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Grey's Anatomy: Gender Differences in Specialty Choice for Medical Students in China

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Abstract: Gender differences in sub-major choices within the science, technology, engineering, and mathematics (STEM) fields have scarcely been discussed. This study uses administrative records from a top medical school in China to examine gender differences in medical students' specialty choices. Results showed that, although the gender gap in choosing a clinical track shrinks over time, female students in the clinical track are far less likely to choose highly paid surgical specialties, and this gap persists over time. However, female students outperformed male students in all of the courses. Thus, academic performance cannot explain the underrepresentation of female students in surgery. We further collected questions such as "Why don't female students choose surgical specialties" and answers to them in "Chinese Quora", Zhihu.com. A preliminary text analysis showed that ultra-physical load, discrimination in recruitment, women-unfriendly work climates, and difficulties in taking care of family are barriers that prevent women from choosing surgery.

Keywords: STEM education; specialty choice; gender differences; medical students; female surgeon; China

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1. Introduction

Gender differences in college majors are important determinants of the wage gap between college-educated men and women [1]. Mainly, women are far less likely to take science, technology, engineering, and mathematics (STEM) majors, in which returns are higher than those of humanities, social sciences, and other majors. Moreover, even within the same occupation, men's earnings are higher than those of women; for example, male physicians earn more than female physicians over the entire career path [2–4]. A possible explanation for the gender earning gap in physicians is that female physicians are underrepresented in highly paid specialties, such as surgery. It is a global phenomenon that surgeons earn more than other specialties [5–7]. Surgery is predominantly performed by men globally [8]. According to the Association of American Medical Colleges (AAMC), only 22% of general surgeons in the United States were women in 2019 [9]. On China's largest online medical website, only 8% of surgeons are women, well below the 47.65% average for all specialties (see Appendix A). Thus, it is important to understand gender differences in college specialty choices. This study uses registration records from a top medical school and data from the largest social question-and-answer (SQA) website in China to examine gender differences in specialty choice and explore possible explanations.

1.1. Medical Education in China

As shown in Figure 1, medical education in China begins after high school and varies from 3–5 years at the undergraduate level. Clinical and non-clinical tracks were chosen immediately after the college entrance examination. The undergraduate curriculum for all students comprises basic courses in natural sciences, medical courses, and at least one year of clinical internship for clinical students. In the sample medical school, clinical-track students were required to take three years of natural science courses and medical courses, followed by two years of a clinical internship in the affiliated hospitals. The internship involved rotations in various departments, each lasting for several months. Most students in high-ranking medical schools continue to pursue a master's or doctoral degree after a five-year undergraduate education. At the beginning of the graduate study, students on the clinical track chose surgical or nonsurgical specialties. They had two-year residency training in hospitals affiliated with medical schools. After graduating from medical school, students in clinical specialties apply to positions offered by hospitals. Physicians are hospital employees in China. They belong to a specific department in the hospital, such as the general surgical, orthopedic, and endocrinology departments. A typical physician starts their career as a resident physician and can then be promoted to attending physician, associate chief physician, and chief physician of that department.

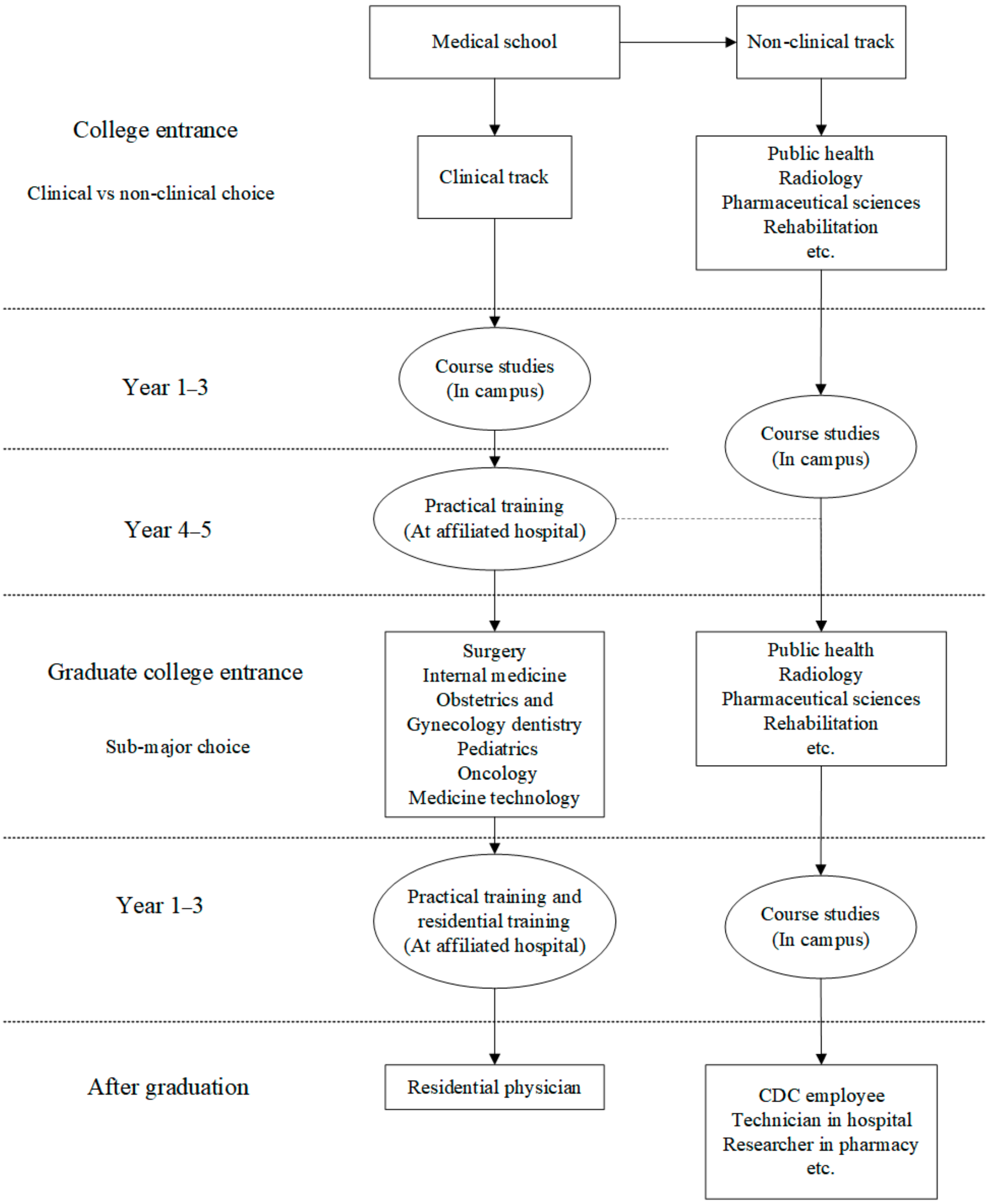

Figure 1. Specialty training program in medical school in China.

1.2. A Brief Review of Literature on Gender Differences in Major Choice

Many studies have documented gender differences in major choices [10,11]. Generally, female students are less likely to choose STEM majors [1,12,13]. Several typical reasons for the gender differences in STEM major choices are summarized.

The first one is academic performance and choice of their pre-college subject. Numerous studies have confirmed a correlation between course performance and major choices. Mathematics achievement in high school has proven to be a crucial determinant in choosing STEM majors in college [14]. The grades of introductory STEM courses in college have also substantially affected students' choices of relevant majors [15]. There is also contrary evidence. Justman and Mendez [16] denied that the gender imbalance in the choice of STEM major in Victoria, Australia, is driven by prior math achievement. Main and Ost [17] showed no causal effect of grades in the first-year economic course on the probability of majoring in economics. In many countries, the choice of a major in college is limited by the subjects chosen in high school, especially STEM majors. Delaney and Devereux [18] found that subject choice in secondary schools plays a vital role in explaining the gender difference in STEM major choice among students applying for college in Ireland. Another study using administrative data from Canada drew similar conclusions [19]. Another branch of the literature showed the complicated and gender-specific academic performance impact when majoring in STEM. Loyalka et al. [20] found that, when making choices between STEM and non-STEM tracks, girls tend to compare their STEM and non-STEM course performances, while boys tend to compare their STEM course performance with others. The findings of Delaney and Devereux [18] support an opposite pattern. Notably, the academic performance and subject choice in high school can still be traced back to many social and cultural factors [21,22].

The second is expected returns and labor market discrimination. Altonji et al. [23] systematically reviewed the role of demand in college students' major choices. Several studies have documented that major choices respond to wage changes in the labor market, as students would consider the current wage as the most important reference for their future wage [24,25]. However, ability sorting in major choices affects the returns of different majors in the labor market. Thus, most economic studies on this topic construct theoretical models based on individual utility maximization and estimate discrete choice models [26,27]. As for anticipated discrimination, although it has been widely documented that gender stereotypes harm women's performance in STEM [28], direct evidence of the impact of anticipated discrimination on major choice is limited. For example, Charness et al. [29] designed a novel hiring experiment where participants could choose their gender avatar (male, female, or neutral) sent to the firm. When assigned a math-related task, female participants were less likely to show their true gender to the firm because they anticipated potential discrimination.

The third is work–life balance. An increasing number of studies have focused on work–family issues for women in STEM fields, such as software professionals [30] and faculty in STEM departments [31]. Jean et al. [32] provided comprehensive reviews on women's family issues in STEM fields. In addition to the commonly discussed issues of pregnancy and childbirth, childcare, and dual-career couples, they noticed the unique challenges women face in STEM fields and the biological and career clock. Many jobs in STEM fields, such as physicians, require doctoral degrees, causing women to miss the best time to have children. Additionally, the motherhood penalty in STEM jobs may differ from that in the humanities and the social sciences. The seminal work of Bronson [33] showed that different college majors are different at "work-family flexibility", reflected as the wage penalty for temporary work interruption after marriage. Female students consider this in their choice of education.

Additionally, some scholars have used behavioral factors to explain women's choices of STEM majors. A study with administrative records of four high schools in China found that exposure to female peers with a good performance in math-related subjects increased the probability of taking a science track [34]. However, the impact of female peers on women's choice of major in STEM is more complicated and even reversed in several other studies [35,36]. A study utilizing data from U.S. medical schools found weak evidence for peer effects in the choice of specialty, and the effects were not heterogeneous by gender [37]. Porter and Serra [38] emphasized the importance of role models. Their field experiment showed that a successful female student in the introductory economic class could increase students' choice of economics as their major by eight percentage points. Other experiments in psychology and chemistry courses have yielded similar findings [39].

Clinical specialties yield a higher return on investment than non-clinical specialties among medical specialties, and surgical specialties are a better choice in terms of future income among clinical specialties. We aim to answer the following research questions, utilizing the registration records of students enrolled between 2001 and 2018 from a top medical school in China. First, is there a gender difference in the clinical and non-clinical choices of medical students? Second, is there a sex difference in surgery and nonsurgery choices for clinical students? If the answer is yes, to what extent can academic performance explain this gap? Do other factors, such as those mentioned above, expected labor market discrimination, and work–life balance contribute to the gap? Lastly, since it could not be accounted for in the medical school data, we analyzed the relevant questions on Zhihu, the largest Chinese online Q&A community, to make preliminary discussions.

This study contributes to the literature in several ways. First, it is the first study to document gender differences in the specialty choices of medical students in China. It helps to understand the gender imbalance in the medical industry in China. Second, this study highlights gender differences in sub-major choices within specific STEM majors. Previous studies have found that gender differences within STEM mean that women are less represented in math-intensive majors. However, the differences between clinical and non-clinical tracks and surgical and nonsurgical specialties are not relevant to math. Third, it enriches the discussion of high-achieving female students' choice of entering a male-dominated major, as the sampled medical school ranks in the top 10 for admission scores in the China College Entrance Examination. Finally, the gender differences in specialty choice discussed in this study provides implications for making policies that better support women's participation in STEM.

The remainder of this paper is organized as follows: Section 2 presents the data and statistical methods used in this study. The main results from the registration data of the medical schools are presented in Section 3. A further discussion of SQA site data is presented in Section 4. Section 5 concludes.

2. Materials and Methods

The main data we used were the registration records of all graduate students enrolled between 2001 and 2018 at a medical school. Located in a megacity, the medical school is one of the best medical schools in China. The data included students' gender, birth date, birthplace, degree type, and major or specialty. The original records covered 23,108 students, of whom 13,816 were women.

Overall, 36.52% of female students chose clinical specialties, compared to 41.47% of male students. Nevertheless, gender differences in clinical specialty choices have gradually vanished, as illustrated in Figure 2. Nonclinical specialties are diverse, including public health, epidemiology, and toxicology. Clinical specialties were composed of seven subspecialties: surgery (28.65%), internal medicine (33.43%), dentistry (16.35%), obstetrics, and gynecology (5.83%), oncology (5.33%), pediatrics (3.67%), and medical technology (6.74%). A detailed specialty classification of medical education in China is shown in Appendix B. Surgery had the lowest share of females across specialties from 2001 to 2018 (Figure A2). Figure 3 shows that only 13.72% of the female students chose surgery. In contrast, over 50% of male students chose surgery. Gender differences remained constant across the cohorts.

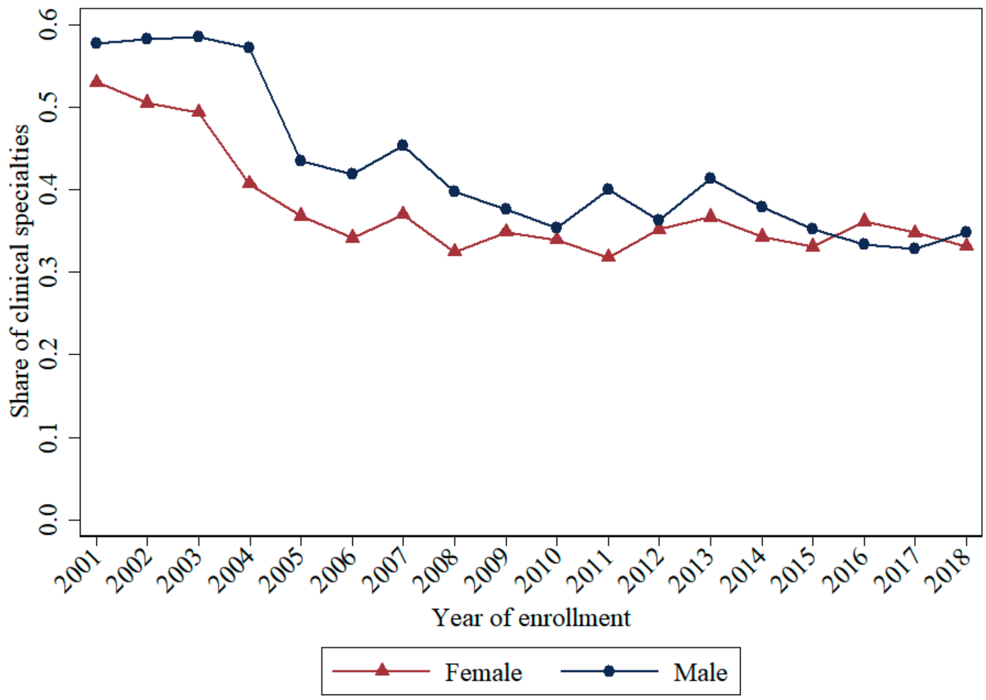

Figure 2. Share in clinical specialties for male and female students by enrollment year.

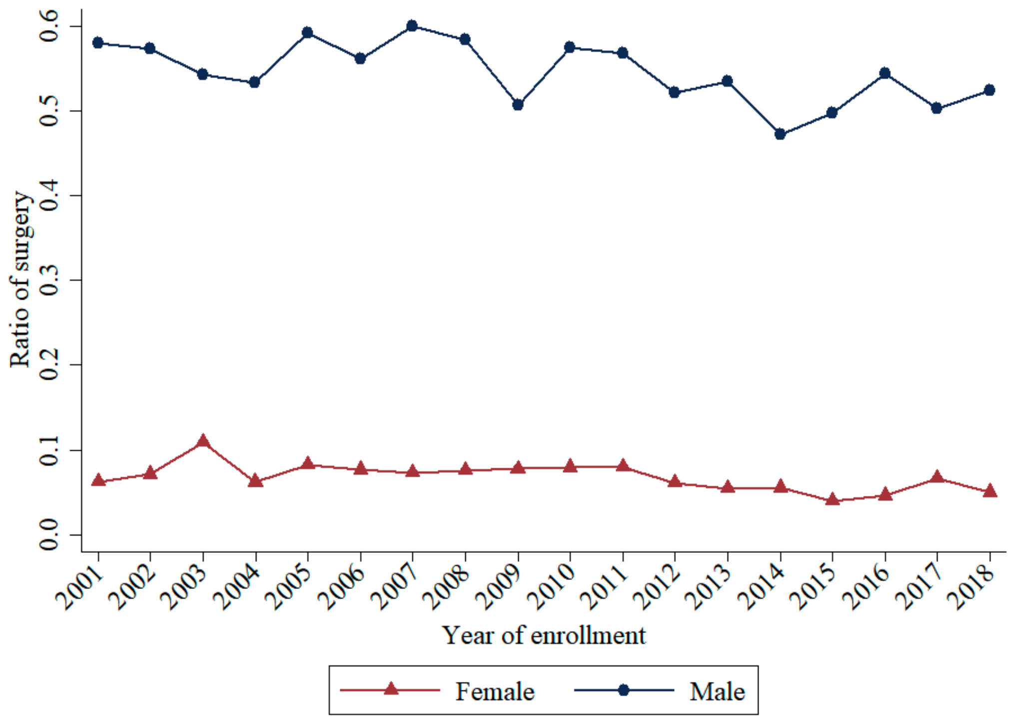

Figure 3. Share in the surgical specialty for male and female clinical students by enrollment year.

To examine the gender differences in specialty choice, we estimated the following linear equation using the ordinary least squares method:

$$Y_i = \beta_0 + \beta_1 female_i + \sum_{t=1}^{n} \phi_t grad_{it} + \sum_{t=1}^{n} \varphi_k female_i \cdot grad_{it} + \eta X_i + \varepsilon_i \quad (1)$$

where the dependent variable Y_i is a dummy indicating whether a student chooses clinical track or surgical specialties. X_i is a vector of control variables, including degree type, enrolment year fixed effects, and the province of birth fixed effects. β_1 represents the differences of interest between women and men. To further test the cross-cohort dynamics of gender differences in specialty choice, we interacted a female dummy with categorical dummies of enrollment year groups $grad_{it}$. Each coefficient on the interaction term can be interpreted as a gender difference in specialty choice for a given enrollment cohort relative to the reference group.

To examine the role of academic performance in clinical students' specialty choices, we used student profiles from one affiliated hospital of the medical school. The hospital is among the best in the megacity and undertakes practical teaching for its students. The student profiles contained eight courses for all students (571) enrolled between 2001 and 2011 who completed their training in the affiliated hospital. We estimated the following linear equation using the OLS method:

$$Surgical_i = \gamma_0 + \gamma_1 female_i + \sum_{k=1}^{n} \lambda_k Score_i^k + \sum_{k=1}^{n} \tau_k female \cdot Score_i^k + \theta X_i + \mu_i \quad (2)$$

where $Surgical_i$ is a dummy indicating whether a student in the affiliated hospital chooses surgery as a specialty. When the standardized score of the eight courses $Score_i^k$ is added into the regression, the coefficient of female γ_1 is expected to decrease significantly if academic performance substantially accounts for a large share of gender difference in the surgical or nonsurgical choice. When the interaction terms of the standardized scores and females are further included, the coefficient of the interaction term τ_k is expected to be significant if the course score k is the driving force of the gender difference in the surgical or nonsurgical choice.

To further discuss the reasons behind the under-representation of female students in surgical specialties, we searched questions such as "Why don't female students choose surgical specialties" in Zhihu.com (accessed on 20 November 2021), a Chinese equivalent of Quora established in 2011. All Zhihu users were free to ask and answer questions, and the questions had no predefined answers. There were nine relevant questions and 105 answers in total. We collected all questions, answers, and the number of comments and likes for each answer. Detailed descriptions of the questions are shown in Appendix C. Overall, 437,101 people viewed these questions, and it is reasonable to believe that a substantial fraction of them were medical students. We used the online Chinese text segmentation tool weiciyun.com to analyze the answers.

3. Results

The results in Column (1) of Table 1 suggest that female students are 4.9% less likely to choose the clinical track than males. The inclusion of control variables did not change gender differences. Column (3) indicates that gender differences in clinical specialty choices have diminished over the last two decades.

We further restrict the sample to clinical-track students and estimate the gender differences in surgical specialty choice in columns (1)–(3) of Table 2. Female students were approximately 50% less likely to select a surgical specialty. This gap persists over time, as indicated in Column (3).

The persistent gender gap in surgical specialty choice may be due to differences in academic performance. However, female students outperformed males in all courses taken in affiliated hospitals, including internal, surgery, obstetrics, pediatrics theories, internal practice, surgery practice, obstetrics practice, and pediatric practice (Appendix D). This is consistent with many studies that take samples from US medical schools. There were no significant gender differences in the clinical competency assessment [40] or post-residency clinical performance assessment [41] of US medical students. Women perform better in obstetrics [42].

Table 1. Gender differences in the choice of clinical or nonclinical track.

	(1)	(2)	(3)
Variables		**Clinic**	
Female	−0.049 ***	−0.047 ***	−0.107 ***
	(0.007)	(0.007)	(0.019)
Female * enrolled in 2005–2010			0.031
			(0.023)
Female * enrolled in 2010–2015			0.060 ***
			(0.022)
Female * enrolled after 2015			0.115 ***
			(0.023)
Master's degree		−0.012 *	−0.012 *
		(0.007)	(0.007)
Enrollment year FE	No	Yes	Yes
Birth province FE	No	Yes	Yes
Observations	23,108	20,335	20,335
R2	0.002	0.045	0.047
Mean of Y	0.385	0.401	0.401

Notes: The estimates are based on the full sample. The reference group is students enrolled before 2005. Robust standard errors are in parentheses. * $p < 0.1$, *** $p < 0.01$.

Table 2. Gender differences in the choice of surgical or nonsurgical specialty.

	(1)	(2)	(3)
Variables		**Surgery**	
Female	−0.490 ***	−0.497 ***	−0.521 ***
	(0.008)	(0.009)	(0.020)
Female * enrolled in 2005–2010			−0.001
			(0.026)
Female * enrolled in 2010–2015			0.048 *
			(0.026)
Female * enrolled after 2015			0.045
			(0.028)
Master's degree		−0.046 ***	−0.047 ***
		(0.009)	(0.009)
Enrollment year FE	No	Yes	Yes
Birth province FE	No	Yes	Yes
Observations	8899	8146	8146
R2	0.323	0.344	0.345
Mean of Y	0.239	0.239	0.239

Notes: The estimates were based on students in clinical specialties. The reference group is students enrolled before 2005. Robust standard errors are in parentheses. * $p < 0.1$, *** $p < 0.01$.

In Table 3, we added the standardized scores of the eight courses in Column (2) and their interaction terms to the female dummy in Column (3). The primary result in Column (1) shows that women are approximately 63% less likely to choose the surgical specialty than men. In Column (2), the gap remains almost unchanged after controlling for the standardized scores of the eight courses. Gender differences in academic performance are unlikely to narrow these gaps significantly. In Column (3), the interaction terms of gender and pediatrics theory, internal practice, and pediatrics practice are significantly negative. It is reasonable that women with good performance in these courses are less likely to choose surgery than their male counterparts. However, neither surgery theory nor surgery practice had a significant interaction effect with women.

Table 3. Academic performance and the gender differences in surgical specialty choice.

	(1)	(2)	(3)
Variables		**Surgery**	
Female	−0.633 ***	−0.640 ***	−0.643 ***
	(0.035)	(0.044)	(0.043)
Internal theory		−0.046	−0.072
		(0.035)	(0.050)
Surgery theory		0.041	0.056
		(0.029)	(0.042)
Obstetrics theory		−0.028	−0.079 *
		(0.030)	(0.044)
Pediatrics theory		−0.007	0.024
		(0.031)	(0.045)
Internal practice		0.022	0.057 *
		(0.021)	(0.031)
Surgery practice		0.039	0.039
		(0.033)	(0.041)
Obstetrics practice		−0.025	−0.015
		(0.027)	(0.038)
Pediatrics practice		0.026	0.066 **
		(0.033)	(0.032)
Female * internal theory			0.073
			(0.051)
Female * surgery theory			−0.026
			(0.053)
Female * obstetrics theory			0.118 **
			(0.049)
Female * pediatrics theory			−0.089 *
			(0.053)
Female * internal practice			−0.091 **
			(0.039)
Female * surgery practice			−0.004
			(0.040)
Female * obstetrics practice			−0.010
			(0.045)
Female * pediatrics practice			−0.090 *
			(0.046)
Observations	547	470	470
R-squared	0.461	0.485	0.508
Mean of Y	0.367	0.396	0.396

Notes: Birth province FE and enrollment year FE are controlled for in all the columns. Robust standard errors are in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4. Discussion

The regression results based on the medical school data in the previous section suggest that girls are less likely to choose surgery, but not because of gender differences in their academic performance. Therefore, we have to turn to other potential factors that influence women's choice in surgery, which data from medical schools cannot detect. Inspired by a summary of relevant questions and answers in Zhihu (Appendices C and E), we discuss these issues.

(1) Physical Demand

Generally, STEM jobs involve brainwork in the office. However, being a surgeon is mentally and physically demanding. In the text of answers in Zhihu, the most commonly observed words were "exhausted" (32 times) and "physical strength" (47 times). Several answers specifically described the "leg lifting" task in orthopedic surgery, difficult for girls because of their lack of physical strength. Surgical procedures usually take several hours or more, which is challenging for women to perform. Several answers also mentioned "menstruation", with one explicitly stating that the cold water hand-washing session before surgery during the periods was unbearable for women.

It is encouraging to note that the physical difficulties are not entirely insurmountable. First, not all surgical subspecialties are physically demanding. Several answers indicate that plastic surgery does not require as much physical strength as orthopedic surgery. Second, surgical instruments and equipment have improved, and the use of minimally invasive surgery and other techniques has reduced the physical demands and time required for surgery.

(2) Anticipated Discrimination

Another possible explanation for the gender differences in surgical specialty choice is that female students in surgical specialties may have worse employment opportunities compared with other specialties. In the recruitment process of Chinese hospitals, the department chief has the power to make decisions. Many answers mentioned that the chief of surgery (14 times) was male most times, preferred male candidates, and had very harsh standards on female candidates' resumes.

Additionally, some respondents mentioned that women might not feel comfortable working in a male-dominated surgical department; for example, they may feel embarrassed by jokes made by male colleagues between work sessions. As shown in Table A1, the proportion of men was over 80% in most surgical departments in China. Male surgeons have an obvious advantage in social interactions with male colleagues and chief physicians. The "smoker-to-smoker" advantage explains a large part of the gender gap, especially for face-to-face work scenes [43].

(3) Work-Life Balance

Work-life balance is a concern for female physicians, predominantly female surgeons. Australian data shows that family responsibilities significantly reduce female doctors' labor supply but do not affect male doctors [44]. "Family" is referred to 17 times in the answers in Zhihu. Most of those who mentioned family in their responses were 5–10 years out of school and married. They were in their middle years when their family responsibilities were at their heaviest. According to the answers, two features of a surgeon's job are extremely unfriendly to the work-life balance: extraordinarily long hours, usually lasting over 10 h per shift, and urgent overnight surgeries. These findings align with previous research, which has noticed that there are premiums for working long hours, preventing highly skilled women from earning as much as their male counterparts [45]. Additionally, some responses highlighted that not all surgeries, such as thyroid surgery, involve frequent emergency surgeries at night.

In recent years, China formally changed its one-child policy to a two-child policy in 2016 and then to a three-child policy in 2021, with a significant possibility of altogether canceling fertility restrictions in the future. Policy changes may increase female family responsibilities compared to males. Although we did not find a significant difference in surgical specialty choice in the gender gap after 2016, the policy change may be a potential negative factor for women's choice of being a surgeon.

(4) Peer Effects and Role Models

Some respondents were female students preparing for graduate school entrance exams in China and faced a specialty choice. Their answers mentioned that their senior female apprentices and classmates might influence their choices. Some respondents had just decided on whether to abandon surgery. However, their decisions were influenced more by their colleagues, especially their teammates. Many answers with several likes mentioned female chief physicians of surgical departments at prominent local hospitals or female teachers in their schools' surgical courses, clearly seen as role models by female medical students. Several answers also mentioned more outstanding female surgeons, and that choosing surgery is not stressful for female students in first-tier cities.

5. Conclusions

The medical school's registration record analysis shows that female students are less likely to choose a clinical specialty, and the gap shrinks over time. However, female students are less likely to choose highly paid surgical specialties among students in the clinical track, and this gap persists over time. However, academic performance could not explain these differences. Further analysis of relevant questions in Zhihu shows that ultra-physical load, discrimination in recruitment, a women-unfriendly work climate, and difficulties in taking care of family are barriers prevent women from choosing surgery. However, role models can encourage women to choose surgery. These findings align with those in other countries [8,46,47]. These conclusions have important policy implications. Hospital executives should pay close attention to technological advances that can ease surgeons' physical demands. More efforts should be made to create a women-friendly work atmosphere and family-friendly working arrangements in surgery. Medical schools should pay more attention to the gender balance of faculty members in specialty courses.

Although this study shows an interesting pattern in choosing a specialty for China's medical students for the first time and provides a preliminary discussion of the reasons for women's underrepresentation in surgery, it has limitations due to the lack of data. First, we could not track the career path of students in the sampled medical school, which is the most convincing way to show gender differences in career development starting from specialty choice. Second, gender differences in specialty choice shaped by personality, risk preference, and gender role attitudes are challenging to detect using administrative data and answers on SQA websites. Future studies utilizing questionnaires or experiments with physicians are expected to explore the roles of these issues in specialty choice. Third, more descriptive studies targeting other majors are necessary because we do not know to what extent the pattern in medical students can be generalized to other sub-major choices in STEM fields.

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Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Secondary data can be obtained by searching for the questions listed in Appendix C on www.zhuhu.com (accessed date: 20 November 2021). The primary data are administrative records that are unavailable to the public.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

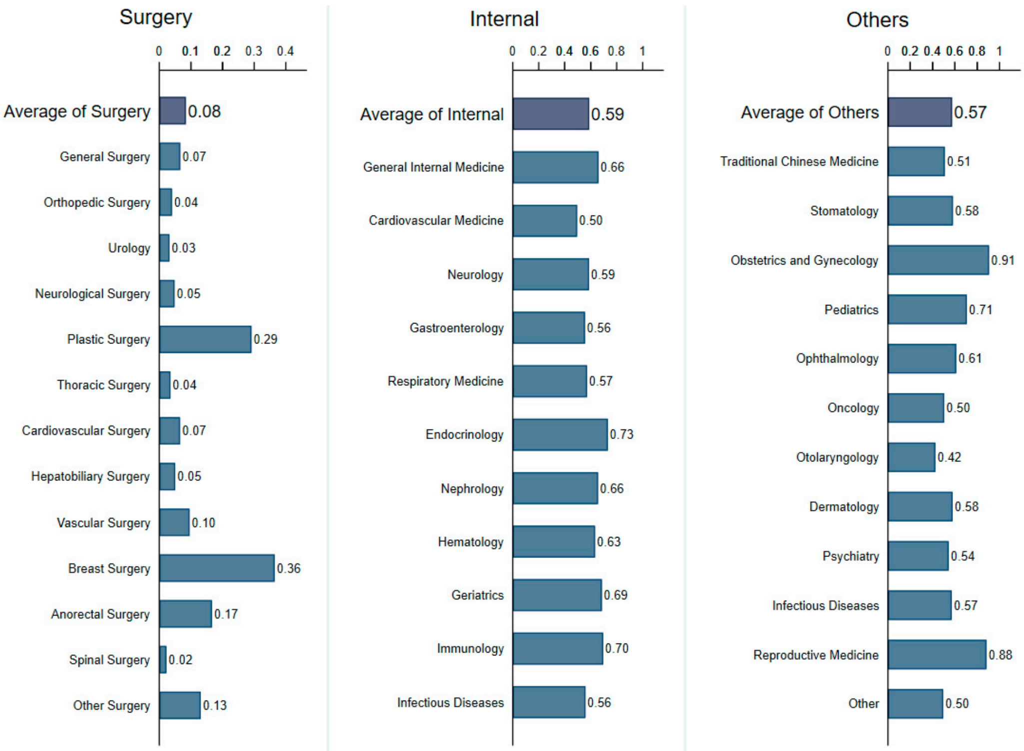

Figure A1. Share of female physicians across specialties in Haodf.com (Accessed on: 10 October 2020).

Appendix B

Medical specialties in China include basic medicine, clinical medicine, dentistry, public health and preventive medicine, traditional Chinese medicine, traditional Chinese and Western medicine, pharmacy, traditional Chinese medicine, special medicine, medical technology, and nursing, with 11 specialties (primary disciplines). Clinical medicine comprises more than 20 specialties (secondary disciplines), including internal medicine, surgery, obstetrics and gynecology, pediatrics, geriatrics, neurology, dermatology and venereology, imaging and nuclear medicine, clinical laboratory diagnosis, ophthalmology, otorhinolaryngology, oncology, anesthesiology, and emergency medicine. Surgery comprises six specialties (tertiary disciplines), including general surgery, orthopedics, urology, thoracic surgery, and neurosurgery. Internal medicine comprises eight specialties (tertiary disciplines), including cardiovascular disease, hematology, respiratory disease, gastroenterology, endocrine and metabolic disease, nephrology, rheumatology, and infectious disease.

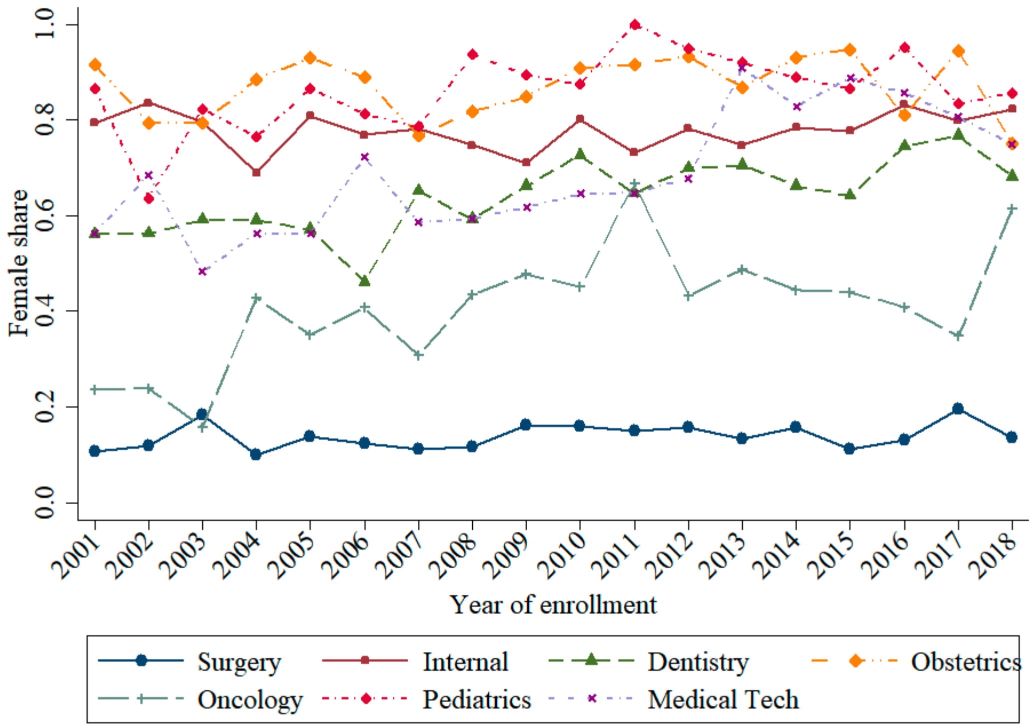

Figure A2. Female share across specialties (2001–2018).

Appendix C

Table A1. Questions and answers of female medical students' choice in Zhihu.com.

Questions	No. of Answers	No. of Viewers
Is it really bad for a woman to be a surgeon?	21	72,133
Is surgery for girls?	11	27,171
Is it good for girls to study surgery?	5	8977
Why do you rarely see female doctors in general surgery?	28	192,834
Is surgery suitable for girls?	18	120,219
Is it really impossible for a female student to take the medical examination for cardiac surgery?	10	8511
Is it really impossible for a girl to study cardiac surgery in the medical examination?	6	1322
Is it impossible for a woman to work in surgery?	1	540
Why are there so few female surgeons when more and more women are studying surgery?	5	5409

Appendix D

Table A2. Gender differences in academic performance of medical students.

Panel A	Standardized Score of Theory Course			
	Internal	**Surgery**	**Obstetrics**	**Pediatrics**
Female	0.712 ***	0.748 ***	0.713 ***	0.793 ***
	(0.075)	(0.085)	(0.081)	(0.082)
Observations	478	482	481	481
R2	0.467	0.282	0.392	0.348
Panel B	**Standardized Score of Practice Course**			
	Internal	**Surgery**	**Obstetrics**	**Pediatrics**
Female	0.485 ***	0.301 ***	0.608 ***	0.720 ***
	(0.086)	(0.058)	(0.084)	(0.083)
Observations	481	481	478	479
R2	0.288	0.699	0.381	0.295

Notes: The estimates are based on students enrolled between 2001 and 2011 and completed their training in the affiliated hospital. Birth province fixed effects and enrollment year fixed effects are controlled for in all the columns. All scores were standardized with a mean of zero and an SD of one. Robust standard errors are reported in the parentheses. *** represents statistical significance at the 1% level.

Appendix E

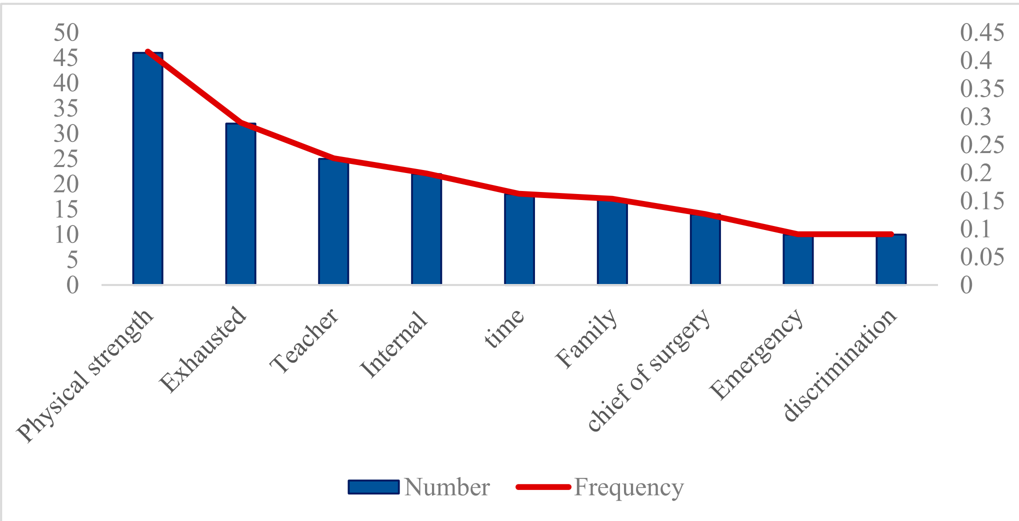

Figure A3. High-frequency words in the answers in Zhihu.

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