

Attitudes and Perceptions of Omani Medical Students and Interns Toward Neurosurgery: A Cross-Sectional Study

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Abstract

Background: Significant changes occurred in the field of medicine in past years including advances in technologies, researches as well as women and minority students entering the field of medicine. Multiple factors can affect the influence of interns and medical students toward specialty choosing. Previous study showed that most medical students are unfavorably disposed to neurosurgery as a specialty. To the best of our knowledge, this paper is the first in the country to study the attitudes and perceptions of Omani medical students and interns toward neurosurgery. **Aim:** The aim of the study is to evaluate the attitudes and perceptions of Omani medical students and interns toward neurosurgery. **Method:** The study was conducted by using a cross sectional survey. A postal questionnaire sent to 500 Omani medical students in Sultan Qaboos university (SQU), Oman Medical College (OMC) and Omani medical students from International Medical Colleges (IMC). The questionnaire included two sections. The first section was about personal demographic information. Whereas the second section was about different factors that may affect students attitudes toward neurosurgery. **Results:** There was a total number of 230 participants filled the questionnaire completely with the highest number of the students were from Collage of Medicine at SQU (72.2%) followed by students from OMC (13.9%) and IMC students (13.9%). Both male and female Omani medical students and interns strongly reported that the top drawback of neurosurgery in Oman was the challenging nature of neurosurgical cases, followed by absence of neurosurgery residency program in Oman. Presence of mentor in neurosurgery can increase medical students interest in this field with a percentage of 98%. **Conclusion:** An earlier involvement of medical students in neurosurgery rotations can result in an improved understanding of neurosurgery among other practitioners as well as a greater number of well qualified residency applicants into neurosurgery.

Keywords

Omani, Medical Students, Interns, Attitude, Neurosurgery, Residency

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1. Background

Significant changes occurred in the field of medicine in past years including advances in technologies, researches as well as women and minority students entering the field of medicine [1]. However, many studies were done to

investigate the recent reduction in the number of student entering the medical school. Multiple factors can affect the influence of interns and medical student toward specialty choosing. Specialties are chosen by interns and medical students based in view of what is accessible to them instead of what they really have a passion for in many situations [2]. Final decision of choosing a career is affected by factors like

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availability of residency program, number of training years in the specialty and level of competition involved [2]. In general, there was a decline in surgical specialty as a career choice by medical student including neurosurgery. [1, 3].

Previous study showed that most medical students are unfavourably disposed to neurosurgery as a specialty [3]. Different reasons were thought to be the causes for this attitude, such as insufficient exposure of the medical students to neurosurgery during their medical school years, knowledge and skills of neurosurgery field are difficult to be done by medical students and the long duration of training years in neurosurgery residency programs worldwide [3]. In the USA, there is decline in the neurosurgery residency applications [4]. Nitin Agarwal *et al.* reported that lifestyle and work hours significantly affect medical students' residency decisions [4].

In Canada, they reported the same issue as well, as Mitchell P mentioned in his study that despite the increase the number of graduating medical students in this period of time, the number of students applying to neurosurgery did not change since long time. This study suggested that the reason behind this relatively stable number is decrease the exposure of neurosurgery in the face of changing their medical program [5]. Another study conducted in china to evaluate the perception of medical students toward neuroscience in general including neurosurgery and the result came as students had low neuroscience knowledge [6]. The situation is not different in Saudi Arabia, as one study conducted in Tabuk University showed that neurosurgery is the most difficult specialty chosen by participants [7].

In addition, the inequality between the proportion of male and female medical students graduating from medical schools can affect the application rates toward neurosurgery. As known that, female medical students are more than male students [5]. Mitchell P. elaborate more about this disparity as mentioned in the study that application rates of surgical specialty are likely affected by proportion of female applicants [5]. Many high-level position, promotions and even residency acceptance are potential obstacles preventing women from having a job as neurosurgery according to Benzil *et al* [8].

As a matter of fact, that the priorities of students continue to change with time [5]. It is likely that, students have ruled out Neurosurgery as one of their first priorities on the basis of expected difficulty of this specialty and the commitments between personal lifestyle and profession prior to sufficient knowledge and exposure to the specialty [5].

An earlier, organized involvement in medical student education can result in an improved understanding of neurological surgery among other practitioners as well as a greater number of well qualified residency applicants into neurosurgery [4]. Other ways to increase student's interest toward neurosurgery is involving them to Neurosurgery clinics as early as possible, orient them to different area like interventional neurology and neurophysiological procedures and at the same time encouraging students to read more about neurology [9].

Neurosurgery have to attract the attention of the brightest and best students to enable the continuity and viability of this profession. Once recruited those students, they must undergo a training program in learning the demand of hard work, competence and the overall the environment of neurosurgery [8].

In Oman, there is no neurosurgery residency program so applicants who are interested in neurosurgery need to go abroad for their residency. However, to the best of our knowledge, there is no study done in our region to study the attitudes and perception of medical students and interns toward neurosurgery. Therefore, the rationale for conducting this research is to raise the awareness of neurosurgery among Omani medical students as well as study the potential causes of why less students applying to neurosurgery. We will provide the results of the study to higher authority in the country including college of medicine and health sciences at SQU and OMC. Data can be used also by the Oman Medical Specialty Board (OMSB) to consider the factor influencing the selection of neurosurgery by Omani medical students as future career.

2. Methods and Study Design

2.1. Methodology

The study was conducted by using a cross sectional survey. A postal questionnaire sent to 500 Omani medical students in Sultan Qaboos university (SQU), Oman Medical College (OMC) and Omani medical students from International Medical Colleges (IMC). The questionnaire included two sections. The first section was about personal demographic information including gender, year and place of study and expected year to graduate. Whereas the second section was about different factors that may affect student attitude toward neurosurgery. Fifteen items were mentioned in the survey and scored following a Likert ranking scale (1: Agree, 2: Disagree) as it is shown in Table 1.

Table 1. Pro Forma: Attitudes and Perceptions of Omani Medical Students and Interns Toward Neurosurgery.

| Demographic Information | | |
|---|-------|----------|
| Gender: Male <input type="checkbox"/> Female <input type="checkbox"/> | | |
| Year of study: Year 3 <input type="checkbox"/> Year 4 <input type="checkbox"/> Year 5 <input type="checkbox"/> Year 6 <input type="checkbox"/> Year 7 <input type="checkbox"/> Interns <input type="checkbox"/> | | |
| Place of study: SQU <input type="checkbox"/> OMC <input type="checkbox"/> International medical students <input type="checkbox"/> | | |
| Survey core questions | Agree | Disagree |
| 1. I consider neurosurgery as a career option | | |
| 2. My neurosurgery exposure is inadequate | | |
| 3. Adding neurosurgery rotation in medical school will have positive impact in the field | | |
| 4. Presence of mentor in neurosurgery can increase my interest in this field | | |
| 5. Neurosurgical history is difficult to be obtained | | |
| 6. Neurosurgical signs are difficult to be elicited | | |
| 7. Neurosurgical illnesses are complicated and difficult | | |
| 8. Neurosurgical illnesses are challenging and interesting | | |
| 9. Most neurosurgical illnesses have poor outcomes | | |
| 10. Neurosurgery requires a long training period | | |
| 11. Neurosurgery involves long operating hours | | |
| 12. Huge prestige and income are attached to neurosurgery | | |
| 13. Neurosurgery can affect my family & social life | | |
| 14. Absence of neurosurgery residency program in Oman making it challenging | | |
| 15. Future job opportunities in Oman will be limited | | |

2.2. Data Analysis

Data collected from the survey was analysed using IBM Statistical Package for the Social Sciences (SPSS) 23 computer program. The participants were categorized according to gender (male and female), place of study into three groups (SQU students, OMC students and IMC). In addition, they were grouped according to the year of study into six groups. Chi-square test was used to identify some areas that may be targeted to stimulate and improve Omani medical students' passion toward neurosurgery. P value of < 0.05 was considered for the statistical significance.

3. Result

3.1. Descriptive Statistics

The demographic information for the subjects participated in the study is shown in Table 2. There was a total number of 230 participants filled the questionnaire completely with response rate of 46%. The highest number of the students were from Collage of Medicine at SQU (72.2%) followed by students from OMC (13.9%) and IMC students (13.9%). The vast majority were in their 5th year followed by 3rd years, 4th years, interns and 7th year. Among the total number of participants there were 128 females and 102 males.

Table 2. Socio-demographic characteristics of the subjects.

| Variables | | Number | Percentage (100%) |
|----------------|---------------|--------|-------------------|
| Gender | Male | 102 | 55.7 |
| | Female | 128 | 44.3 |
| Year of study | Year 3 | 49 | 21.3 |
| | Year 4 | 40 | 17.4 |
| | year 5 | 53 | 23 |
| | Year 6 | 21 | 9.1 |
| | Year 7 | 32 | 13.9 |
| | Interns | 35 | 15.2 |
| | SQU | 166 | 72.2 |
| Place of study | OMC | 32 | 13.9 |
| | International | 32 | 13.9 |

As shown in Figure 1, Majority of IMC students who filled the questionnaire studying in Ireland (47.0%), followed by Bahrain (38.0%). The rest were in New Zealand, Pakistan, Cyprus and Malta.

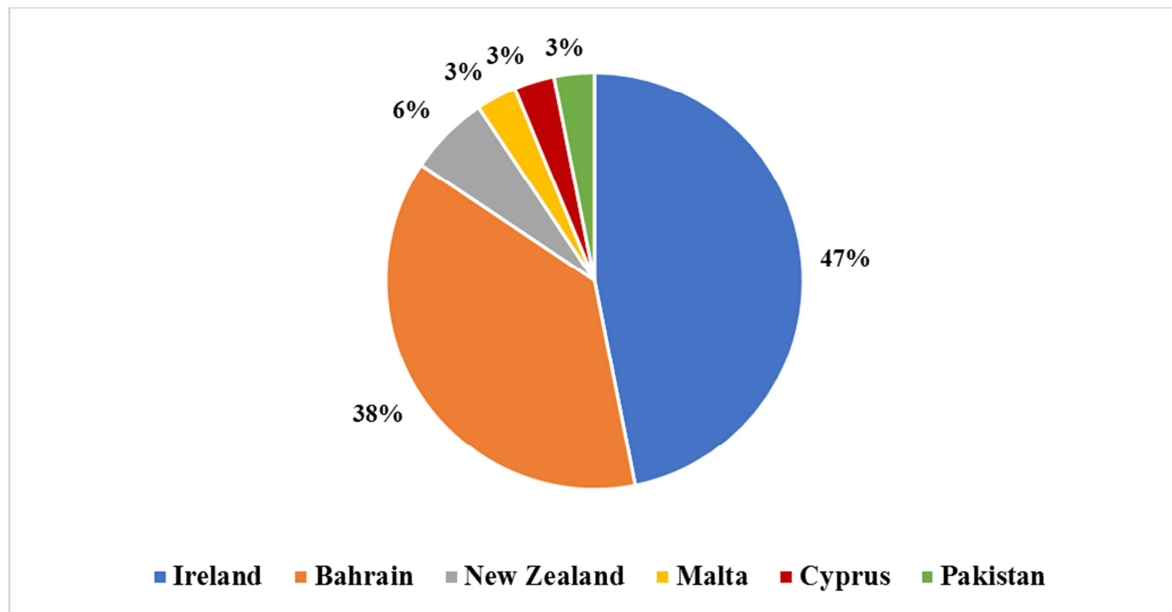


Figure 1. Study's country of international Omani medical students.

Figure 2 shows that there were 165 applicants (71.7%) were interested in neurosurgery as future career option with variable degree of interest. The remaining 65 applicants (28.3%) were not interested in choosing neurosurgery.

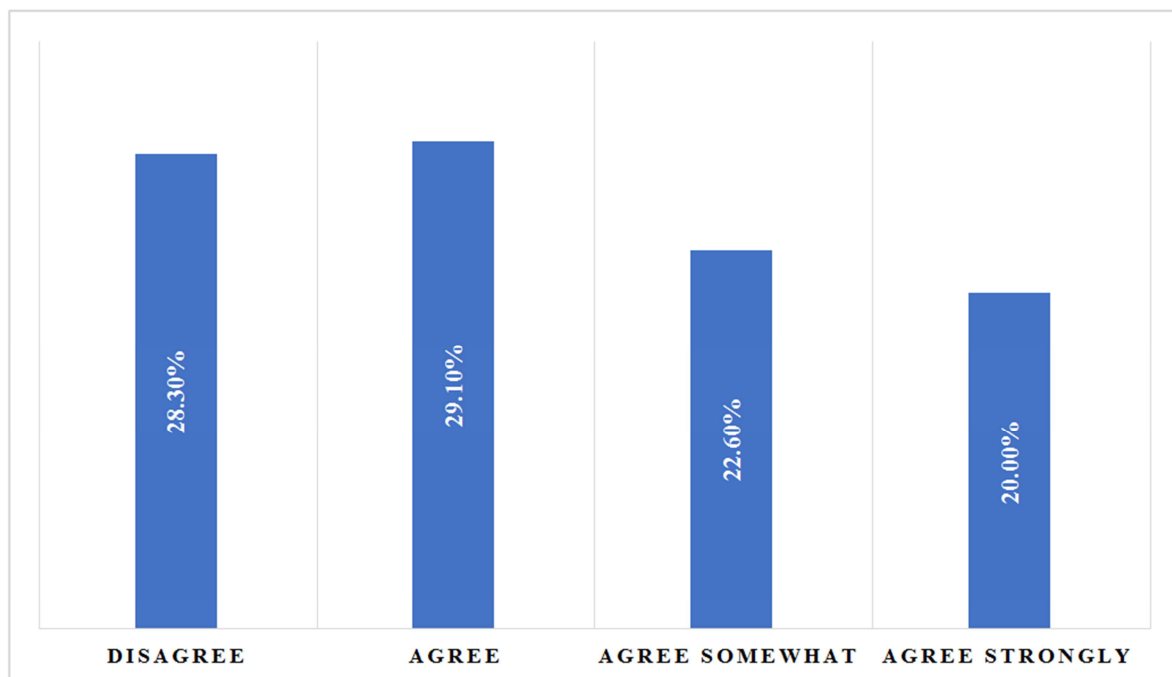


Figure 2. Consideration of neurosurgery as a career option.

3.2. Factor Affecting Considering Neurosurgery as a Career Option

Table 3 displays the drawbacks of neurosurgery among male and female Omani medical students and interns. Both male and female Omani medical students and interns were strongly reported the top drawback of neurosurgery in Oman was the

challenging nature of neurosurgical cases (M:96.1%, F:98.4%), followed by absence of neurosurgery residency program in Oman (M:95.1%, F:95.3%), long training period of the specialty (M:94.1%, F:96.9%) and inadequate exposure during medical schools (91.2%, F:94.5%).

Table 3. Drawbacks of Neurosurgery [N (%)].

| Variable | Male | | Female | |
|---|-----------|-----------|------------|-----------|
| | Agree | Disagree | Agree | Disagree |
| Inadequate exposure | 93 (91.2) | 9 (8.8) | 121 (94.5) | 7 (5.5) |
| Difficult in history taking | 74 (72.5) | 28 (27.5) | 102 (79.7) | 26 (20.3) |
| Difficulty in examination | 62 (60.8) | 40 (39.2) | 94 (73.4) | 43 (26.6) |
| Complicated illnesses | 87 (85.3) | 15 (14.7) | 109 (85.2) | 19 (14.8) |
| Challenging cases | 98 (96.1) | 4 (3.9) | 126 (98.4) | 2 (1.6) |
| Poor outcomes | 87 (85.3) | 15 (14.7) | 105 (82.0) | 23 (18.0) |
| Long training period | 96 (94.1) | 6 (5.9) | 124 (96.9) | 4 (3.1) |
| Family & social life effects | 90 (88.2) | 12 (11.8) | 101 (78.9) | 27 (21.1) |
| Absence of neurosurgery residency program | 97 (95.1) | 5 (4.9) | 122 (95.3) | 6 (4.7) |

Figure 3 shows factors that may improve medical students and interns' education in neurosurgery. As it is shown that, presence of mentor in neurosurgery can increase medical students interest in neurosurgery with a percentage of 98

followed by adding neurosurgery rotation and huge prestige and income are attached to neurosurgery. Omani medical students and interns also acknowledged high prestige and income attached to neurosurgery in Oman.

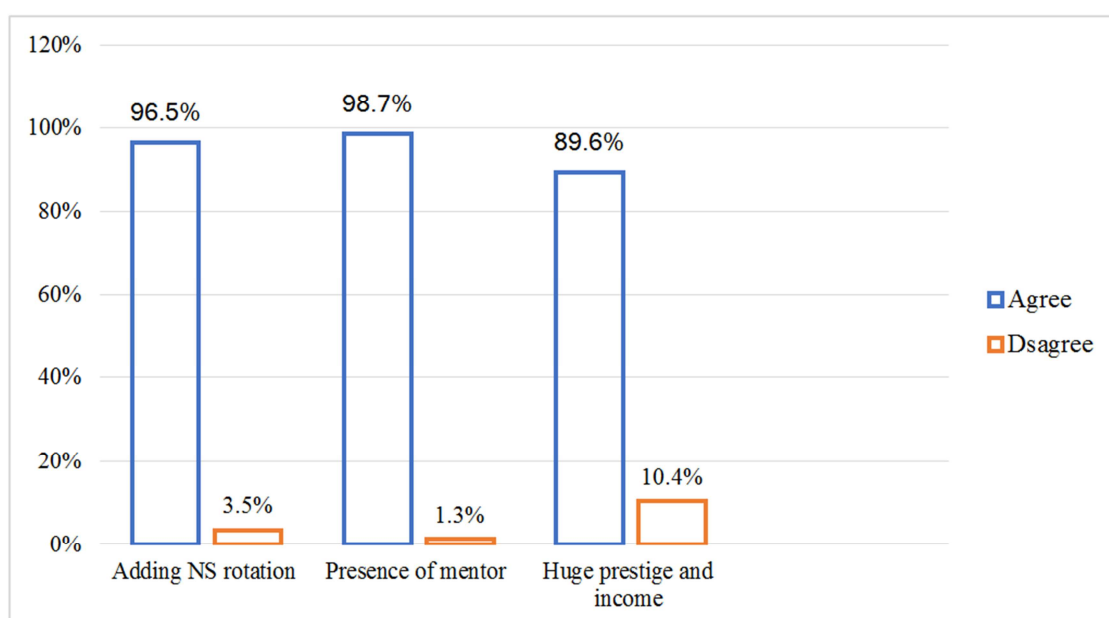
**Figure 3.** Factors that improve medical students and interns education in neurosurgery.

Table 4 shows relationship between considering neurosurgery as future career and long operating hours vs. absence of residency program in Oman. Seventy- three of participants who considered neurosurgery as future career agreed that neurosurgery involves long operation hours (p 0.01). The

same percentage agreed that absence of the neurosurgery residency program in Oman making it challenging (p 0.04). More than half of the applicants believed that future job opportunities in Oman will be limited including in neurosurgery.

Table 4. Relationship Between Considering Neurosurgery as Future Career and Long Operating Hours vs. Absence of Residency Program in Oman.

| Variables | | Considering neurosurgery as a career option | | P value |
|---|----------|---|----------|---------|
| | | Agree | Disagree | |
| Neurosurgery involves long operating hours | Agree | 73.1% | 26.9% | 0.01 * |
| | Disagree | 28.6% | 71.4% | |
| Absence of neurosurgery residency program in Oman making it challenging | Agree | 73.1% | 26.9% | 0.047 * |
| | Disagree | 45.5% | % | |

4. Discussion

There are multiple factors that result in low number of Omani

neurosurgeons. In this study, we tried to find the reasons for that by studying the attitude and perceptions of Omani medical students and interns toward neurosurgery. As per our knowledge, there was no previous study done in the country

to compare with. Surprisingly the study showed that most Omani medical students and interns as considering neurosurgery as a future career with variable degree of interest. Whereas, Previous studies done outside the country showed the opposite of this trend [1, 3, 4, 6, 7, 9].

The study showed that 93% of Omani medical students and interns had inadequate exposure in neurosurgery during their medical school rotations. This is in agreement with previous study done in Ireland [3]. Participants in this study reported that the most common difficulties in neurosurgery are the challenging nature of neurosurgical cases, absence of neurosurgery residency program in Oman, long training period in neurosurgery and inadequate exposure during medical schools. Poor teaching, difficulty of the neurosurgical subjects and inadequate exposure were also reported in previous studies [7, 9, 10].

The phenomenon was described by *Ralph F.* as neurophobia which is fear of the neural sciences and clinical neurology that is due to the students' inability to apply their knowledge of basic sciences to clinical situations [11].

A study done in China reported that, there was a positive correlation between the likelihood of specializing in neuroscience and students' self-perceived knowledge in this specialty [6]. In the present study, participants believed that neurosurgery can affect their family and social life as it is a very demanding specialty. This was reported in previous studies done in United States and in Nepal [4, 9].

Large percentage of the students and interns in this study believed that adding neurosurgery rotation during medical school will have positive impact in the field and will increase the awareness and the knowledge of the neurosurgical conditions. Different previous studies highlighted factors that increase the interest of medical students toward the surgical specialty including neurosurgery such resident involvement in medical student education [12, 13], faculty-student interaction [12, 16], the influence of mentors [13, 15, 17], the inclusion of didactic lectures by clinical surgeons [12, 15, 18] surgical clerkships [14, 16, 19], and early exposure [18, 20].

5. Conclusion

An earlier involvement of medical students in neurosurgery rotations during medical school can result in an improved understanding of neurosurgery. Presence of well qualified mentors who can establish early mentoring relationships between students and faculty or residents; organize research opportunities with a tiered system for projects will impact positively in the field. Establishing of neurosurgical residency program in Oman will have a positive impact in the specialty. A larger study assessing attitudes of medical

students at multiple institutions in Oman with larger sample size could help shed some light on this.

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