical specialties were among the most preferred medical specialties by undergraduate medical students across multiple countries in the Middle East. This is consistent with other studies which showed high interest in pursuing a career in surgery among students in the Middle East, Africa, North America, and Europe.[30-32,39-41] However, there is global evidence that surgical specialties, specifically general surgery, are facing a shortage in the workforce, as reported by multiple investigations that were carried out over a decade ago[42] and backed by more recent investigations which not only assessed the current reality, but also exploited available data and applied future projection models which concluded that a 10-year shortage in the number of general surgery residencies is expected as their projected numbers suggested that the number of general surgery residencies is likely to be insufficient to meet the future demand for general surgeons.[2] This makes understanding the factors that attract undergraduate medical students to this specialty of great importance for policymakers and postgraduate program development. For that, we correlated students who chose this specialty with certain PEF and PRF, which yielded multiple novel findings. From the findings of our study, it was evident that the amount of workload was a leading influential factor for students who preferred a surgical specialty ($P = 0.003$). One study that investigated the workload and quality of life of 2991 surgeons and compared it to nonsurgery physicians concluded that surgeons face a higher workload than their peers in other specialties. Around 68% of the surveyed surgeons worked more than 60 h per week on average, compared to only 39% of nonsurgery physicians who worked for more than 60 h per week on average. Administrative workload was also more prevalent among surgeons (67%) compared to the control group (57%) with $P = 0.001$.[43] Other profession-associated factors that our study found to be significant in students preferring surgery included career prospects ($P = 0.024$), advice from a practicing doctor ($P = 0.003$), and no night calls ($P = 0.026$). However, income was not considered to be a significant factor to influence students who chose a career in a surgical specialty despite being the most chosen factor among the general participants (68.4%). Career prospect, which was determined to be an important factor for Middle Eastern medical students, requires independent investigation of all aspects, taking into consideration the suggested gender gap, which was emphasized earlier. Academic physicians and physicians working with undergraduate and young postgraduate members should consider that their advice could significantly contribute to determining the future of young students as "advice from a practicing doctor" revealed to be a significant, influential factor for young students. Regarding no night calls, surgery residents showed a positive perception of their night call experience when working in the Night Float (NF) system, whereas daytime physicians are relieved by a night team that admits patients and takes care of patient-related tasks. Many institutions have implemented this system to address increasing concerns about residents' work hours.[44-47] PEF which showed significance with

**Table 5: Average mean score compared according to PRS, PES, and KNS[a]**

| Demographic characteristics | Mean PRS – 1 (SD) | Mean PES 2–3 (SD) | Mean KNS <3 (SD) |
|---|---|---|---|
| Gender | | | |
| Male | 3.28 (1.8) | 2.78 (2.1) | 1.73 (1.4) |
| Female | 3.18 (2.0) | 3.08 (2.2) | 1.91 (1.5) |
| Place of study | | | |
| Saudi Arabia | 3.35 (2.0) | 2.99 (2.1) | 1.94 (1.4) |
| Sudan | 2.21 (1.6) | 2.64 (2.0) | 1.46 (1.3) |
| Egypt | 2.76 (1.5) | 2.22 (1.7) | 2.25 (1.5) |
| Lebanon | 3.34 (1.4) | 2.70 (1.9) | 1.89 (1.8) |
| Yemen | 3.20 (1.8) | 2.86 (1.7) | 1.20 (1.2) |
| Oman | 4.47 (1.5) | 4.60 (2.3) | 2.03 (1.5) |
| Qatar | 3.60 (0.5) | 2.80 (1.6) | 0.80 (1.0) |
| Other | 5.43 (3.0) | 5.30 (2.5) | 1.83 (1.1) |
| Religion | | | |
| Muslim | 3.08 (1.9) | 2.87 (2.1) | 1.84 (1.4) |
| Non-Muslim | 4.16 (2.2) | 3.58 (2.4) | 1.83 (1.5) |
| Current year of study | | | |
| First year | 2.73 (1.9) | 2.75 (2.1) | 1.88 (1.5) |
| Second year | 2.62 (1.8) | 2.50 (1.9) | 1.40 (1.2) |
| Third year | 3.24 (1.8) | 2.77 (2.2) | 1.96 (1.4) |
| Fourth year | 3.57 (2.0) | 3.40 (2.2) | 1.91 (1.5) |
| Fifth year | 3.31 (2.0) | 3.13 (2.1) | 1.67 (1.5) |
| Sixth year | 2.84 (2.1) | 2.43 (1.9) | 2.30 (1.5) |
| Internship | 3.70 (1.5) | 2.81 (1.7) | 1.87 (1.3) |
| Age (years) | | | |
| <23 | 3.21 (2.0) | 2.94 (2.2) | 1.88 (1.5) |
| 23–25 | 3.31 (1.8) | 3.12 (1.8) | 1.66 (1.3) |
| >26 | 3.00 (1.6) | 2.75 (1.4) | 1.79 (1.6) |
| Current GPA | | | |
| A or A+ | 3.33 (2.1) | 2.94 (2.3) | 1.74 (1.3) |
| B or B | 3.15 (1.8) | 3.03 (2.1) | 1.99 (1.7) |
| +C or C+ | 2.42 (1.5) | 2.67 (1.8) | 1.65 (0.8) |
| D or D+ | 3.29 (1.8) | 2.92 (1.8) | 1.81 (1.4) |
| Parents' occupation | | | |
| Doctor | 2.83 (2.5) | 2.73 (2.3) | 1.36 (1.3) |
| Other | 3.25 (1.9) | 2.98 (2.1) | 1.88 (1.5) |
| Siblings' occupation | | | |
| Doctor | 3.03 (2.0) | 3.07 (2.4) | 1.50 (1.3) |
| Other | 3.27 (1.9) | 2.93 (2.1) | 1.94 (1.5) |
| Specialty | | | |

GPA = grade point average, PES = professional score, PRS = professional score, SD = standard deviation. [a]Data are represented as mean and SD

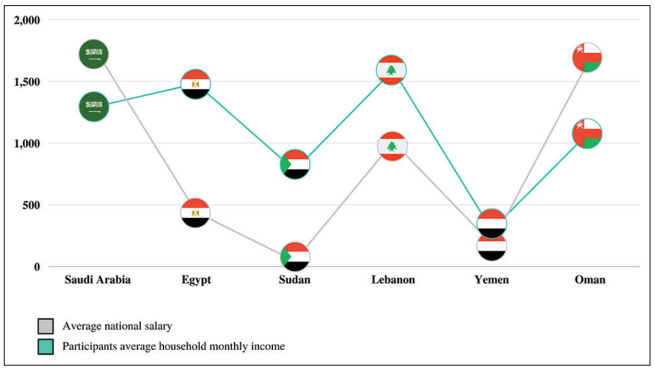


**Figure 2:** Linear chart displaying respondents' average monthly household income in six countries with the highest number of participants in the study compared to their national monthly income

students choosing a surgical specialty included the number and type of patients served ($P = 0.014$), less working hours for more free time ($P = 0.007$), and the ability to immigrate ($P = 0.000$). However, having more free time is an important factor for students in choosing a career in a surgical specialty. Literature investigations showed that other studies suggested that surgeons (40%) consider themselves to have a quality of life worse than that of the general public (nonsurgeons, 22%; $P < 0.001$). One-third of surgeons (32%) considered their quality of life even lower than that of their patients (nonsurgeons, 17%; $P < 0.001$).[43] An important novel finding, which to our extent of knowledge was neither assessed on Middle Eastern medical students nor presented in the previous literature, is their interest in migration and to what extent this factor influences their choice for their future careers. We expected that medical students from low- and middle-income countries would choose a specialty that fulfills their requirement to pursue a life in a more developed country. Our results also showed a significant relationship between choosing a surgical specialty and having the ability to immigrate. Unfortunately, this factor made some medical students choose a surgical specialty over other specialties regardless of other factors related to the profession itself. However, this could be understood as surgery's mean hourly wage is considered the highest in the medical field in a developed country such as the USA,[48] thus favoring students of low–middle-income countries to pursue a career in surgery if they intend to immigrate. A high proportion (42.65%) of the surveyed participants reported being undecided about their preferred future specialty pathway. Furthermore, when it comes to the factors that influence them in choosing their preferred future career path, it appears to be either advice from friends and family or continuing in a specialty with no night calls. The number and type of patients, work-related hazards, and their ability to immigrate were less-influential factors. As mentioned earlier, family and friends' advice has proven to significantly contribute to the students' decision-making process. This was in accordance with the findings of the Medical Faculty of Rostock.[49] From our point of view, this group is affected by the people they are around firmly. The number of undecided students also raises concern about the quantity and quality of promoting postgraduate pathways. Proper information and counseling should be offered to students who declare themselves undecided about their future, most importantly to those in higher academic years, about the challenges and opportunities to select their future careers. Also, diagnostic specialties encompass various career paths that mainly concern physical and laboratory examinations. By understanding the scope of this pathway, we come to an appropriate conclusion that the number and type of patients could be a major influential factor to students who prefer a diagnostic specialty. The results of the present study did indeed show a strong correlation between choosing this field and having the number and type of patients as an influential factor. Moreover, this was the only significant factor among this group of students. However, the same factor was not strongly correlated among students in Taiwan.[7] Moreover, in Germany, students who preferred a diagnostic specialty were mainly motivated to

participate in research projects.[50] From our perspective, students tend to be in one of the diagnostic specialties to avoid on-calls, have a more balanced life away from busy schedules, and follow-up with patients. Influencing factors which were commonly chosen, mainly income, career prospects, length and difficulty of the program, advice from friends and family, and possession of competency needed, were considered the influential factors to pursue a career in psychiatry. These factors were similar to the literature findings, which assessed similar factors among psychiatry residents and concluded that half of the residents consider the length of the training program "extremely important," wherein a long program is undesirable.[50] Unfortunately, this leads to a shortage in certain subspecialties, thus promoting bigger recruitment efforts.[50] The study's result also illustrated the influential factors among students who preferred a career in the field of preventive medicine. Accordingly, students focused on factors that achieved a balanced lifestyle away from work pressure. The amount of workload was significant as it was presented in different literature findings.[51] Policymakers should consider the motivational aspects of this specialty and modify cultural stereotypes about the specialty as it proved its importance during the coronavirus disease 2019 (COVID-19) pandemic when the critical role of preventive medicine was evident. Low work pressure for a better quality of life and lesser working hours were significant factors that led medical students to prefer a career in preventive medicine. A similar result was presented in the literature.[52] Moreover, univariate analysis was used to identify the level of specialty-related activities using the mean PES, PRS, and KNS [Table 5]. It was evident that male participants had greater odds of being influenced by PRF, while female participants had a greater chance of being influenced by PEF. This can be expected in eastern communities where the influence of family on females could be greater than that of their male counterparts. However, males will likely tend to be influenced by work-related factors due to the traditional social burden. They will most likely be their families' main income source and cover their families' financial needs. Furthermore, literature findings show that Easterners, in their general life, exhibit more conservative attitudes, cautious behaviors, and self-control abilities than Westerners.[53] This fact reflects even on the young generation where income as well was found to be the most influential factor in general. Nonetheless, this behavior comes with benefits, where Asian households have lower credit delinquency rates than other racial/ethnic groups.[54] Moreover, females experienced a higher average score in the knowledge section. We assessed the knowledge according to multiple variables, including extracurricular activity, research participation, and other social experiences in the same section. This was consistent with the findings of Kim SH,[55] who determined gender difference in applying and enrolling in extracurricular activities. His results concluded that females are more likely to apply and enroll in medical volunteer/community services, nonmedical community services, club activities, and research works ($P < 0.05$), which are similar to the findings of our study. Furthermore, students from the Gulf Cooperation Council member states presented a greater mean of PRS than students of other countries. PES was greatest in Oman particularly and lowest in Egypt. Non-Muslim students presented higher PRS and PES means. However, the knowledge mean was slightly higher among Muslim students. Interestingly, PRS mean showed a general increasing pace with academic year advancement, where students of higher academic years were more influenced by PRF. This could be interpreted by the fact that senior students will more likely focus on PRF as they will be on the verge of choosing a career path for their future, unlike junior students in whom familial influence could be greater. Significantly, with age advancement, students exhibit higher knowledge means as they will likely have broader exposure to clinical opportunities, extracurricular activities, and research activities. Nonetheless, PES, PRS, and KNS did not present a significant pattern when analyzed with the participants' GPA. Finally, PES, PRS, and KNS were all greater among participants who did not have a physician parent or sibling, except for the PES, which was greater among participants who had a physician sibling.

## Limitations of this study

The factors and specialties in the survey may not be conclusive. In questionnaire-based studies, there could be a potential participation bias. However, the relatively high sample size is expected to mitigate this. Despite the fact that our response rate was rather high, with higher ratio of females to males, we cannot rule out the possibility of selection bias, in addition to the fact that conducting the study in Saudi Arabia has led to receiving more responses locally, which could cause a less-representative sample.

# Conclusion

In conclusion, medical and surgical specialties have been identified as the preferred future career paths among Middle Eastern medical students. It was discovered that the student's decision-making process is influenced by income, career prospects, and the sense of possession of competency needed in choosing a future medical specialty. Depending on students' future career choices, the study presented novel findings on the influential factors that were divided between PRF and PEF. Medical schools can use the knowledge from this study to tailor undergraduate curricula and activities to correct false views toward certain specialties or redefine the presentation of specialties which are unpopular among students, especially the specialties that continue to need large volume of undergraduates' enrollment. Implementing workshops and educational courses for students to understand the challenges in each specialty can improve their decision-making process. Students can use this knowledge to reflect on their decision-making for their postgraduate career. Future research to examine students' level of self-assessment and self-reflection in their decision-making processes and the level of certainty about their selected specialty would be revealing.

## Ethical policy and Institutional Review board statement

The study received ethical approval from the Unit of Biomedical Ethics Research Committee at King Abdulaziz University with

a reference number of 63-22. Participation was voluntary and anonymous. All potential participants were informed about the aim of the study before participation and were able to withdraw at any point during their participation. Moreover, through the invitation to participate in the study, an online written consent was taken from each participant. Collaborators adhered to the ethical requirements of their institute.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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