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Changes in Career Perceptions Following a Three-Month General Surgery Internship Among Newly Graduated Medical Doctors in Pakistan: A Pre–Post Study

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Abstract

Background:
Exposure to the surgical environment may influence medical graduates' perceptions of General Surgery as a career. In Pakistan, the three-month General Surgery internship undertaken as part of the house job provides newly graduated doctors with greater clinical exposure and opportunities for mentorship. However, limited evidence exists regarding its influence on perceptions of General Surgery as a career choice. This study assessed changes in career-related perceptions before and after a three-month General Surgery internship among newly graduated medical doctors in Pakistan.

Methods:
An observational pre–post study was conducted among medical graduates undertaking a three-month General Surgery internship at FMH College of Medicine & Dentistry, Lahore, Pakistan, from April 2021 to April 2022. Participants completed an online questionnaire one week before and within one week after completing the internship. Thirteen perception domains were assessed using a five-point Likert scale. Paired-sample t-tests were used to compare pre- and post-internship mean scores. Post-internship differences across predefined career-choice groups were assessed using two-way analysis of variance and Tukey's HSD post-hoc test.

Results:
A total of 124 participants completed both pre- and post-internship surveys; 80 (64.5%) were female. At the end of the internship, 14 participants (11.3%) selected General Surgery as their intended future career. Mean scores for **exposure to surgeries** and **having a mentor in General Surgery** increased significantly following the internship, while no significant changes were observed in the remaining perception domains. At the post-internship assessment, participants choosing General Surgery had significantly higher scores for perceived **aptitude** (4.43 vs. 3.27, $p<0.001$), **personality traits and values** (3.86 vs. 2.95, $p=0.001$), **role model and mentor** (4.07 vs. 3.36, $p=0.028$), and **diversity** (4.29 vs. 3.75, $p=0.027$) compared with those choosing other specialties. Several perceptions also differed by gender, academic achievement, and having a first-degree relative practicing General Surgery.

Conclusions:
A three-month General Surgery internship was associated with greater perceived exposure to surgery and stronger recognition of mentorship, while most career-related perceptions remained unchanged. Among graduates who selected General Surgery as a future career, perceived aptitude, personality fit, mentorship, and career diversity were particularly prominent. These findings suggest that structured clinical exposure and mentorship may be important components of surgical career development among newly graduated doctors in Pakistan. Multicenter studies with longer follow-up are needed to determine whether changes in perceptions translate into sustained career choices.

1. Introduction

Surgery as a future career fascinates many students right from the inception of their medical schools. However, a significant decline in interest towards surgery is seen later during the clinical years of medical school, with only a few opting for it as a career [1, 2]. Numerous factors influence these career decisions, chief among them being exposure to the surgical environment during clinical rotations [3, 4].

In the Western medical education system, students undergo intensive clinical rotations, known as clerkships, in the latter stages of their training. These surgical clerkships can profoundly influence their perceptions and career-related decisions [5]. Similarly, in Pakistan, medical students embark on their clinical rotations during the last three years of medical school. However, most of these rotations fail to offer much hands-on experience at the undergraduate level, especially in the field of surgery. The concept of "surgical shadowing" for medical students, as studied by Bartlett et al., remains largely unknown in Pakistan but could be instrumental in familiarizing students with the surgical setting [6].

The uncertainties regarding a surgical career choice that an undergraduate student carries can be cleared up during a 3-month paid internship after graduation (as a part of the 1-Year house job). These internships provide an excellent opportunity for newbie doctors to become well accustomed to the lifestyle and working environment of different specialties, with plenty of hands-on experience and opportunities to find mentors and role models [7]. Nevertheless, there is a scarcity of literature assessing the impact of this present 3-month surgical internship program on the perceptions of fresh medical graduates about General Surgery as a future career choice.

The rationale for designing this study is to determine the impact of a 3-month General Surgery internship on the perceptions of fresh medical graduates regarding General Surgery as their future career option. Additionally, it seeks to examine any associations between graduates' perceptions and factors such as socioeconomic status, academic performance, and extracurricular activities. Ultimately, the study intends to propose recommendations for tailoring the surgical internship program to attract more graduates to this overlooked specialty, particularly in a developing country like Pakistan.

2. Methods

This observational pre-post study was conducted at the FMH College of Medicine & Dentistry, Lahore, Pakistan spanning from April 2021 to April 2022. A survey questionnaire was formulated after a thorough literature review on perceptions and influencing factors regarding general surgery as a career choice [1, 8, 9]. The questionnaire was piloted on a cohort of senior house officers/interns. The content was further validated by two expert general surgeons.

All medical graduates starting their general surgery house job/internship were administered an online survey questionnaire via Google forms. Survey forms were administered one week before and within a week of the 3-month general surgery rotation. Those who completed the survey forms at both intervals were included in the study. All thirteen perception questions were answered on a 5-point Likert scale (Strongly Disagree = 1, Disagree = 2, Neutral = 3, Agree = 4, Strongly Agree = 5). After the post-interval survey, four groups were devised based on career choice: 1) general surgery (pre) to general surgery

(post), 2) general surgery (pre) to not general surgery, 3) not general surgery (pre) to not general surgery (post), 4) not general surgery (pre) to general surgery (post).

Data analysis was conducted using IBM SPSS v.22. Descriptive statistics were utilized to examine participant distribution and demographics, presented in percentages and proportions. The Likert scale responses were treated as quantitative data, with mean values calculated alongside standard deviations where appropriate. Paired sample t-tests were employed to assess significant differences in mean values between pre- and post-interval responses. Furthermore, two-way analysis of variance (ANOVA) and Tukey's Honestly Significant Difference (HSD) post-hoc test were conducted to identify significant mean differences across and within the four career groups post-interval, respectively. The alpha error was set at 5%, with a p-value of less than 0.05 considered significant for analytical purposes.

3. Results

A total of 124 participants completed the survey questionnaire at both the pre- and post-internship interval. (Fig. 1) Among these, the majority were females, comprising 80 participants (64.5%). (Table 1) At the conclusion of the 3-month surgical internship, 14 participants (11.3%) chose general surgery as their future career. Out of these, only 4 (28.6%) were females.

The overall comparison of mean perception scores at the pre- and post-internship intervals showed significantly higher mean scores for "Exposure to surgeries" and "Mentor in General Surgery" at the post-internship interval. (Table 2) The rest of the perception variables did not show a significant change.

Overall, Internal Medicine remained the top career choice at the pre-internship interval, whereas Gynaecology & Obstetrics was the top career choice at the post-internship interval. However, none of the males opted for the latter, neither at the pre- nor at the post-internship interval. General Surgery remained the third most opted career choice at both intervals. (Table 3)

Upon further stratified analysis based on gender at the post-internship interval, the mean scores for "Aptitude for General Surgery" (males = 3.73, females = 3.23; $p = 0.01$), "Surgery is a Competitive Career" (males = 4.48, females = 3.90; $p < 0.001$), "Personality traits & Values Match with Surgeon's" (males = 3.30, females = 2.91; $p = 0.035$) were all significantly higher among males. In contrast, females had significantly higher mean scores in "Surgery is a Gender-biased Career" (females = 3.85, males = 3.43; $p = 0.032$) and "Surgical Career preference for Spouse" (females = 3.31, males = 2.61; $p = 0.003$) at the post-internship interval.

At the post-internship interval, those opting for general surgery as the future career had significantly higher mean scores for "Aptitude" (4.43 vs 3.27, $p < 0.001$), "Personality Traits & Values" (3.86 vs 2.95, $p = 0.001$), "Role Model & Mentor" (4.07 vs 3.36, $p = 0.028$) and "Diversity" (4.29 vs 3.75, $p = 0.027$) compared to those who opted for careers other than general surgery.

Furthermore, at the post-internship interval, graduates who were high achievers had a lower mean score for “Prestige” than the average achievers (3.58 vs 4.10; p = 0.042). Additionally, those who had a first-degree relative practicing general surgery had a lower mean score for “Stressful & Difficult” (3.46 vs 3.86; p = 0.044) and a higher mean score for “Role Model & Mentor” (3.89 vs 3.31; p = 0.017).

Likewise, at the post-interval, there were significant differences in means across the four career choice groups for the perception questions on "Aptitude", "Prestige", "Earnings", and “Personality values & traits”. (Tables 4 & 5)

4. Discussion

The study engaged a group of participants in a pre- and post-internship survey exploration, with a predominant representation of female participants. Post-internship, males showed significantly higher mean scores in aptitude and career perception towards general surgery, while females exhibited higher scores in perceptions related to gender bias and spousal preference in surgical careers. Besides individualized perceptions and gender stratification, the study also explored variables associated with changes in career choices at the pre- and post-internship intervals by categorizing participants into four groups (Tables 4 and 5).

In a study, initially, ten participants expressed interest in surgery. After completing their clerkship, this number increased by twenty, bringing the total to thirty. The surge in interest was attributed to finding mentors and acquiring skills during the clerkship [5]. A significant frequency of duty hour violations was observed, indicating the demanding and hectic schedule typical in general surgery, as evidenced by a study. This could be attributed to factors such as marital status and the desire to spend more time with family [10].

Previous studies demonstrate that surgical exposure and mentorship are crucial in shaping career choices [11, 12]. Exposure to surgical procedures during clinical rotations inclined more interest toward surgery, a trend also observed in our study [1, 13]. Similarly, mentorship as a key factor influencing career choices in surgery mentorship has been consistently identified among students [13]. Structured internships as conducted in the West significantly boost interest in surgery, a finding that diverges from our study. In Pakistan, a lack of hands-on experience in undergraduate surgical rotations may explain why the internship period did not substantially increase the number of students opting for surgery as a future career.

Our study revealed gender discrepancies in perceptions of surgical careers post-internship. Males exhibited higher aptitude scores for general surgery, viewing it as a more competitive field. Similar to our findings, males were more likely to view surgery as a competitive career, while females perceived greater challenges related to work-life balance and gender biases [14–17]. The observed gender disparities highlight the need for policies that encourage female participation in surgical careers. Females having less interest in surgery as a future career may be attributed to the preference of having a role model of the same gender and fewer women in surgery who can act as their mentors [18, 19]. It also has been

identified that females prefer going to the field having higher proportion of women [20, 21]. To overcome this, the implementation of structured mentorship programs aimed at fostering role models for female trainees. However, a few studies have shown that mentorship programs designed for females regardless of the model gender increase female medical students' interest in a career [22].

Hands-on surgical experience and structured learning should be incorporated into the internships to maximize learning and significantly impact future career choices. Our findings indicate that although exposure to surgery improved significantly post-internship, it did not translate into an increased number of students choosing surgery. Meaningful engagement with surgical procedures during internships can help overcome post-internship career choices as recommended by a prior study [1, 23].

Participants inclined towards general surgery demonstrated stronger scores in various areas, including aptitude, personality traits, and mentorship, indicating a heightened dedication to the specialty. Additionally, perceptions of prestige varied across groups, highlighting diverse influences on career preferences. These findings emphasize the need to tackle gender biases and foster mentorship programs to ensure fair opportunities in surgical specialties.

We identified several limitations in our study. Firstly, the research's single institution focus in Pakistan limits the broader applicability of its findings across diverse healthcare systems. Secondly, the reliance on self-reported perceptions through Likert scales may introduce bias stemming from participants' subjectivity or social desirability. Participants may have answered in a socially desirable manner rather than reflecting their true perceptions [24]. Thirdly, given its focus on a single institution in Pakistan, the study's findings may not fully capture the broader contextual factors influencing surgical career choices in other cultural or healthcare contexts, further limiting the generalizability of the results. Finally, long-term follow-up studies are needed to determine whether the impact of the surgical internship is sustained over time and turns into actual career choices.

Declarations

A statement on participant consent - The need for consent was waived by the ethics committee on the condition of maintaining the anonymity of the participants. A statement of ethics approval: The study was reviewed and approved by the IRB of FMH College of Medicine & Dentistry, IRB number: FMH-03-2021-IRB-877-M.

References

1. Peel JK, Schlachta CM, Alkhamesi NA (2018) A systematic review of the factors affecting choice of surgery as a career. Can J Surg 61(1):58–67. 10.1503/cjs.008217. PMID: 29368678; PMCID: PMC5785290
2. Rehman A, Rehman T, Shaikh MA, Yasmin H, Asif A, Kafil H (2011) Pakistani medical students' specialty preference and the influencing factors. J Pak Med Assoc 61(7):713–718 PMID: 22204259

3. Coffeng LE, Visscher AJ, Ten Cate OT (2009) The influence of early clinical experiences on career preference of male and female medical students. Med Teach. ;31(7):e323-6. 10.1080/01421590802650084. PMID: 19811141
4. Kirkham JC, Widmann WD, Leddy D, Goldstein MJ, Samstein B, El-Tamer M, Harari A, Arnell TD, John R, Hardy MA (2006) Nov-Dec;63(6):397–400 Medical student entry into general surgery increases with early exposure to surgery and to surgeons. Curr Surg. 10.1016/j.cursur.2006.05.005. PMID: 17084768
5. Makama JG, Ameh EA (2010) Does general surgery clerkship make a future career in surgery more appealing to medical students? Afr Health Sci 10(3):292–296 PMID: 21327142; PMCID: PMC3035956
6. Bartlett RD, Momin SM, Azam S, Rotimi O, Quick TJ (2019) Development of a Surgical Shadowing Scheme to improve undergraduate experiences of surgery. Adv Med Educ Pract 10:619–626 PMID: 31496863; PMCID: PMC6698155
7. Hossain N, Hossain T (2016) Motivating factors and barriers towards choosing a career in general surgery: a review of the literature. Int Surg J [Internet]. ;2(2):121-4. Available from: https://www.ijsurgery.com/index.php/isj/article/view/504
8. Yang Y, Li J, Wu X, Wang J, Li W, Zhu Y, Chen C, Lin H (2019) Factors influencing subspecialty choice among medical students: a systematic review and meta-analysis. BMJ Open 9(3):e022097. 10.1136/bmjopen-2018-022097. PMID: 30850399; PMCID: PMC6429728
9. Brundage SI, Lucci A, Miller CC, Azizzadeh A, Spain DA, Kozar RA (2005) Potential targets to encourage a surgical career. J Am Coll Surg. ;200(6):946 – 53. 10.1016/j.jamcollsurg.2005.02.033. PMID: 15922210
10. Ellis RJ, Holmstrom AL, Hewitt DB, Engelhardt KE, Yang AD, Merkow RP, Bilimoria KY, Hu YY (2020) A comprehensive national survey on thoughts of leaving residency, alternative career paths, and reasons for staying in general surgery training. Am J Surg 219(2):227–232 Epub 2019 Oct 25. PMID: 31679652; PMCID: PMC7024040
11. Kerdegari N, Tandanu E, Lee K, Zakri R, Dasgupta P, Chandak P (2024) A prospective cohort study on the role of surgical mentorship on medical students' surgical experience and attitudes towards surgery. BMC Med Educ 24(1):1116. 10.1186/s12909-024-06047-0. PMID: 39390549; PMCID: PMC11468475
12. Gurgel RK, Schiff BA, Flint JH, Miller RA, Zahtz GD, Smith RV, Fried MP, Smith RJ (2010) Mentoring in otolaryngology training programs. Otolaryngol Head Neck Surg. ;142(4):487 – 92. doi: 10.1016/j.otohns.2009.12.002. PMID: 20304265
13. Nguyen SQ, Divino CM (2007) Surgical residents as medical student mentors. Am J Surg. ;193(1):90 – 3. 10.1016/j.amjsurg.2006.07.011. PMID: 17188095
14. Park J, Minor S, Taylor RA, Vikis E, Poenaru D (2005) Why are women deterred from general surgery training? Am J Surg. ;190(1):141-6. 10.1016/j.amjsurg.2005.04.008. PMID: 15972188

15. Ferris LE, Mackinnon SE, Mizgala CL, McNeill I (1996) Do Canadian female surgeons feel discriminated against as women? CMAJ 154(1):21–27 PMID: 8542564; PMCID: PMC1488087
16. McCord JH, McDonald R, Leverson G, Mahvi DM, Rikkers LF, Chen HC, Weber SM (2007) Motivation to pursue surgical subspecialty training: is there a gender difference? J Am Coll Surg 205(5):698–703. 10.1016/j.jamcollsurg.2007.06.014. Epub 2007 Sep 17. PMID: 17964446
17. Rasmussen JM, Najarian MM, Ties JS, Borgert AJ, Kallies KJ, Jarman BT (2021) Jan-Feb;78(1):119–125 Career Satisfaction, Gender Bias, and Work-Life Balance: A Contemporary Assessment of General Surgeons. J Surg Educ. doi: 10.1016/j.jsurg.2020.06.012. Epub 2020 Jul 3. PMID: 32624451
18. Ek EW, Ek ET, Mackay SD (2005) Undergraduate experience of surgical teaching and its influence and its influence on career choice. ANZ J Surg. ;75(8):713-8. 10.1111/j.1445-2197.2005.03500.x. PMID: 16076339
19. Neumayer L, Konishi G, L'Archeveque D, Choi R, Ferrario T, McGrath J, Nakawatase T, Freischlag J, Levinson W (1993) Female surgeons in the 1990s. Academic role models. Arch Surg. ;128(6):669 – 72. 10.1001/archsurg.1993.01420180071013. PMID: 8503771
20. Jagsi R, Griffith KA, DeCastro RA, Ubel P (2014) Sex, role models, and specialty choices among graduates of US medical schools in 2006–2008. J Am Coll Surg 218(3):345–352 Epub 2013 Nov 20. PMID: 24468225
21. Rouprêt M, Maggiori L, Lefevre JH (2011) Upcoming female preponderance within surgery residents and the association of sex with the surgical career choice in the new millennium: results from a national survey in France. Am J Surg 202(2):237–242 Epub 2011 Jun 16. PMID: 21679917
22. Farkas AH, Bonifacino E, Turner R, Tilstra SA, Corbelli JA (2019) Mentorship of Women in Academic Medicine: a Systematic Review. J Gen Intern Med 34(7):1322–1329. 10.1007/s11606-019-04955-2. PMID: 31037545; PMCID: PMC6614283
23. Hoffmann H, Oertli D, Mechera R, Dell-Kuster S, Rosenthal R, Reznick R, MacDonald H Comparison of Canadian and Swiss Surgical Training Curricula: Moving on Toward Competency-Based Surgical Education. J Surg Educ 2017 Jan-Feb ;74(1):37–46. doi: 10.1016/j.jsurg.2016.07.013. Epub 2016 Sep 30. PMID: 27697404.
24. Podsakoff PM, MacKenzie SB, Lee JY, Podsakoff NP (2003) Common method biases in behavioral research: a critical review of the literature and recommended remedies. J Appl Psychol. ;88(5):879–903. 10.1037/0021-9010.88.5.879. PMID: 14516251

Tables

Tables are available in the Supplementary Files section.

Figures

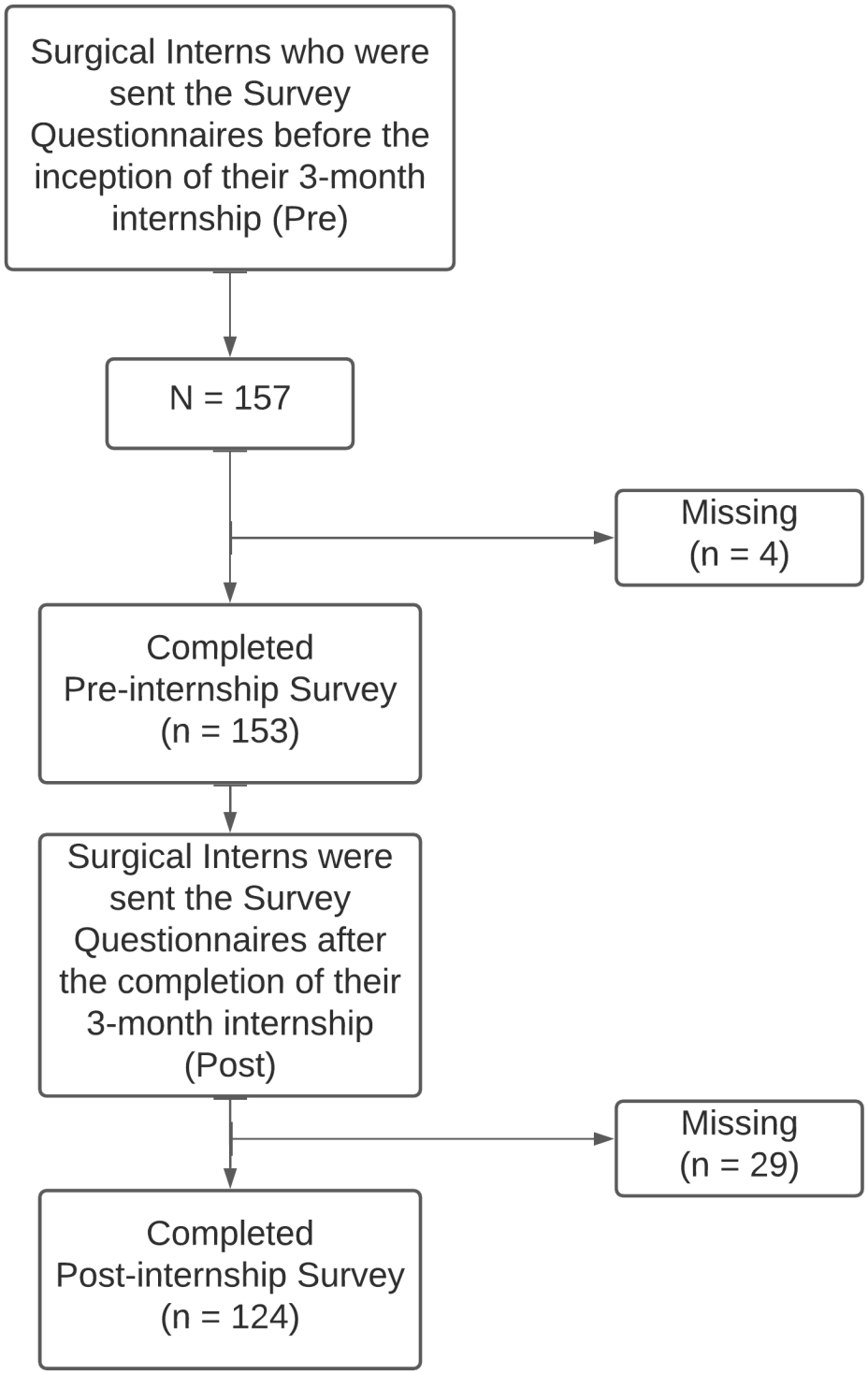


Figure 1

Flowchart of participation in pre- and post- internship surveys

Supplementary Files

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