



THE AGA KHAN UNIVERSITY

eCommons@AKU

---

Medical College Documents

Medical College, Pakistan

---

1-7-2022

## Societal preferences for gender of surgeons: A cross-sectional study in the general population of Pakistan

Russell S. Martins

*Aga Khan University*, [russell.martins@scholar.aku.edu](mailto:russell.martins@scholar.aku.edu)

Mishal Gillani

*Aga Khan University*, [mishal.gillani@scholar.aku.edu](mailto:mishal.gillani@scholar.aku.edu)

Samreen Jawaid

*Dow University of Health Sciences*

Syeda Maryam Zehra Zaidi

*Cedar College*

Mahim Akmal Malik

*Aga Khan University*, [mahim.malik@aku.edu](mailto:mahim.malik@aku.edu)

Follow this and additional works at: [https://ecommons.aku.edu/pakistan\\_fhs\\_mc\\_mc](https://ecommons.aku.edu/pakistan_fhs_mc_mc)



Part of the [Anatomy Commons](#), [Cardiology Commons](#), [Sociology Commons](#), and the [Surgery Commons](#)

---

### Recommended Citation

Martins, R. S., Gillani, M., Jawaid, S., Zaidi, S. M., Malik, M. A. (2022). Societal preferences for gender of surgeons: A cross-sectional study in the general population of Pakistan. *World journal of surgery*. Available at: [https://ecommons.aku.edu/pakistan\\_fhs\\_mc\\_mc/245](https://ecommons.aku.edu/pakistan_fhs_mc_mc/245)



# Societal Preferences for Gender of Surgeons: A Cross-Sectional Study in the General Population of Pakistan

Russell Seth Martins<sup>1</sup> · Mishal Gillani<sup>1</sup> · Samreen Jawaid<sup>2</sup> · Syeda Maryam Zehra Zaidi<sup>3</sup> · Mahim Akmal Malik<sup>4,5</sup> 

Accepted: 4 November 2021

© The Author(s) under exclusive licence to Société Internationale de Chirurgie 2021

## Abstract

**Background** Sociocultural norms and gender biases may result in surgeon gender preferences among the general public. This study aimed to understand preferences and perceptions related to surgeon gender among the general population in Pakistan, a lower-middle-income country.

**Methods** A cross-sectional study was conducted by the Aga Khan University, Karachi, among the adult general population in Pakistan. Sequential mixed-mode data collection was performed via online dissemination on social media platforms and in-person surveying at different geographic locations in Karachi.

**Results** Among 1604 respondents, 50% did not report having surgeon gender preferences in general. Among respondents with gender preferences, there was a highly significant preference for gender concordance across all surgical subspecialties ( $p < 0.001$ ) except cardiothoracic surgery and neurosurgery. Exceptions where women preferred a male surgeon were neurosurgery (59.7% vs. 40.3%;  $p < 0.001$ ) and cardiothoracic surgery (53.1% vs. 46.9%;  $p < 0.001$ ). Moreover, respondents felt more comfortable communicating with (67.6%) and being examined by (73.3%) gender concordant surgeons. Men more commonly perceived male surgeons as more competent (26% vs. 14.5%;  $p < 0.001$ ) and warmer (18.3% vs. 9.8%;  $p < 0.001$ ) than female surgeons. Nevertheless, the most important factors influencing selection of a surgeon were the surgeon's reputation (69.6%) and experience (50.5%). Most respondents (84.5%) believed that more females should practice surgery.

**Conclusion** While around half of respondents do not have gender preferences, a significant proportion prefers a gender concordant surgeon across subspecialties. In a society where conservative sociocultural norms play a significant role when seeking health care, this makes yet another compelling argument for gender parity in surgery.

Russell Seth Martins and Mishal Gillani have contributed equally to this paper.

✉ Mahim Akmal Malik  
mahim.malik@gmail.com

<sup>5</sup> Congenital Cardiothoracic Surgery, Section of Cardiothoracic Surgery, Aga Khan University Hospital, Karachi, Pakistan

<sup>1</sup> Medical College, Aga Khan University, Karachi 74800, Pakistan

<sup>2</sup> Medical College, Dow University of Health Sciences, Karachi 74200, Pakistan

<sup>3</sup> Cedar College, Karachi 75600, Pakistan

<sup>4</sup> Department of Surgery, Aga Khan University, Karachi 74800, Pakistan

## Introduction

A population's perceptions and preferences are important considerations in the provision of surgical health care. Perceptions of surgeons' attitudes may affect satisfaction with treatment [1], adherence to postoperative rehabilitation [2], recommendation patterns [3], trust in surgeons [4], and malpractice claims [5]. The effect of surgeons' genders in mediating patients' perceptions of surgeons is a complex interplay of social stereotypes. On one hand, gender stereotypes of women as being generally more warm but less competent than men may influence the public's perceptions of female surgeons (stereotype "spillover effects") [6–9]. On the other hand, occupational stereotypes regarding surgery as a traditionally male profession may cause the public to perceive women surgeons as "out of place" and both less competent and less warm (stereotype "backlash effects") [10–12].

Although patients' gender preferences with regards to surgeons are not fully understood, they are believed to be determined by multifactorial social and cultural influences. In Western countries such as the USA, studies across surgical subspecialties including orthopedics surgery [13, 14], oral and maxillofacial surgery [15], plastic surgery [16], and otolaryngology [17] have shown the largest percentage of patients to have no gender preference in surgeons. On the other hand, in non-Western countries, patients are more likely to demonstrate preference for gender concordance when choosing surgeons in subspecialties that entail sensitive physical examinations, such as obstetrics and gynecology (OBGYN), breast surgery, and urology. For instance, in the United Arab Emirates, over 85% of women prefer female gynecologists [18]. This stronger preference for gender concordance needs to be better understood but may be attributed to different sociocultural norms in non-Western countries.

In Pakistan, women surgeons represent a small minority across all surgical subspecialties in the country, barring breast surgery [19]. Deterrents to female representation in the field of surgery in Pakistan include cultural barriers, lack of women surgeon role models, and gender discrimination and abuse in surgery [19–22]. In the absence of the existing literature from Pakistan, it is unclear whether public perceptions of women surgeons further systemic barriers to achieving gender parity. Understanding preferences of the general public with regard to surgeon gender is an important step toward providing population-specific surgical care while striving toward gender equality. Thus, this study aims to understand preferences and perceptions related to surgeon gender among the general population in Pakistan and compare these across different sociodemographic strata.

## Methods

### Study setting and population

This cross-sectional study was conducted by the Aga Khan University Hospital (AKUH) in Pakistan, over January–February 2021, after obtaining ethical approval from the institutional review board. An anonymous self-administered survey was distributed to the adult ( $\geq 18$  years) general population in Pakistan.

### Data collection tool

The survey used in this study was adapted by the research team from a previously available questionnaire [14]. A consent form preceded the survey, explaining the aim of the study and the extent of participants' involvement. In addition, screening questions asking participants' age, nationality, and country of residence, were also included before the main survey. Respondents not meeting the inclusion criteria for this study (adult Pakistani national residing in Pakistan) were thus excluded. The survey and its consent form underwent translation to Urdu, the national language of Pakistan, which is spoken and understood by most of the country's population. Both the English and Urdu versions of the survey were pretested amongst adult members of the general population to identify and address any ambiguities prior to dissemination.

The final survey consisted of the following sections:

*Demographics* Age, sex, education, marital status, province of residence, and monthly family income.

Preference for Gender of Surgeons across Different Surgical Subspecialties

*Perception of male and female surgeons* Participants were asked to describe first male surgeons and then female surgeons from a list of 12 adjectives, six of which were coded as positive and six of which negative. A blank space was also left for participants to add their own adjectives, which were later coded as positive or negative. These were used to calculate a Positive Perception Score (PPS) for male and female surgeons, as was done by Inam et al. [19] (see Data Synthesis and Analysis).

Awareness of Challenges Faced by Female Surgeons

*Satisfaction with male and female surgeons* Respondents who had undergone surgery at any point in their adult life were asked to rate their satisfaction with their surgeon on a Likert scale (1 = Satisfied; 2 = Neither Satisfied nor Dissatisfied; and 3 = Dissatisfied).

## Sample size calculation and data collection procedure

Sample size was calculated using OpenEpi. Using an anticipated frequency of having a gender preference as 50% (which also provided the maximum required sample size) and 95% confidence level, the minimum required sample size was 384 individuals.

A sequential mixed-mode approach to data collection was used, whereby the survey was first distributed online via Google Forms and then in-person by a team of 15 data collectors. Mixed-mode data collection allowed a more nationally representative sample of survey respondents from different geographic locations across Pakistan via online platforms, while ensuring inclusion of the lower socioeconomic groups without internet access. Dividing the minimum required sample size of 384 equally across the two modes of data collection meant that a minimum of 192 responses were required from both the online and in-person data collection.

Online platforms for survey dissemination included Facebook, Twitter, and Instagram. Both the English and the Urdu versions of the tool were available for respondents online. The screening questions ensured only individuals meeting the inclusion criteria responded online, as ineligible respondents were directly routed to the end of the Google Forms survey.

In-person data collection was performed in different geographic locations within Karachi, the largest metropolitan city of Pakistan, by the 15 data collectors. In a conservative society like Pakistan's, individuals may not be comfortable engaging in a survey interview with a data collector of the opposite sex. Thus, in order to achieve similar representation of both the sexes in our sample, we selected eight female and seven male data collectors. Moreover, the in-person data collection would also help ensure a representative age distribution, as it was expected that most responses from online social media collection would be from young adults. Cluster sampling was employed for the in-person survey dissemination, with the 15 data collectors operating independently across the five administrative districts of Karachi (East, West, South, Central, and District Malir). This would ensure an ethnically and socioeconomically diverse population, and help negate the selection bias of online data collection. Data collectors approached potential participants in their area, and after explaining the scope and nature of the study, screened them for suitability of inclusion. If subjects fulfilled the inclusion criteria, they were provided with the paper survey, in English or Urdu as desired, which was then self-administered.

## Data synthesis and analysis

Statistical analysis was performed using IBM SPSS (Armonk, NY) version 23. Continuous data were reported as mean and standard deviation while categorical data were reported as frequencies and percentages. Chi-squared tests were used to compare categorical data. In the section Perception of Male and Female Surgeons, adjectives used to describe male and female surgeons were coded as "positive" or "negative". The Positive Perception Score was calculated by computing the percentage of positive adjectives used out of total adjectives used. The Positive Perception Score of respondents for male vs. female surgeons was compared using paired-sample *t*-tests. A *p*-value <0.05 was considered significant for all analyses.

## Results

### Demographics

A total of 1604 individuals, with mean age  $35.08 \pm 12.55$  years and 47.7% aged >35 years, responded to the survey. A similar number of responses were achieved from the online (901/1604; 56.2%) and in-person (703/1604; 43.8%) data collection modes. The majority of respondents were from Sindh (60.1%) and Punjab (21.3%), with 85.9% belonging to large metropolitan cities. Among these, 890 (55.5%) respondents were women, 677 (42.2%) were men, and 37 (2.3%) preferred not to reveal their sex. Around 68.2% of respondents had a college (undergraduate or postgraduate) degree. Barring those who chose not to reveal their monthly family income (33.6%), the highest percentage (20.3%) of respondents reported a monthly family income <50,000 PKR (324 USD) (Table 1).

### Preference for gender of surgeons

At least half of respondents overall reported no gender preference when choosing a surgeon for themselves (50%) or their family members (67.6%). However, among respondents who did have a preference, there was a clear preference for same-gender surgeons: around 89.5% of men preferred a male surgeon if they were to undergo surgery, while 88% of women likewise preferred a female surgeon ( $p < 0.001$ ). In addition, although most respondents believed that male and female surgeons were equally competent (72.8%), a significantly greater percentage of women believed female surgeons to be more competent than male surgeons (10.2% vs. 4.9%;  $p < 0.001$ ). Respondents from Punjab were most likely to report a gender preference when choosing a surgeon for themselves

(58.4%;  $p = 0.009$ ), as compared to Sindh (47.7%), Balochistan (51.4%), and Khyber Pakhtunkhwa (44.7%).

### Factors considered while choosing a surgeon

Overall, the most common factors considered in selecting a competent surgeon were the surgeon's experience (73.9%), reputation (46.9%), hospital (46.9%), and board certification (37%). Women were significantly more likely to report the surgeon's experience (79.1% vs. 68.2%;  $p < 0.001$ ), hospital (50.6% vs. 43.4%;  $p < 0.005$ ), and attitude toward patients (36.5% vs. 25.4%;  $p < 0.001$ ) as factors when considering a surgeon. Men were more likely to consider the surgeon's age (21% vs. 16%;  $p = 0.011$ ) and physical appearance (11.1% vs. 6.6%;  $p = 0.002$ ) when selecting a surgeon.

Finally, a significantly greater percentage of women reported considering surgeons' genders when selecting a surgeon (16.7% vs. 10.9%;  $p = 0.001$ ). Approximately one-fifth (19.4%) of respondents overall reported having been advised to choose a male surgeon over a female surgeon (Table 2).

### Effect of education on gender preferences

Respondents with a college degree were significantly more likely to report no preference of surgeon gender if they (52.7% vs. 44.1%;  $p = 0.003$ ) or their family member (69.7% vs. 63.3%;  $p < 0.001$ ) needed surgery. Respondents without a college degree were more likely to consider surgeons' gender (17.3% vs. 12.7%;  $p = 0.015$ ) and physical appearance (14.3% vs. 6.3%;  $p < 0.001$ ) when selecting a surgeon. Respondents with a college degree believed that male and female surgeons were equally competent (75.1% vs. 67.6%;  $p < 0.001$ ) and warm toward their patients (55.3% vs. 44.9%;  $p < 0.001$ ).

### Gender preference across surgical subspecialties

Most respondents reported gender preference for surgeons in OBGYN (76.5%), cardiothoracic surgery (51.2%), breast surgery (73.5%), and urology (53.6%).

Figure 1 shows respondents' preference of surgeon gender according to surgical subspecialties, after respondents with no preference were excluded. Women demonstrated gender concordant preferences for most specialties, which was particularly marked for OBGYN, breast surgery, and urology (all  $p < 0.001$ ). Men displayed a highly significant preference for male surgeons for all but two surgical subspecialties, only preferring female over male surgeons for OBGYN (97.2% vs. 2.8%;  $p < 0.001$ ) and breast surgery (96.8% vs. 3.8%;  $p < 0.001$ ).

**Table 1** Demographics

Variable	Overall ( $N = 1604$ ) $n$ (%) / Mean $\pm$ SD
<i>Age</i>	
18–35 Years	839 (52.3)
>35 Years	765 (47.7)
<i>Sex</i>	
Female	890 (55.5)
Male	677 (42.2)
Prefer not to say	37 (2.3)
<i>Province</i>	
Sindh	964 (60.1)
Punjab	341 (21.3)
Khyber Pakhtunkhwa	161 (10.0)
Balochistan	138 (8.6)
<i>Education</i>	
Uneducated	115 (7.2)
Primary school	125 (7.8)
Secondary school	270 (16.8)
Undergraduate degree	460 (28.7)
Postgraduate degree and higher	634 (39.5)
<i>Marital status</i>	
Single	585 (36.5)
Married	938 (58.5)
Divorced	32 (2.0)
Widowed	27 (1.7)
Other	22 (1.4)
<i>Monthly family income (PKR/USD)</i>	
<50,000 PKR/ 324 USD	326 (20.3)
50,000–100,000 PKR/324–648 USD	217 (13.5)
100,000–200,000 PKR/648–1296 USD	223 (13.9)
>200,000 PKR/1296 USD	299 (18.6)
Prefer not to say	539 (33.6)

PKR Pakistani rupee, SD standard deviation, USD United States dollar

### Perceptions of male and female surgeons

Overall, and in the male and female subsets of respondents, female surgeons were perceived significantly more positively than male surgeons. When compared according to level of education, however, a significant difference was only appreciated in respondents having a postgraduate or higher college degree ( $93.02\% \pm 14.11\%$  vs.  $87.16\% \pm 23.18\%$ ;  $p < 0.001$ ) (Table 3). There were no differences in the PPS between respondents from the four provinces.

Most respondents overall (84.5%) believed that more females should enter the field of surgery, with more women expressing this sentiment than men (89% vs. 79.5%;

$p < 0.001$ ). Men, on the other hand, were more likely to believe that females are better suited to non-surgical medical specialties (32.8% vs. 22.8%;  $p < 0.001$ ) are emotionally less stable than male surgeons (40.5% vs. 31.2%;  $p < 0.001$ ) and are less capable of handling difficult situations than male surgeons (28.7% vs. 19.1%;  $p < 0.001$ ). These results are shown in Table 4.

Women were more likely than men to perceive gender discrimination in surgery (49.3% vs. 39%;  $p < 0.001$ ) and hostile working conditions in surgery (35.2% vs. 30%;  $p = 0.031$ ) as reasons for the shortage of female surgeons (Table 4).

### Satisfaction with male and female surgeons

A total of 529 individuals (33%) had undergone at least one operation, for a total of 1053 operations. Out of these, 585 (55.6%) operations were performed by male surgeons.

Respondents reported high levels of satisfaction with both male and female surgeons (84.3% vs. 83.1%, respectively;  $p = 0.254$ ). Overall, 106 respondents had undergone operations by at least one male and at least one female surgeon. Out of these, 74 (69.8%) felt that both their male and female surgeons were equally competent.

### Discussion

Our findings show that while 50% of the general population in Pakistan report not having surgeon gender preferences in general, there is a significant preference for gender concordance across most surgical subspecialties. In our study, female surgeons were perceived as warmer but less competent than male surgeons. Gender Schema theory, which refers to a cognitive structure regarding the expectations a person has for other individuals based on

**Table 2** Preference for gender of surgeons

	Overall <i>n</i> (%)	Male <i>n</i> (%)	Female <i>n</i> (%)	<i>p</i> Value
<i>Preference for surgery for self</i>				
Male surgeon	342 (21.3)	281 (41.5)	57 (6.4)	<b>&lt;0.001</b>
Female surgeon	460 (28.7)	33 (4.9)	419 (47.1)	
No preference	802 (50.0)	363 (53.6)	414 (46.5)	
<i>Preference for surgery for family member</i>				
Male surgeon	264 (16.5)	143 (21.1)	113 (12.7)	<b>&lt;0.001</b>
Female surgeon	255 (15.9)	77 (11.4)	176 (19.8)	
No preference	1085 (67.6)	457 (67.5)	601 (67.5)	
<i>Who do you think is more competent?</i>				
Male surgeon	309 (19.3)	176 (26.0)	129 (14.5)	<b>&lt;0.001</b>
Female surgeon	128 (8.0)	33 (4.9)	91 (10.2)	
No difference/both equal	1167 (72.8)	468 (69.1)	670 (75.3)	
<i>Factors considered to select a competent surgeon</i>				
Experience	1186 (73.9)	464 (68.2)	704 (79.1)	<b>&lt;0.001</b>
Surgeon's reputation	1117 (69.6)	486 (71.8)	611 (68.7)	0.180
Hospital surgeon works at	753 (46.9)	294 (43.4)	450 (50.6)	<b>0.005</b>
Board certification	593 (37.0)	238 (35.2)	340 (38.2)	0.216
Surgeon's attitude toward patients	507 (31.6)	172 (25.4)	325 (36.5)	<b>&lt;0.001</b>
Age of surgeon	295 (18.4)	142 (21.0)	142 (16.0)	<b>0.011</b>
Surgeon's gender	227 (14.2)	74 (10.9)	149 (16.7)	<b>0.001</b>
Amount of surgeon's published research	158 (9.9)	64 (9.5)	90 (10.1)	0.664
Physical appearance	142 (8.9)	75 (11.1)	59 (6.6)	<b>0.002</b>
<i>Who do you think has a warmer approach to patients?</i>				
Male surgeon	215 (13.4)	124 (18.3)	87 (9.8)	<b>&lt;0.001</b>
Female surgeon	555 (34.6)	229 (33.8)	321 (36.1)	
No difference/both equal	834 (52.0)	324 (47.9)	482 (54.2)	
Been told to choose a male surgeon over a female	311 (19.4)	125 (18.5)	178 (20.0)	0.486

Bold values indicates  $p < 0.05$



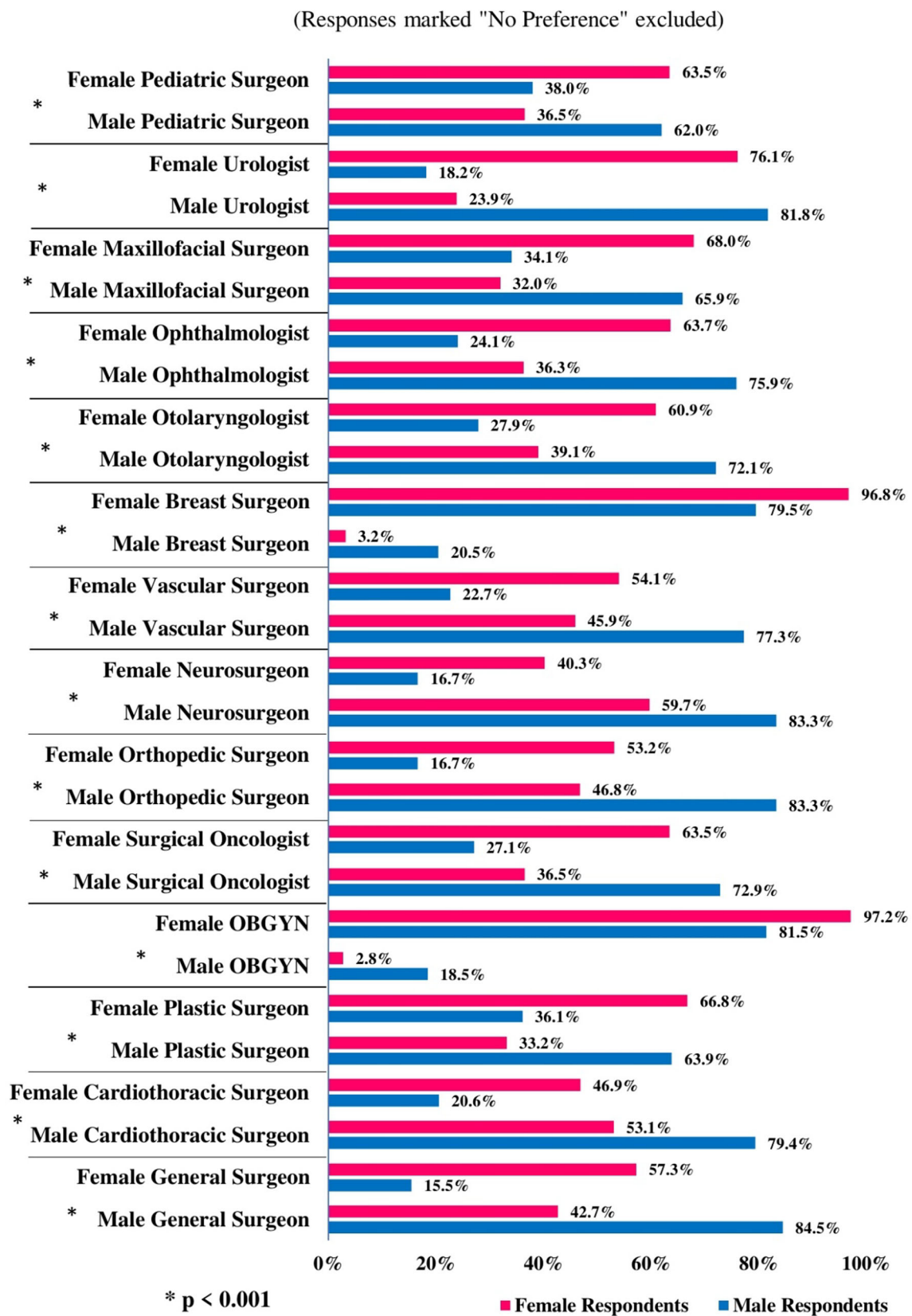


Fig. 1 Respondents' preference by subspecialties (responses marked "No Preference" excluded)

biological sex, attempts to explain this perception [23], where men are expected to be direct and assertive (“agentic”), while women are expected to be supportive and nurturing (“communal”). However, women surgeons are expected to show a combination of both agentic traits so that they are deemed competent, and communal traits for societal approval [24].

At least half of the respondents in our study reported having no preferences for most surgical subspecialties, barring OBGYN, breast surgery, cardiothoracic surgery, and urology where the majority had gender preferences. The results like ours have been reported by a study conducted in Lebanon, where despite half the population reporting no gender preferences for surgeons overall, respondents were more likely to prefer male cardiac, orthopedic, and neurosurgeons over females [25]. Given the influence of mass media, it is likely that the historic predominance of surgeons across news media, medical dramas, and television shows reinforces gender biases in these specialties [26–28]. It is heartening, however, that social media movements such as #ILookLikeASurgeon and #YouCantBeWhatYouCantSee have made global strides in negating gender-based stereotypes by increasing the visibility of female surgeons around the world [29].

Preferences for gender concordance were also seen in how most respondents reported that they felt more comfortable communicating with (67.6%) and being examined by (73.3%) surgeons of the same gender as themselves. In the West, gender concordance is more likely to be

preferred only in surgical subspecialties that entail physical examinations of a sensitive nature, such as OBGYN, urology, or breast surgery [30–35]. However, even in these subspecialties, a sizeable percentage of patients in Western populations still report no gender preference [34, 35]. The preference for gender concordance across most surgical subspecialties in our population likely reflects conservative sociocultural elements within Pakistani society.

Preference for gender concordance with regard to selection of surgeon may have far-reaching public health implications for surgery in Pakistan. The region of South Asia, which includes Pakistan, is second only to Africa in terms of unmet need for surgical care [36]. This notion is supported by the predominantly gender concordant surgeon preferences in our study, and the prospect of eliminating gender disparities in the unmet need for surgical care is an attractive incentive for national commitment to increasing women surgeons in Pakistan.

This study has a few limitations. These include unequal representation from the four administrative provinces of Pakistan, from rural populations in the country, and selection bias against nonusers of social media, despite employing a mixed mode of questionnaire dissemination. Moreover, although the self-administered nature of the survey provided respondents with privacy and helped reduce social desirability bias, it precluded those without the ability to read from filling the survey. In addition, the role of religion in mediating the public’s perceptions regarding surgeons was not explored. Lastly, the proportion

**Table 3** Positive perception scores for male and female surgeons

Positive perception score	Female surgeons Mean ± SD	Male surgeons Mean ± SD	<i>p</i> Value
Overall sample ( <i>N</i> = 1604)			
Positive perception score (%)	88.05 ± 21.17	85.09 ± 25.31	<b>&lt;0.001</b>
Male subset ( <i>N</i> = 677)			
Positive perception score (%)	87.44 ± 21.14	83.66 ± 26.34	<b>0.002</b>
Female subset ( <i>N</i> = 890)			
Positive perception score (%)	89.04 ± 20.40	86.70 ± 24.01	<b>0.021</b>
No education ( <i>N</i> = 112)			
Positive perception score (%)	84.52 ± 26.54	83.03 ± 29.98	0.598
Primary education ( <i>N</i> = 121)			
Positive perception score (%)	76.46 ± 25.71	75.46 ± 28.71	0.743
Secondary education ( <i>N</i> = 208)			
Positive perception score (%)	81.07 ± 27.29	82.71 ± 25.61	0.410
Undergraduate degree ( <i>N</i> = 351)			
Positive perception score (%)	89.81 ± 19.52	87.37 ± 24.57	0.111
Postgraduate degree or higher ( <i>N</i> = 530)			
Positive perception score (%)	93.02 ± 14.11	87.16 ± 23.18	<b>&lt;0.001</b>

Bold values indicates *p* < 0.05



**Table 4** Perceptions regarding surgeons' gender and awareness of challenges for female surgeons

	Overall <i>n</i> (%)	Male <i>n</i> (%)	Female <i>n</i> (%)	<i>p</i> Value
<i>More females should enter the field of surgery<sup>a</sup></i>				
Strongly agree/agree	1355 (84.5)	538 (79.5)	792 (89.0)	<b>&lt;0.001</b>
Strongly disagree/disagree	70 (4.4)	37 (5.5)	26 (2.9)	
<i>MS have better surgical outcomes than FS<sup>a</sup></i>				
Strongly agree/agree	520 (32.4)	274 (40.5)	239 (26.9)	<b>&lt;0.001</b>
Strongly disagree/disagree	566 (35.3)	192 (28.4)	357 (40.1)	
<i>Females are better suited to non-surgical specialties<sup>a</sup></i>				
Strongly agree/agree	435 (27.1)	222 (32.8)	203 (22.8)	<b>&lt;0.001</b>
Strongly disagree/disagree	757 (47.2)	251 (37.1)	488 (54.8)	
<i>FS are emotionally less stable than MS<sup>a</sup></i>				
Strongly agree/agree	563 (35.1)	274 (40.5)	278 (31.2)	<b>&lt;0.001</b>
Strongly disagree/disagree	671 (41.8)	214 (31.6)	439 (49.3)	
<i>MS are more skilled than FS<sup>a</sup></i>				
Strongly agree/agree	607 (37.8)	303 (44.8)	295 (33.1)	<b>&lt;0.001</b>
Strongly disagree/disagree	577 (36.0)	199 (29.4)	358 (40.2)	
<i>I prefer being physically examined by SGS<sup>a</sup></i>				
Strongly agree/agree	1176 (73.3)	464 (68.5)	692 (77.8)	<b>&lt;0.001</b>
Strongly disagree/disagree	151 (9.4)	77 (11.4)	62 (7.0)	
<i>Communication is easier with SGS<sup>a</sup></i>				
Strongly agree/agree	1084 (67.6)	442 (65.3)	626 (70.3)	<b>0.020</b>
Strongly disagree/disagree	232 (14.5)	96 (14.2)	129 (14.5)	
<i>FS are less capable to handle difficult situations<sup>a</sup></i>				
Strongly agree/agree	370 (23.1)	194 (28.7)	170 (19.1)	<b>&lt;0.001</b>
Strongly disagree/disagree	920 (57.4)	320 (47.3)	579 (65.1)	
<i>Respondent-perceived reasons for shortage of FS</i>				
Early marriage of women in surgery	1117 (69.6)	456 (67.4)	640 (71.9)	0.051
Cultural barriers for women to practice surgery	810 (50.5)	353 (52.1)	439 (49.3)	0.269
Gender discrimination in field of surgery	722 (45.0)	264 (39.0)	439 (49.3)	<b>&lt;0.001</b>
Hostile working conditions for FS	524 (32.7)	203 (30.0)	313 (35.2)	<b>0.031</b>
Long duration of training not feasible for women	390 (24.3)	157 (23.2)	228 (25.6)	0.269
Lack of awareness about a potential career in surgery	35 (22.1)	141 (20.8)	204 (22.9)	0.322
Less demand for FS (relative to MS)	236 (14.7)	95 (14.0)	134 (15.1)	0.570
Less competency of FS with regards to surgical skills	166 (10.3)	80 (11.8)	76 (8.5)	<b>0.032</b>

Bold values indicates  $p < 0.05$

FS female surgeons, MS male surgeons, SGS same-gender surgeons

<sup>a</sup>Responses marked "Neither Agree/ Disagree" not shown

of college-educated individuals from metropolitan cities in our dataset may hinder generalizability to rural populations from less privileged backgrounds.

## Conclusion

The findings of this study indicate that while at least half the respondents do not have a gender preference when seeking surgical care, a significant proportion prefers a

gender concordant surgical care provider. In a society where conservative sociocultural norms play a significant role when seeking health care, this makes yet another compelling argument for gender parity in surgery. Our results can form the basis for institutional efforts to work toward countering gender stereotypes and provide an environment that support women surgeons, while also encouraging more women to choose surgical careers. Considering that more medical students are now women, ignoring this equally qualified pool will serve as a missed

opportunity to fulfill the goal of equitable surgical care for all.

**Acknowledgements** We would like to acknowledge the Research and Development Wing of the Society for Promoting Innovation in Education at the Aga Khan University for providing valuable research mentorship to author Syeda Maryam Zehra Zaidi.

### Declarations

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical approval** This study was conducted in accordance with all ethical principles outlined in the 1964 Declaration of Helsinki and its future amendments. The institutional review board at the Aga Khan University reviewed and approved the protocol of this study.

**Informed consent** Informed consent was obtained from all respondents.

### References

- Steinhausen S, Ommen O, Thüm S, Lefering R, Koehler T, Neugebauer E et al (2014) Physician empathy and subjective evaluation of medical treatment outcome in trauma surgery patients. *Patient Educ Couns* 95(1):53–60
- Kim SS, Kaplowitz S, Johnston MV (2004) The effects of physician empathy on patient satisfaction and compliance. *Eval Health Prof* 27(3):237–51. <https://doi.org/10.1177/0163278704267037>
- McLafferty RB, Williams RG, Lambert AD, Dunnington GL (2006) Surgeon communication behaviors that lead patients to not recommend the surgeon to family members or friends: analysis and impact. *Surgery* 140(4):616–624
- Axelrod DA, Goold SD (2000) Maintaining trust in the surgeon–patient relationship: challenges for the new millennium. *Arch Surg* 135(1):55–61. <https://doi.org/10.1001/archsurg.135.1.55>
- Ambady N, LaPlante D, Nguyen T, Rosenthal R, Chaumeton N, Levinson W (2002) Surgeons' tone of voice: a clue to malpractice history. *Surgery* 132(1):5–9
- Cejka MA, Eagly AH (1999) Gender-stereotypic images of occupations correspond to the sex segregation of employment. *Pers Soc Psychol Bull* 25(4):413–423. <https://doi.org/10.1177/0146167299025004002>
- Delgado A, López-Fernández L-A, de Dios Luna J, Saletti-Cuesta L, Gil N, Jiménez M (2011) The role of expectations in preferences of patients for a female or male general practitioner. *Patient Educ Couns* 82(1):49–57
- Nicolai J, Demmel R (2007) The impact of gender stereotypes on the evaluation of general practitioners' communication skills: an experimental study using transcripts of physician–patient encounters. *Patient Educ Couns* 69(1):200–205
- Eagly AH (2013) Sex differences in social behavior: a social-role interpretation. Psychology Press
- Rudman LA, Phelan JE (2008) Backlash effects for disconfirming gender stereotypes in organizations. *Res Organ Behav* 28:61–79
- Phelan JE, Rudman LA (2010) Prejudice toward female leaders: backlash effects and women's impression management dilemma. *Soc Pers Psychol Compass* 4(10):807–820
- Eagly AH, Karau SJ (2002) Role congruity theory of prejudice toward female leaders. *Psychol Rev* 109(3):573
- Abghari MS, Takemoto R, Sadiq A, Karia R, Phillips D, Egol KA (2014) Patient perceptions and preferences when choosing an orthopaedic surgeon. *Iowa Orthop J* 34:204
- Dineen HA, Patterson JMM, Eskildsen SM, Gan ZS, Li Q, Patterson BC et al (2019) Gender preferences of patients when selecting orthopaedic providers. *Iowa Orthop J* 39(1):203–210
- Franklin A, Carrico CK, Laskin DM (2017) Societal preference for gender of surgeons performing patients' surgery. *J Oral Maxillofac Surg* 75(3):458–461
- Huis in't Veld EA, Canales FL, Furnas HJ (2017) The impact of a plastic surgeon's gender on patient choice. *Aesthet Surg J* 37(4):466–71
- Chitgutti C, Brar T (2018) Do otolaryngology patients show gender preference when choosing a surgeon?—a quantitative and qualitative analysis. *Int Arch Otorhinolaryngol* 22(4):404–407
- Rizk DEE, El-Zubeir MA, Al-Dhaheer AM, Al-Mansouri FR, Al-Jenaibi HS (2005) Determinants of women's choice of their obstetrician and gynecologist provider in the UAE. *Acta Obstet Gynecol Scand* 84(1):48–53
- Inam H, Janjua M, Martins RS, Zahid N, Khan S, Sattar AK et al (2020) Cultural barriers for women in surgery: how thick is the glass ceiling? An analysis from a low middle-income country. *World J Surg* 44:2870–2878
- Malik M, Inam H, Janjua MBN, Martins RS, Zahid N, Khan S et al (2021) Factors affecting women surgeons' careers in low–middle-income countries: an international survey. *World J Surg* 45(2):362–368
- Martins RS, Hashmi SA, Inam H, Janjua M, Malik M (2021) Harassment and mental health in surgical training: a pilot survey of surgical trainees in Pakistan. *JPMA J Pak Med Assoc* 71(1 (Suppl 1)):S23
- Janjua MB, Inam H, Martins RS, Zahid N, Sattar AK, Khan SM et al (2020) Gender discrimination against female surgeons: a cross-sectional study in a lower-middle-income country. *Ann Med Surg* 57:157–162
- Starr CR, Zurbriggen EL (2017) Sandra Bem's gender schema theory after 34 years: a review of its reach and impact. *Sex Roles* 76(9):566–578
- Braun HJ, O'Sullivan PS, Dusch MN, McGrath MH, Ascher NL (2017) The roles of gender and demeanor in perceptions of female surgeons. *Arch Psychol*. <https://archivesofpsychology.org/index.php/aop/article/view/25>
- Halim NA, Beaineh P, Fenianos M, Gebran S, Msheik A, Sharara S et al (2020) Preferences of Lebanese adults for the gender of their surgeons: a cross-sectional study. *East Mediterr Health J* 26(5):573–579
- Pilz M, Stummer W, Holling M (2020) Neurosurgery in contemporary medical dramas: How Grey's Anatomy & Co. may affect perception of neurosurgery in the media. *J Neurol Surgery Part A Cent Eur Neurosurg* 81(06):495–500
- Motiwala M, Ajmera S, Akinduro O, Wallace D, Norrdahl SP, Schultz A et al (2019) How does the media portray neurosurgeons? *World Neurosurg* 122:e598–605
- Flores G (2002) Mad scientists, compassionate healers, and greedy egotists: the portrayal of physicians in the movies. *J Natl Med Assoc* 94(7):635
- Logghe H, Jones C, McCoubrey A, Fitzgerald E (2017) #LookLikeASurgeon: embracing diversity to improve patient outcomes. *BMJ*. <https://doi.org/10.1136/bmj.j4653>
- Childs AJ, Friedman WH, Schwartz MP, Johnson M, Royek AB (2005) Female patients' sex preferences in selection of gynecologists and surgeons. *South Med J* 98(4):405–409
- Schmittiel J, Selby JV, Grumbach K, Quesenberry CP (1999) Women's provider preferences for basic gynecology care in a large health maintenance organization. *J Women's Health Gender-Based Med* 8(6):825–33

32. Johnson AM, Schnatz PF, Kelsey AM, Ohannessian CM (2005) Do women prefer care from female or male obstetrician-gynecologists? A study of patient gender preference. *J Am Osteopat Assoc* 105(8):369–379
33. Tempest HV, Vowler S, Simpson A (2005) Patients' preference for gender of urologist. *Int J Clin Pract* 59(5):526–528
34. Cil TD, Easson AM (2018) The role of gender in patient preference for breast surgical care—a comment on equality. *Isr J Health Policy Res* 7(1):1–3
35. Wynn J, Johns PL (2021) Patient preference for urologist gender. *Int J Urol* 28(2):170–175
36. Meara JG, Leather AJM, Hagander L, Alkire BC, Alonso N, Ameh EA et al (2016) Global Surgery 2030: evidence and solutions for achieving health, welfare, and economic development. *Int J Obstet Anesth* 25:75–78

**Publisher's Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Mishal Gillani** Mishal Gillani is a final year medical student at the Aga Khan University, Pakistan. Her principle research interests include surgical oncology, trauma, cultural barriers and healthcare gender disparities. She has presented multiple posters on trauma with special emphasis on geriatric and penetrating trauma in National and International conferences. Her achievements include “Best Poster Award” at the 5th AKU Annual Surgical Conference.

She is a mentor to a number of students in their endeavors to conduct research. She is an avid horse-rider and loves playing basketball. @mishalgillani1.