

Gender bias in specialty preferences among Danish medical students: a cross-sectional study

Laura Toftegaard Pedersen, Nanna Hasle Bak, Agnete Skovlund Dissing & Birgit H. Petersson

ABSTRACT

INTRODUCTION: Female medical students tend to prefer person-oriented specialties characterized by close doctor-patient contact and aspects of care. Conversely, male medical students tend to seek towards specialties with elements of autonomy, technology and “action”. Furthermore, female doctors will outnumber male doctors in Denmark by 2017 and this may have implications for the availability of specialized doctors.

MATERIAL AND METHODS: Data derives from a baseline questionnaire pertaining to a Danish follow-up study. A total of 561 first year medical students enrolled in 2006 and 2007 answered the questionnaire. Binary logistic regression analysis was used to calculate odds ratio estimates of the relationship between gender and specialty preference. Variables measuring self-image were included in the analysis as potential mediators.

RESULTS: 47% female and 19% male students pursued person-oriented specialties and 46% female and 68% male students pursued technique-oriented specialties. More female students pursued technique-oriented specialties than in 1992. Female students have 69% less probability of choosing a technique-oriented specialty than males. This association is mediated by lack of self-confidence.

CONCLUSION: If specialty preferences are persistent during medical school, the results suggest that we will face more difficulties recruiting males to person-oriented specialties than females to technique-oriented specialties in the future. Furthermore, when addressing students’ specialty preferences, we should consider both self confidence and gender.

FUNDING: not relevant.

TRIAL REGISTRATION: not relevant.

Research shows that gender plays a significant role in medical students’ choice of specialty. A Danish study of a student cohort from 1992 demonstrated that already during the first year at medical school, female students tend to prefer person-oriented specialties characterized by close doctor-patient contact, aspects of care and often of low prestige, e.g. general practise. On the other hand, the study found that male medical students tend to seek toward specialties with elements of autonomy, technology and “action” which are often high-prestige

specialties, e.g. surgery [1]. A study from Norway found that females tend to cluster in fewer specialties such as paediatrics, general practice and gynaecology and obstetrics which are characterised by a focus on patient-doctor relations [2]. International literature has revealed similar trends in other countries [3, 4]. Yufit et al introduced the distinction between technique- and person-oriented specialties and found correlates between students’ personality traits and their choice of specialty. Order, narcissism and dominance were characteristic for students pursuing a technique-oriented specialty, while students aiming at people-oriented specialties had needs for nurturance, intimacy and empathy [5]. This suggests that variables besides gender influence students’ specialty preferences.

In 2008, 64% of all Danish female doctors were specialized within a person-oriented specialty compared with 46% of the male doctors. It is estimated that female doctors will outnumber male doctors by 2017 [6] and if specialty choices continue being gender-biased, this may constitute a barrier for recruitment of doctors to technique-oriented specialties. Moreover, patients will benefit from the availability of both male and female doctors. Type of diagnosis and treatment varies not only according to the gender of the patient, but also according to the gender of the doctor [7]. Also, females tend to prefer a same-sex doctor when going through cervical, breast and colon cancer screening. This has implications for waiting lists, early detection of disease, and hence possibly patient mortality rates [8, 9].

Medical students’ gender-specific specialty preferences measured during the first year of study to some extent persist throughout medical school [10]. Therefore, knowledge about students’ specialty preferences in their first year of medical school may be an indicator of future availability of specialized doctors. This knowledge may provide information necessary to address undesirable gender differences in specialization during medical school.

MATERIAL AND METHODS

Data

This article is based on data deriving from the baseline questionnaire of the Danish follow-up study “From

ORIGINAL ARTICLE

Women and Gender Research in Medicine Unit, Section of General Practice, Department of Public Health, University of Copenhagen

Dan Med Bul 2011;58(9):A4304

Student to Graduate” which examined a wide range of factors related to university students’ lifestyle and well-being. The project was approved by the Danish Data Protection Agency (j. no. 2006-41-6,876). The cohort includes medical students enrolled in 2006 and 2007 at The University of Copenhagen. A total of 561 of 979 medical students returned the questionnaire; hereof 72% females (n = 403) and 28% males (n = 158). Hence, the response rate was 57%. Study design, data collection and ethics have been described elsewhere [11]. A response analysis revealed lower responses among male students and a lower mean age among respondents than among non-respondents [12].

Measurements

At commencement of the study, the students were

asked whether they planned to specialize after medical school. If so, they were invited to write a free text answer stating which specialty or specialties they were aiming for. The specialties were categorized in accordance with the list of specialties approved by the Danish National Board of Health. Specialties not approved by the Board were categorized as “other” and excluded from the statistical analysis. From these categories, the outcome variable was categorized as people-oriented or technique-oriented specialties. To ensure compatibility, the categorisation was similar to that used by Odborg et al in a study of first-year medical students’ specialty preferences in 1992/1993 [1]. The categorization is demonstrated in **Table 1**.

Gender was analysed as the exposure variable and nationality and social class as potential confounders, because research suggests a correlation between these factors and educational choices [13, 14]. Nationality was categorized as Danish, Nordic, other Western and non-Western nationality. Social class was categorized in accordance with the Danish National Centre for Social Research’s five groups according to parents’ educational level, work and number of employees. Refer to Pedersen et al for a thorough definition [14].

Yufit et al’s [5] findings suggest that the role of personality may explain the relationship between gender and specialty preference. In the present study, students were asked whether they perceived themselves as ambitious or not ambitious, self confident or lacking self confidence, and active or passive. These variables were included as potential mediators of the association between gender and specialty preference. Being active/passive and ambitious/not ambitious was assessed on a scale from one to five. One and two were defined as high scores, whereas three to five were defined as low scores. Self confident/lacking self confidence was assessed by responding on a 4-point Likert scale to the question: “Sometimes I feel that my lack of self confidence is a burden”. The question was dichotomized into strongly agree and agree versus disagree and strongly disagree.

Statistical analysis

The statistical analyses were conducted in PASW Statistics 18 using the χ^2 test and the Waldt test at a 5% significance level. Binary logistic regression analysis was used to calculate marginal and adjusted odds ratio (OR) estimates of two models. Model 1 tested the association between gender and specialty preference controlled by potential confounders. In model 2 the three potential mediators were included in model 1. The two models are depicted in **Figure 1**.

Trial registration: not relevant.

TABLE 1

Number of students who pursued each specialty in their first year of medical school (number of students who had the specialty as their first priority).

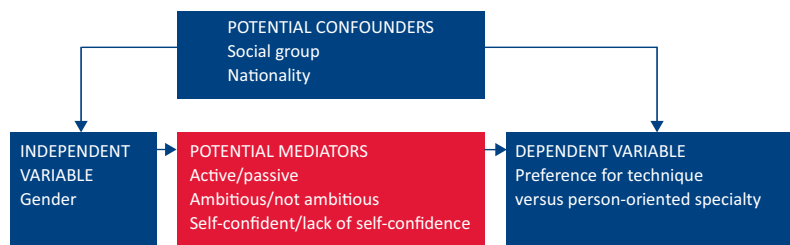
Specialty ^a	Males (n = 52)	Females (n = 150)
<i>Person-oriented</i>	23 (16)	107 (82)
Child and adolescent psychiatry	0 (0)	3 (2)
Community medicine	0 (0)	2 (0)
Dermatology and venereology	0 (0)	4 (4)
General practice	2 (2)	28 (23)
Neurology	8 (5)	10 (9)
Obstetrics and gynaecology	0 (0)	11 (7)
Occupational medicine	0 (0)	1 (1)
Paediatrics	9 (8)	28 (23)
Psychiatry	4 (1)	20 (13)
<i>Technique-oriented</i>	48 (30)	84 (65)
Anaesthesiology	9 (8)	13 (10)
Clinical genetics	2 (1)	2 (1)
Clinical immunology	1 (0)	0 (0)
Clinical oncology	2 (2)	4 (3)
Clinical pharmacology	0 (0)	1 (1)
Diagnostic radiology	0 (0)	1 (1)
Forensic medicine	1 (1)	2 (1)
General surgery	8 (5)	35 (29)
Internal medicine: Cardiology	4 (2)	3 (3)
Internal medicine: Endocrinology	2 (1)	1 (0)
Internal medicine: Haematology	2 (0)	0 (0)
Internal medicine: Infectious medicine	1 (1)	3 (2)
Internal medicine: Rheumatology	1 (0)	0 (0)
Neurosurgery	1 (1)	5 (4)
Ophthalmology	1 (1)	4 (2)
Orthopaedic surgery	6 (3)	4 (3)
Otolaryngology	2 (1)	0 (0)
Pathology	1 (0)	0 (0)
Plastic surgery	3 (2)	3 (3)
Thorax surgery	1 (1)	3 (2)
Other specialties ^b	7 (6)	7 (3)

a) Some specialties are not present in the Table because they were not chosen by any students.

b) Other specialties are specialist educations not available in Denmark for example emergency medicine, sports medicine and tropical medicine.

FIGURE 1

Models tested in statistical analyses. Model 1 includes the blue boxes only and model 2 includes all boxes in the figure.



RESULTS

93% (n = 516) of the students were planning to specialize after medical school with no significant gender difference (χ^2 : p = 0.547). 40% (n = 206) of the students were pursuing one or more specific specialties. More female (41%) than male student (36%) answered that they pursued specific specialties, but the difference was not significant (χ^2 : p = 0.149). Four of these students did not write which specialty they were aiming for and were excluded from the analysis.

Table 1 shows which specialties the 202 students who formed the basis of the analysis were aiming for. 31% (n = 63) of the students had preferences for more than one specialty and therefore only the numbers in parentheses showing the students' first priority sum to 202. The most popular specialties among female students were general surgery, general practice, paediatrics and psychiatry, while most male students preferred anaesthesiology, paediatrics, general surgery and neurology. Several of the female students stated an interest in obstetrics and gynaecology while none of the males did.

Table 2 shows the development in male and female students' specialty preferences between 1992 and 2006/07. In 2006/2007 more females than males pursued person-oriented specialties and more males than females pursued technique-oriented specialties. The number of females pursuing person-oriented specialties, however, had decreased seven percentage points, and the number of females pursuing a technique-oriented specialty increased by 16 percentage points during the period. Furthermore, a decrease was observed in the number of male students pursuing technique-oriented specialties (8%) as well as person-oriented specialties (2%). More males considered both technique-oriented and person-oriented specialties in 2006/2007 than in 1992, whereas fewer females pursue both types of specialties.

The result of the logistic regression is presented in **Table 3**. Backward stepwise variable selection revealed no significant confounders (results are not shown), but adjusted as well as unadjusted ORs for the relationship

between gender and specialty preference are depicted in the Table. The adjusted ORs in model 1 demonstrate that female students have 69% reduced odds for preferring a technique-oriented specialty compared with male students. In model 2, where active/passive, ambitious/not ambitious and self-confident/lacking self confidence was added to Model 1, lacking self confidence was the only variable independently associated with specialty preference. Table 3 demonstrates that the OR of the association between gender and specialty preference slightly decreases in magnitude which implies that lack of self confidence partially mediates the relationship between gender and specialty preference. Hence, women have 64% less odds of preferring a technique-oriented specialty when self confidence is included in the analysis.

DISCUSSION

In the present study, gender remains a significant predictor of specialty preference in first-year medical students. Fewer male students pursued a person-oriented specialty in 2006/2007 than in 1992, but more males considered both technique and person-oriented specialties. This suggests that we will see a decrease in the number of male doctors in person-oriented specialties in the future, which may have implications for patients and for the development of the specialties since males and females have different approaches to the profession [7]. Few studies have investigated the development in medical students' preferences for technique versus person-oriented specialties, but one study found that in the

TABLE 2

Female and male students' specialty preferences in 1992 and 2006/2007 as percentages.

Specialty preference	Female students		Male students	
	1992 ^a	2006/2007	1992 ^a	2006/2007
Person-oriented	54.4	47.3	21.3	19.2
Technique-oriented	30.4	46.0	68.1	61.5
Person and technique-oriented	15.2	6.7	10.6	19.2
Total	100	100	100	100

a) Data derived from Odborg et al [1].

 TABLE 3

Odds ratios for having preferences for a technique-oriented speciality.

	n	OR (95% CI)	p value	Adjusted for social group and nationality		
				n	OR (95% CI)	p value
<i>Model 1</i>						
Male	42	1		41	1	
Female	140	0.30 (0.14-0.67)	0.003	135	0.31 (0.14-0.70)	0.005
<i>Model 2</i>						
Active/passive:						
Male	42	1		41	1	
Female	140	0.30 (0.14-0.66)	0.003	135	0.31 (0.14-0.70)	0.005
Ambition:						
Male	42	1		41	1	
Female	140	0.32 (0.14-0.69)	0.004	135	0.33 (0.14-0.73)	0.007
Self-confidence ^a :						
Male	42	1		41	1	
Female	138	0.36 (0.16-0.80)	0.012	133	0.36 (0.16-0.83)	0.016

CI = confidence interval; OR = odds ratio.

a) Lacking self-confidence is the only potential mediator which was significantly associated with specialty preference: OR (adjusted for social group and nationality) = 0.33 (0.17;0.65), p = 0.001.

1980s, Norwegian females spread their specialty choices over more fields than in the 1970s [2]. Furthermore American research demonstrates that males interest in specialties such as general practice, obstetrics and gynaecology, psychiatry and pediatrics has decreased between 1990 and 2003 [15]. We do not know whether the students' specialty preferences persist throughout medical school, but a study of first-year medical students indicates that it is reasonable to believe that the students' specialty choices become even more gender-specific through medical school. Manuel et al found that 39% of male students had an early interest in person-oriented specialties, but only 50% of these eventually chose a person-oriented specialty and only 29% of male students with an early interest in technique-oriented specialties eventually chose a person-oriented specialty [4]. The study showed similar results for females. Only 38% of females with an interest in technique-oriented specialties during their first year of education eventually chose a technique-oriented specialty, while 81% of the females with an early interest in person-oriented specialties eventually entered a person-oriented specialty [4]. This may suggest that even though almost 50% of the females pursued a technique-oriented specialty and more than 25% of the females pursued a surgical specialty in the present study, it may still prove difficult to recruit females to technique-oriented specialties in the future. One study showed that women, despite displaying an initial interest in surgery, do not eventually choose surgery because during medical school they adopt the perception that a career in surgery cannot be combined with family obligations [16]. Lempp & Seale

explain this with the "hidden curriculum" or culture at medical schools which teaches female students that surgery is primarily for males. The authors call for teachers to address these issues throughout medical school [17].

Mediation

Choice of a person-oriented specialty correlated positively with perceived lack of self confidence. Moreover, when included in the analysis, lack of self confidence mediated the association between gender and specialty preference. Hence, when investigating the relationship between gender and specialty preference, some of the correlation can be explained by lack of self confidence among females. Lempp and Seale found that students regard the work environment in surgery to be competitive, which may prevent less confident females from aiming for these specialties [17]. For that reason, medical schools could focus more on addressing especially women's self confidence in relation to their specialty choices. It was not possible to identify other research of the mediating role of self confidence, but Sobral found a positive relationship between choice of surgery and having a high self-confidence as a learner [18]. The present study did not find a mediating role of ambition and being active/passive. This may imply that first-year medical students associate prestige with specialties besides the technique-oriented specialties. A recent study finds that medical students also perceive a few person-oriented specialties as high-prestige specialties [19]. Furthermore, the distinction between active and passive specialties may not be suitable when doing research on students, even though this is a well known distinction in academia [20].

Limitations and future research

The relatively low response rate (57%) might affect the results of this study, which is also reflected in the wide confidence intervals. The baseline questionnaire of the study is lengthy and involves personal questions which may provide an explanation for the low response rate; however, similarly low response rates are seen in other studies of medical students [16]. Generalizing the results especially to males and older students should only be done with caution and, likewise, when generalizing to students at other universities. The study should therefore be followed by further research of the specialty preferences among medical students at other universities. The results suggest a need for research into how specialty choices are constructed and altered during medical school and what motives students have when choosing certain specialties. Such research should be done to address gender-biased specialty choices. Furthermore, when addressing students' specialty choices, self-confidence and gender should be considered.

CORRESPONDENCE: *Nanna Hasle Bak*, CSS, Afdeling for Almen Medicin, Institut for Folkesundhedsvidenskab, University of Copenhagen, 1014 Copenhagen K, Denmark. E-mail: nahab@sund.ku.dk

ACCEPTED: 6 June 2011

CONFLICTS OF INTEREST: none

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