Impact of plastic surgery medical training on medical students' knowledge, attitudes, preferences, and perceived benefits: Comparative study

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Abstract

Introduction: Misconceptions surrounding the discipline of plastic surgery are widespread public and medical students and professionals, as well. The purpose of this study was to explore how the inclusion of plastic surgery rotation into the medical curriculum affects medical students’ knowledge, attitudes, and preferences regarding plastic surgery specialization and referral.

Design and Methods: A descriptive-correlational design was utilized to collect data from 200 medical students in the final two years of education from two separate six-year medical programs in Jordan. Data was collected using self-reported questionnaires regarding knowledge of surgical procedures allocation, attitude towards plastic surgery, preference of specialization, and benefits of plastic surgery to physicians and patients.

Results: Analysis showed that medical students of plastic surgery integrate rotation (program A) had a higher average score of correct procedure-allocation (M=12.57, SD = 3.14), compared to non-integrated plastic surgery rotation program (program B) (M=8.29, SD=3.05). About 83% (n=83) of students in program A had their knowledge on plastic surgery from direct exposure to a plastic surgeon, compared to 43% (n=43) of program B, and 24% (n=24) of students in program A reported that their perception of plastic surgery influenced by media compared to 62% (n=62) of those in program B.

Conclusions: Medical students exposed to plastic surgery education are more confident about procedures of plastic surgery and had more reliable sources of knowledge about plastic surgery than those who were not exposed to plastic surgery rotation.

Introduction

Plastic surgery is an expanding specialty with procedures which incorporate reconstructive surgery, cosmetic procedures, orthopedics, and oncology.1 The global misconception of plastic surgery education was not limited to professionals in the field; rather, for medical students. This was evident by the fact that misconceptions about the discipline of plastic surgery were not only confined to the public,2 but also among medical professionals and students.3,4 Plastic surgery is mainly presented in mainstream media as synonymous with cosmetic or aesthetic surgery. This leads to major misconception regarding the practice of plastic surgery and influences the attitudes of medical students who are not exposed to plastic surgery in their rotations.4,5 Thus, certain medical schools have countered this misconception by incorporating plastic surgery education into the medical curriculum.5,7

Medical education in Jordan has been established at Program A at the first and largest leading university in Jordan. Program A offers the “Doctor of Medicine” curriculum that is a six-year undergraduate degree. All other established schools of medicine have used the curriculum of Program A and proposed some minor modifications that correspond with the Ministry of Higher Education (MOHE) guidelines causing very minimal differences such as the plastic surgery rotation at the fifth year. The core courses are the same, while differences made in the elective university courses. This has caused minor difference in the number of credit hours of the two programs where Program A has 256 credit hours while the total credit hours at Program B is 257. Both universities follow the same path of education and clinical training throughout the six years. In addition, program B was originally established by the same management and medical team of

Significance for public health

Plastic surgery procedures contribute to large proportion of the worldwide surgical disease burden. Appropriate and timely intervention using plastic surgery has significant impact on multiple medical conditions and reduce cost of complications. Plastic surgery interventions acknowledged as low cost to resolve disabling conditions. However, misconception about plastic surgery may contribute in delayed referral and untimely and inappropriate intervention that may cause further burden to individuals, medically and economically. Comparing between medical programs that include plastic rotation and those who are not will increase the public health awareness, and in particular among medical staff, regarding benefits and needs of plastic surgery interventions to health of individuals. Major medical conditions such as deformities and disabilities can be resolved with timely plastic surgery interventions that improves health of people and lowering medical cost and burden of diseases.
Purpose of the study

In this study, we emphasize the importance of integrating plastic surgery training into the medical curriculum. Medical students’ knowledge about plastic surgery, procedures performed by plastic surgeons, and the inclusion of plastic surgery in the curriculum may influence the likelihood of choosing plastic surgery as a future specialization. Therefore, the purpose of this study was to explore how the inclusion of plastic surgery rotation into the medical curriculum affects medical students’ knowledge, attitudes and preferences regarding plastic surgery specialization and referral.
The reviewed information was concerned mainly of procedures of plastic surgery, preference of medical specialty, attitudes, sources of information, benefits or plastic surgery education. Data from previous studies and international guidelines, description and information related to specialty of plastic surgery. The information for this study was reviewed by a team with expertise in plastic surgery. The methodologist of the study used the guidelines proposed for adapting or adopting an instrument (http://korbedpsych.com) to develop the tools of the study. Then, the researchers organized the information into four main parts. Pilot testing was conducted using medical students (n=10) requesting their appraisals for the culture and language appropriateness of the tools, clarity, time required, and understandability. Minor linguistic changes were made based on their report. The survey is formed of four parts:

Part 1: Consists of 18 scaled items of different clinical procedures or scenarios. In addition, the students were given a list of 10 medical specialties and were asked to correlate each given procedure or scenario to the medical specialty they believe is most experienced and suitable to deal with (see appendix 1). They need to match the given medical procedures to the appropriate medical specialty. This will allow exploring student’s knowledge about the procedures that are performed by the plastic surgeons. The scale showed internal consistency with Cronbach’s alpha of .78.

Table 1. Descriptive characteristics of students (n=200).

| Variable                                      | n    | %    |
|-----------------------------------------------|------|------|
| Sex                                           |      |      |
| Male                                          | 93   | 46.5 |
| Female                                        | 107  | 53.5 |
| University                                    |      |      |
| A                                             | 100  | 50.0 |
| B                                             | 100  | 50.0 |
| Academic Year                                 |      |      |
| 5th                                           | 100  | 50.0 |
| 6th                                           | 100  | 50.0 |
| Place of residence                            |      |      |
| City                                          | 175  | 87.5 |
| Suburbs                                       | 13   | 6.5  |
| Village                                       | 12   | 6.0  |
| Does your father work in the health field?    |      |      |
| Yes                                           | 42   | 21.0 |
| No                                            | 158  | 79.0 |
| Does your mother work in the health field?    |      |      |
| Yes                                           | 21   | 10.5 |
| No                                            | 179  | 89.5 |
| Does your brother work in the health field?   |      |      |
| Yes                                           | 8    | 4.0  |
| No                                            | 192  | 96.0 |
| Does your sister work in the health field?    |      |      |
| Yes                                           | 8    | 4.0  |
| No                                            | 192  | 96.0 |
| Acceptance into university                    |      |      |
| Competitive                                   | 62   | 31.0 |
| Scholarship                                   | 39   | 19.5 |
| Parallel                                      | 64   | 32.0 |
| International                                 | 35   | 17.5 |
| Who pays your university fees                 |      |      |
| Parent/s                                      | 134  | 67.0 |
| Scholarship                                   | 23   | 11.5 |
| Welfare                                       | 39   | 19.5 |
| Charity                                       | 0    | 0.0  |
| Welfare                                      |      |      |
| Relatives                                     | 3    | 1.5  |
| Self-funded                                   | 1    | 0.5  |
| Family income from your point of view         |      |      |
| High                                          | 26   | 13.0 |
| Medium                                        | 168  | 84.0 |
| Low                                           | 6    | 3.0  |
| Have you or any family member undergone a plastic surgery | | |
| Yes                                           | 13   | 6.5  |
| No                                            | 187  | 93.5 |
| Have you had a training course in plastic surgery | | |
| Yes                                           | 2    | 1.0  |
| No                                            | 198  | 99.0 |

Part 2: 24 scaled items regarding attitudes toward plastic surgery. The students are requested to make their answers on a Likert scale from strongly disagree (1) to strongly agree (5). Students are asked to rate their response on the scale showing their perspective towards each statement (see Appendix 1). The higher the score the more positive attitudes toward plastic surgery. In this study, the scale showed good internal consistency with Cronbach’s alpha of .82.

Part 3: 13 scaled items regarding the likelihood of specialization in plastic surgery. The students are requested to make their answers on a dichotomous scale whether yes (1) or no (0). The higher the score the more preference of specialization and favor of plastic surgery. The question is addressing factors contribute to their preference decision. For example, “Do you plan to choose plastic surgery for your future specialization?” “I found plastic surgery boring and not interesting”. In this study, the scale showed good internal consistency with Cronbach’s alpha of 0.72.

Part 4: 10 scaled items to measure the benefits of plastic surgery. Five questions were about benefits to physicians and five questions regarding benefits to the patient (see appendix 1). The students are requested to make their answers on a Likert scale from strongly disagree (1) to strongly agree (5). This would allow understanding how students experience whether took the plastic surgery rotation or not assumes the benefits and allow making comparisons...
between the two programs. For example, “Knowledge about plastic surgery will enable better treatment options for surgical problems” “Plastic surgery will improve physical Health of patients.” The higher the score the more benefits are the plastic surgery to the identified person. In this study, the scale showed good internal consistency with Cronbach’s alpha of .79.

Demographic information

In addition, the survey included background information regarding students’ personal details including age, sex, details about their academic level, socio-economic level, GPA, family information regarding plastic surgery, family and personal history of plastic surgery.

Data analysis plans

The computer program, SPSS-IBM Windows (version 24.0) used to describe the variable of the study using the central tendency measures (means, and medians) and the dispersion measures (standard deviation and ranges). The estimated descriptive statistics compared to normative samples in the literature. t-test has been used to test differences in the variables of the study in relation to continuous demographic characteristics, and chi-square used to examine the difference in demographic characteristics of the subjects related to the variables of the study for the categorical level of measurement. Pearson correlation (r) was used to test the association among the coniferous variables. Data set to two tailed 0.05 level of significance.

Results

Descriptive characteristics

A total of 200 students filled out the survey out of 250 surveys distributed with a response rate of 80%. The mean age was 23.1 (+0.96) years, with 46.5% (n=93) being male and 53.5% (n=107) being female. The average GPA was 3.16 (±.45) (Table 1)

| Items                                      | A | B |                  |
|--------------------------------------------|---|---|------------------|
| Bedsores in patients after spinal cord injuries | 41 | 95 | 41.0 | 95.0 |
| Correct                                    | 59 | 5 | 59.0 | 5.0 |
| Total hip replacement                      | 2 | 9 | 2.0 | 9.0 |
| Incorrect                                  | 98 | 91 | 98.0 | 91.0 |
| Breast reconstruction following mastectomy | 11 | 29 | 11.0 | 29.0 |
| Incorrect                                  | 89 | 71 | 89.0 | 71.0 |
| Correct                                    | 9 | 64 | 9.0 | 64.0 |
| Rhinoplasty                                | 84 | 79 | 84.0 | 79.0 |
| Incorrect                                  | 16 | 21 | 16.0 | 21.0 |
| Full-thickness abdominal burn              | 11 | 41 | 11.0 | 41.0 |
| Incorrect                                  | 89 | 59 | 89.0 | 59.0 |
| Appendectomy                               | 3 | 10 | 3.0 | 10.0 |
| Incorrect                                  | 97 | 90 | 97.0 | 90.0 |
| Abdominoplasty                             | 35 | 36 | 35.0 | 36.0 |
| Correct                                    | 65 | 64 | 65.0 | 64.0 |
| Breast reduction                           | 19 | 43 | 19.0 | 43.0 |
| Incorrect                                  | 81 | 57 | 81.0 | 57.0 |
| Correct                                    | 36 | 78 | 64.0 | 78.0 |
| Cleft palate repair                        | 64 | 22 | 64.0 | 22.0 |
| Liposuction                                | 38 | 45 | 38.0 | 45.0 |
| Incorrect                                  | 62 | 55 | 62.0 | 55.0 |
| Ear laceration                             | 52 | 87 | 52.0 | 87.0 |
| Incorrect                                  | 48 | 13 | 48.0 | 13.0 |
| Correct                                    | 18 | 31 | 18.0 | 31.0 |
| Breast augmentation                        | 82 | 69 | 82.0 | 69.0 |
| Lower leg skin graft                       | 10 | 38 | 10.0 | 38.0 |
| Incorrect                                  | 90 | 62 | 90.0 | 62.0 |
| Correct                                    | 31 | 78 | 31.0 | 78.0 |
| Skin cancers of the face                   | 69 | 22 | 69.0 | 22.0 |
| Management of amputated digits             | 60 | 83 | 60.0 | 83.0 |
| Incorrect                                  | 40 | 17 | 40.0 | 17.0 |
| Correct                                    | 31 | 51 | 31.0 | 51.0 |
| Facelift                                   | 60 | 49 | 60.0 | 49.0 |
| Incorrect                                  | 25 | 54 | 25.0 | 54.0 |
| Correct                                    | 75 | 46 | 75.0 | 46.0 |
| Acutely ischemic foot                      | 36 | 84 | 36.0 | 84.0 |
| Incorrect                                  | 64 | 16 | 64.0 | 16.0 |
Knowledge of medical procedures

The analysis (Table 2) showed that the mean score for procedure-specialty allocation for program A (those who received plastic surgery education) was 12.57 (±3.14), and for program B it was 8.29 (±3.05). Comparing the two programs, the mean difference in mean scores at program A and B was statistically significant (p=0.021) with a mean difference of 4.28 (95% CI: 3.42 to 5.14). The analysis infers that students in program A had higher level of accuracy to identify procedures of plastic surgery than those in program B. Moreover, a significant positive correlation between GPA and procedure-specialty allocation was found (r=0.30, p=0.007), inferring that students with higher GPA are more likely to identify the medical procedures appropriate to specialties indicating higher level of knowledge. While, using chi-square, no significant differences were found regarding knowledge of medical procedure related to gender, academic year, and age (p>0.05). The item analysis showed that the most reported incorrect answers for program A were Rhinoplasty (84%), management of amputated digits (60%), and ear laceration (52%). While, bedsores in patients after spinal cord injuries (95%), total hip replacement (91%), and ear laceration (87%) were the most reported wrong answers by students in Program B. The analysis infers that there is a huge difference between the two programs in terms of procedure-specialty allocation.

Table 3. Attitudes towards plastic surgery (n=200).

| Item                                                                 | SDA A % | SDA B % | DA A % | DA B % | N A % | N B % | AG A % | AG B % | SAG A % | SAG B % |
|----------------------------------------------------------------------|---------|---------|--------|--------|-------|-------|--------|--------|---------|---------|
| 1. Plastic surgery and cosmetic surgery are the same                  | 38      | 17      | 46     | 39     | 11    | 20    | 5      | 20     | 0       | 4       |
| 2. Plastic surgery is a complementary type of treatment              | 38      | 32      | 35     | 16     | 18    | 8     | 30     | 6      | 9       |
| 3. Plastic surgery is favored for celebrities and rich                | 31      | 14      | 24     | 19     | 15    | 25    | 20     | 30     | 10      | 12      |
| 4. Plastic surgery is recommended for those with physical abnormalities.| 3       | 3       | 14     | 14     | 31    | 50    | 36     | 19     | 16      |
| 5. People use plastic surgery for luxurious purposes                 | 15      | 5       | 15     | 25     | 26    | 32    | 34     | 32     | 10      | 6       |
| 6. Plastic surgery is limited to specific parts of body               | 37      | 14      | 37     | 40     | 17    | 25    | 7      | 16     | 2       | 5       |
| 7. Plastic surgery accepted socially                                 | 1       | 2       | 19     | 24     | 39    | 37    | 37     | 31     | 4       | 6       |
| 8. Plastic surgery requires special training and specialization       | 0       | 1       | 3      | 3      | 0     | 9     | 25     | 37     | 12      | 50      |
| 9. Plastic surgery is one sub-specialty of surgical specialties       | 5       | 2       | 5      | 13     | 3     | 13    | 41     | 45     | 46      | 27      |
| 10. Performing cosmetic surgery cause shame and snobness              | 27      | 28      | 31     | 32     | 27    | 26    | 15     | 11     | 0       | 3       |
| 11. Performing plastic surgery cause shame and snobiness              | 38      | 25      | 36     | 40     | 16    | 19    | 8      | 13     | 2       | 3       |
| 12. Women seeking cosmetic surgery more often than men                | 1       | 1       | 2      | 5      | 18    | 25    | 60     | 42     | 19      | 27      |
| 13. Younger population are increasingly accepting cosmetic procedure   | 0       | 3       | 6      | 10     | 13    | 23    | 61     | 49     | 20      | 15      |
| 14. Cosmetic surgery is a waste of money                              | 18      | 15      | 38     | 28     | 25    | 35    | 15     | 16     | 4       | 6       |
| 15. Those who undergo cosmetic surgery do it to look better           | 4       | 2       | 8      | 11     | 31    | 33    | 49     | 47     | 8       | 7       |
| 16. Plastic surgery is more about beauty                              | 21      | 4       | 41     | 26     | 21    | 33    | 15     | 33     | 2       | 4       |
| 17. Plastic surgery is for people who want to improve their physical appearance | 8       | 2       | 24     | 15     | 31    | 35    | 33     | 39     | 4       | 9       |
| 18. Media portrayals play a significant role in making decision to undergo plastic surgery | 0       | 0       | 6      | 10     | 28    | 33    | 46     | 43     | 20      | 14      |
| 19. I support those who want to do a plastic surgery                  | 2       | 3       | 6      | 10     | 29    | 37    | 40     | 38     | 23      | 12      |
| 20. If I had cosmetic surgery, I would be eager to tell people        | 12      | 6       | 26     | 20     | 43    | 50    | 12     | 22     | 7       | 2       |
| 21. In the future, I might have cosmetic surgery                      | 19      | 15      | 31     | 21     | 25    | 34    | 14     | 25     | 11      | 5       |
| 22. Cosmetic surgery can be a big benefit to a person’s self-image.   | 2       | 4       | 6      | 9      | 19    | 26    | 51     | 48     | 22      | 13      |
| 23. I do follow plastic surgery TV shows and magazines                | 39      | 18      | 24     | 21     | 17    | 30    | 15     | 25     | 5       | 6       |
| 24. I would never have any kind of plastic surgery                    | 25      | 10      | 17     | 19     | 33    | 48    | 17     | 19     | 8       | 4       |
about plastic surgery was from the media/television compared to 24% in Program A.

Regarding attitudes and preferences of plastic surgery, students in program B were more likely to agree that plastic surgery is synonymous with cosmetic surgery, unnecessary or ‘complementary’ treatment, and that it is limited to celebrities and the wealthy people, compared to students in program A who had much less agreements (Table 3). In addition, 20% of students in program A followed plastic surgery in the media, compared to 31% of those in Program B.

Discussion

Plastic surgery has been misperceived in the literature and media. More alarmingly, however, plastic surgery has also been misperceived by medical students inferring that the specialization and related procedures are not well addressed in the medical curriculum and medical care plans. Therefore, this study compared the differences between medical students enrolled in a medical program that integrates plastic rotation in practicum (program A) and medical students in a program that does not (program B). The results of the study showed, in general, that medical students in program A have significant and remarkable positive knowledge, attitudes, and perceived benefits about plastic surgery and have better awareness about the short and long-term benefits of plastic surgery. The results also did find that students in program B have a better understanding of the knowledge and referral plans once identified.

Students in program A were also more capable to identify procedures per specialty inferring that their knowledge about plastic surgery and its related procedures did enable them to have better medical awareness and a higher level of accuracy of referral when needed. For example, students in program A were more likely to associate both reconstructive procedures (such as bedsores, skin grafts, breast reconstruction post-mastectomy, full-thickness burns) and cosmetic procedures (such as liposuction, rhinoplasty, facelift, and breast augmentation) with plastic surgery, as opposed to group B who incorrectly associated them with other specialties. This was comparable to the results found by Farid et al., who found that certain procedures were more likely to be associated with plastic surgery when it is included in the curriculum.

Regarding the students’ perspectives towards considering plastic surgery as a future career, students in program B have higher tendency to choose plastic surgery as a future career than students in program A. Although this may seem unexpected; however, one explanation could be that students exposed to plastic surgery education and rotation in practicums were able to make well-informed decisions about plastic surgery away from misconceptions and media portrayals of plastics surgeons as living a luxurious lifestyle. This corresponds to several similar studies, that found that knowledge about plastic surgery among medical students not exposed to plastic education and training are largely come from media, compared to students of programs integrating plastic surgery as part of medical education who acquired their knowledge from immediate clinical experience and plastic surgeons. More clinical information and medical awareness could have influenced students in program A to make better decisions of future specialty.

On the other hand, students in program B probably had an arbitrary selection of the plastic surgery as their future career depending largely on their misconceptions influenced by their lack of information.

Furthermore, lack of studies that measure the differences before and after exposure to plastic surgery education and training are lacking. Such a research approach would allow better understanding and control and effect of other sources of information that affect medical students’ decision, knowledge and preferences. The classroom and instructional style of tutors and medical educators do play significant role to inform students about different specialties in medicine. In the Arabian culture, studying medicine is the most preferred specialty for all students, and those enrolled in this specialty represent the top 10% of all students at the high school achievement score. This would indicate that students at schools of medicine have high academic and education skills and motivation, and chose to study medicine acknowledging their future career line.

One question asked whether the students believed that plastic surgery and cosmetic surgery were the same. Only five percent of the students in group A held this belief, while 24% of the students in group B did. The students were also asked whether they believed plastic surgery was a complementary type of treatment, as opposed to a necessary specialty. Of the students in group A, 39% of them either agreed or strongly agreed with this statement. Only 14% of the students in group B agreed with this statement. These answers can be explained by the representation of plastic surgery in the media and the lack of proper plastic surgery education even for students in group A although much higher effect was observed on students in group B.

One limitation of this study it that information of this study depended largely on cross sectional approach. A longitudinal one following up medical students after graduation and being more involved in medical clinical practices and specialization would reveal more information conclusions.

Conclusion

This study found that medical students who had a plastic surgery rotation had better knowledge and a more positive attitude toward plastic surgery, than students who did not. The study signifies that the integration of plastic surgery into medical curriculum is essential, not only for increasing knowledge, rather for more accurate medical decision-making. This is evident by the higher level of accuracy in identifying medical procedures related to plastic surgery among the students who attended a plastic surgery rotation. The decisions made by medical students, as future physicians, my influence the cost of medical care and compromise the patient’s health, if not appropriate and accurate. The misconception about plastic surgery was greater among students who relied on the media and not on the medical curricula to obtain their knowledge and information. If the misconceptions amongst medical students regarding plastic surgery are preemptively combatted, then this will allow for a better understanding of plastic surgery procedures, improved referral patterns, and subsequently increased patient satisfaction.
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