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### Article abstract

**Background:** Female physicians and patients experience gender bias in healthcare. The purpose of this research is to explore medical students' gender bias toward physicians and patients and whether their bias varies by gender.

**Methods:** We surveyed medical students at Memorial University between November 2020 and April 2021. We recruited participants through Facebook, email, and e-posters. We collected demographic information, including gender and class year. We used the Nijmegen Gender Awareness in Medicine Scale to measure gender sensitivity, gender role ideology toward patients, and gender role ideology toward doctors. We analyzed the data using averages and t-tests.

**Results:** Mean gender sensitivity scores were 4/5 indicating high gender sensitivity. Gender role ideology toward doctors mean scores were 2/5 indicating that students did not hold strong stereotypical views toward doctors. Although male students scored higher than female students ( $p < .05$ ), mean scores for gender role ideology toward patients were low for both male and female students ( $x < 2$ ), indicating low stereotyping toward patients.

**Conclusions:** We found that students held largely non-biased ideologies surrounding gender in medicine and that female students were even less biased than male students for gender role ideology toward patients.



## A survey of undergraduate medical students' gender awareness and bias: the Newfoundland and Labrador perspective

Une enquête sur la sensibilisation aux questions de genre et aux préjugés sexistes des étudiants en médecine de premier cycle : la perspective de Terre-Neuve-et-Labrador

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### Abstract

**Background:** Female physicians and patients experience gender bias in healthcare. The purpose of this research is to explore medical students' gender bias toward physicians and patients and whether their bias varies by gender.

**Methods:** We surveyed medical students at Memorial University between November 2020 and April 2021. We recruited participants through Facebook, email, and e-posters. We collected demographic information, including gender and class year. We used the Nijmegen Gender Awareness in Medicine Scale to measure gender sensitivity, gender role ideology toward patients, and gender role ideology toward doctors. We analyzed the data using averages and t-tests.

**Results:** Mean gender sensitivity scores were 4/5 indicating high gender sensitivity. Gender role ideology toward doctors mean scores were 2/5 indicating that students did not hold strong stereotypical views toward doctors. Although male students scored higher than female students ( $p < .05$ ), mean scores for gender role ideology toward patients were low for both male and female students ( $\bar{x} < 2$ ), indicating low stereotyping toward patients.

**Conclusions:** We found that students held largely non-biased ideologies surrounding gender in medicine and that female students were even less biased than male students for gender role ideology toward patients.

### Résumé

**Contexte :** Les femmes médecins ou patientes sont victimes de préjugés sexistes dans les soins de santé. L'objectif de cette recherche est d'explorer les préjugés sexistes des étudiants en médecine à l'égard des médecins et des patients et de déterminer si ces préjugés varient en fonction du sexe.

**Méthodes :** Nous avons procédé à une enquête auprès des étudiants en médecine de l'Université Memorial entre novembre 2020 et avril 2021. Nous avons recruté des participants au moyen de Facebook, du courrier électronique et d'affiches électroniques. Nous avons recueilli des données démographiques, y compris le sexe et l'année dans le programme. Nous avons utilisé l'échelle de sensibilisation au genre en médecine de Nijmegen pour mesurer la sensibilité au genre, l'idéologie du rôle du genre envers les patients et l'idéologie du rôle du genre envers les médecins. Nous avons analysé les données à l'aide de moyennes et de tests t.

**Résultats :** Les scores moyens de sensibilité au genre étaient de 4/5, ce qui indique une grande sensibilité au genre. Les scores moyens de l'idéologie du rôle du genre à l'égard des médecins étaient de 2/5, ce qui indique que les étudiants n'avaient pas d'opinion stéréotypée à l'égard des médecins. Bien que les étudiants aient obtenu des scores plus élevés que les étudiantes ( $p < 0,05$ ), les scores moyens pour l'idéologie du rôle du genre à l'égard des patients étaient faibles tant pour les étudiants que pour les étudiantes ( $\bar{x} < 2$ ), ce qui indique un faible niveau d'opinions stéréotypées à l'égard des patients.

**Conclusions :** Nous avons constaté que les étudiants avaient des idéologies largement non biaisées concernant le genre en médecine et que les étudiantes étaient encore moins biaisées que les étudiants en ce qui concerne l'idéologie du rôle du genre envers les patients.

## Introduction

For some time, gender bias has been pervasive in medicine for both physicians and patients.<sup>1-2</sup> Despite the number of female physicians in Canada today, women experience gender bias throughout their medical education and careers, including discrimination and harassment in the workplace and fewer opportunities for mentorship and promotion.<sup>1,3-8</sup> Female physicians are paid less than their male counterparts, even within the same specialty for equal time worked.<sup>9-10</sup> Similarly, female patients are often disadvantaged due to bias from their physicians: their complaints are not taken as seriously and they are less likely to be referred for some specialty services.<sup>11-12</sup> Although not the focus of this research, it should be noted that gender diverse medical students and physicians experience additional stigma and discrimination and are often forced to mask their gender at work.<sup>13</sup>

Much of the literature surrounding gender bias in medicine focuses on the experiences and knowledge of staff and resident physicians, but little is known about gender bias amongst medical students. Understanding medical students' gender awareness and bias will expand the current literature, provide direction for medical education curricula, and inform how gender studies in medicine may evolve.

Critical theory, which "provides the descriptive and normative basis for social inquiry aimed at decreasing domination and increasing freedom," framed this study.<sup>14</sup> Feminist critical theory situates the experiences of women within a patriarchal society, where women are viewed as subordinate to men. Feminist critical theory comments on oppressive systems and social structures as they relate to gender, with the goal of dismantling these oppressive structures. One way that medical education perpetuates gender bias is through curricula that focuses on medical research with male subjects.<sup>15-16</sup> For example, the signs and symptoms of acute myocardial infarction that are deemed "typical", including chest pain, shortness of breath, and diaphoresis, are symptoms experienced classically in males.<sup>17-18</sup> In contrast, female patients often present with "atypical" symptoms, including nausea and jaw pain.<sup>17-18</sup> This has real consequences including, but not limited to, students (and physicians) recognizing myocardial infarctions in male patients more frequently than female patients.<sup>17-19</sup>

Given that female-identifying physicians and patients continue to experience gender bias, we wanted to examine

the bias of medical students through a critical lens. The purpose of this research was to explore medical students' gender awareness and bias toward patients and physicians. In addition, we wanted to know whether their bias differed by their self-identified gender.

## Methods

The Newfoundland and Labrador Health Research Ethics Board approved this research (Reference # 2020.026). We surveyed medical students at Memorial University in St. John's, NL using Qualtrics.© Between November 2020 and April 2021, we recruited medical students from all four years of training to participate through Facebook groups (specific to class year), emails forwarded by the Faculty of Medicine using student listservs, and electronic posters within the medical school. Our inclusion criteria were current medical students in years 1 through 4 at Memorial University. Our exclusion criteria were students from schools other than Memorial University and non-medical students.

Andersson et al. created the Nijmegen Gender Awareness in Medicine Scale and used it to determine gender awareness and gender stereotyping in medicine amongst Dutch and Swedish first year medical students between 2006 and 2009.<sup>20</sup> This tool ranked statements about gender bias using a 5-point Likert scale. We adapted this tool (see Appendix A) for our study and added demographic questions about medical student gender and class year to determine if gender bias varied based on these factors.

The scale produced three subscale scores using the various Likert statements: students' gender sensitivity, gender role ideology toward patients, and gender role ideology toward doctors. We performed statistical analysis using Microsoft Excel.© We used t-tests and ANOVAs to look for differences between genders and class years in the gender sensitivity, gender role ideology toward patients, and gender role ideology toward doctors scores.

## Results

The response rate of the study was 20.3%, as 65 of 320 medical students completed the survey. To explore medical student gender bias in medicine, we generated a score for gender sensitivity, gender role ideology toward patients, and gender role ideology toward doctors and compared these scores across genders (Table 1). We also explored gender bias by class year, however, the subgroup sizes were too small for reliable statistical analysis (Table 2).

*Table 1. Gender comparison of mean scores with standard deviations and p values. For gender sensitivity a higher score indicates more sensitivity and for gender role ideology a higher score indicates more stereotyping.*

Gender Bias Scoring Categories	Gender		T value	Significance
	Male (n = 19)	Female (n = 46)		
Mean gender sensitivity (SD)	3.83 (0.60)	3.94 (0.54)	0.71	NS
Mean gender role ideology toward patients (SD)	1.75 (0.49)	1.46 (0.44)	-2.27	p<.05
Mean gender role ideology toward doctors (SD)	2.08 (0.64)	2.01 (0.54)	-0.39	NS

\*NS = nonsignificant

*Table 2. Exploratory class year comparison of mean scores with standard deviations and p values. For gender sensitivity a higher score indicates more sensitivity and for gender role ideology a higher score indicates more stereotyping*

Gender Bias Scoring Categories	Class Year				F value	Significance
	1 (n = 17)	2 (n = 25)	3 (n = 8)	4 (n = 15)		
Mean gender sensitivity (SD)	3.93 (0.65)	3.98 (0.58)	3.96 (0.78)	3.83 (0.69)	0.17	NS
Mean gender role ideology toward patients (SD)	1.43 (0.43)	1.48 (0.51)	1.59 (0.42)	1.79 (0.44)	2.05	NS
Mean gender role ideology toward doctors (SD)	1.73 (0.49)	2.10 (0.59)	2.05 (0.68)	2.24 (0.46)	2.55	P = .06

\*NS = nonsignificant

Gender sensitivity scores averaged 4 on the 5-point Likert scale indicating that students were more gender sensitive than not and this did not differ by gender. Although gender role ideology toward patients scores were low overall ( $\bar{x}$ =<2), male students held slightly more stereotypical views than female students ( $p < .05$ ). Gender role ideology toward doctors mean scores across groups averaged 2 on the 5-point Likert scale indicating that students did not hold gender-based stereotypical views toward doctors.

## Discussion

The findings in this study demonstrate that Memorial University medical students have a high level of gender awareness in medicine and that their awareness was not significantly different based on their self-identified gender. Our data show that medical students have high gender sensitivity scores and low gender role ideology toward

patients and doctors scores, which indicate high gender sensitivity and low stereotyping, respectively. For gender role ideology toward patients, gender differences were statistically significant ( $p < .05$ ). This indicates that female students demonstrated slightly less gender stereotyping toward patients than male students. However, this difference is unlikely to be relevant in practice as both gender groups had low gender stereotyping toward patients.

Despite similar mean scores across all three gender bias scoring categories, our data showed that students at Memorial University were slightly more gender sensitive (higher scores) and held less stereotypical views (lower scores) than the students surveyed in the Andersson et al. study.<sup>20</sup> This may be due to the approximately 15-year difference between when these studies were performed, as social values have evolved over time.<sup>21</sup> In both ours and the Andersson et al study, score differences were only detected in gender role ideology toward patients. In the Andersson et al. study, female students ( $\bar{x}$ =2.06) had lower scores than male students ( $\bar{x}$ =2.22) for gender role ideology toward patients and these scores were significantly different ( $p < .001$ ).<sup>20</sup> The significance of the difference between male and female students is likely due to the larger sample size ( $n = 1096$ ) in the Andersson et al. study.<sup>20</sup> Like in our study, it is unlikely that this difference between male and female student scores would result in a clinical difference as both scores are low.

Feminist critical theory framed our study on students' gender bias in medicine. Students held largely non-biased ideologies around gender in medicine. It is possible that the results showing that female medical students demonstrated less bias toward patients than their male colleagues may have consequences in practice, including impacts to the quality of care received by female patients.<sup>11-12,22</sup> However, we feel that this is unlikely because, even though the scores are statistically significant, both male and female students reported low levels of gender stereotyping toward patients ( $\bar{x}$ <2). Nonetheless, gender bias in medicine continues in medical curricula, as classifications of "typical" vs "atypical" and "healthy" vs "sick" are largely determined by male subjects.<sup>15,23-24</sup> In the exploratory class year data (Table 2), the scores for gender role ideology toward doctors increase with class year ( $p=.06$ ), which may indicate that students develop slightly more stereotypical views toward doctors as they progress through their medical education. Based on this, it would be interesting to explore the impact

of medical curricula on student biases and how biases change as medical professionals progress through their careers. Future research should focus on how gender bias evolves throughout the stages of medical training, that is, through medical school, residency, and then in practice.

One of the main limitations of this study is that we had a response rate around 20.3%, which means that the sample may not be representative of the medical student body at Memorial University. Moreover, the response rates by class year should have been equal, but they were not. This study is also susceptible to participation bias as those who chose to participate may be more likely to have experience with gender issues in medicine. This will affect our data as it may appear that a falsely low proportion of medical students have a gender bias. Further, the sample is not generalizable to the Canadian population of medical students because Memorial University has a more rural student population than most other medical schools in Canada.<sup>25</sup> This means that we can only draw conclusions from the study about gender bias amongst medical students at Memorial University. A potential solution is to replicate this study at other medical schools across Canada in the future.

## Conclusions

In this study, we found that medical students at Memorial University had largely non-biased ideologies surrounding gender in medicine and that female students held less biased views toward patients than their male colleagues. To the best of our knowledge, this study is the first in Canada to explore gender bias amongst medical students and we hope that these results will be considered in future curricula development and research directions.

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## Appendix A. Demographic survey questions

1. What year of medicine are you in?

1      2      3      4

2. What is your gender identity?

Female      male      other

*Adapted Nijmegen Gender Awareness in Medicine Scale (\* indicates item removed from our analysis due to low factor loading in original Andersson et al. Study)*

**Gender sensitivity (1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, 5 – strongly agree)**

1. Addressing differences between men and women creates inequity in health care\*

1   2      3      4      5

2. Physicians' knowledge of gender differences in illness and health increases quality of care\*

1   2      3      4      5

3. Physicians should only address biological differences between men and women

1   2      3      4      5

4. In non-sex-specific health disorders the sex/gender of the patient is irrelevant

1   2      3      4      5

5. A physician should confine as much as possible to biomedical aspects of health complaints of men and women

1   2      3      4      5

6. Physicians do not need to know what happens in the lives of men and women to be able to deliver medical care\*

1   2      3      4      5

7. Differences between male and female physicians are too small to be relevant

1   2      3      4      5

8. Especially because men and women are different, physicians should treat everybody the same

1   2      3      4      5

9. Physicians who address gender differences are not dealing with the important issues

1   2      3      4      5

10. In communicating with patients it does not matter to a physician whether the patients are men or women

1   2      3      4      5

11. In communicating with patients it does not matter whether the physician is a man or a woman

1   2   3   4   5

12. Differences between male and female patients are so small that physicians can hardly take them into account

1   2   3   4   5

13. For effective treatment, physicians should address gender differences in etiology and consequences of disease\*

1   2   3   4   5

14. It is not necessary to consider gender differences in presentation of complaints\*

1   2   3   4   5

**Gender role ideology toward patients (1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, 5 – strongly agree)**

1. Male patients better understand physicians' measures than female patients

1   2   3   4   5

2. Female patients compared to male patients have unreasonable expectations of physicians

1   2   3   4   5

3. Women more frequently than men want to discuss problems with physicians that do not belong in the consultation room

1   2   3   4   5

4. Women expect too much emotional support from physicians

1   2   3   4   5

5. Male patients are less demanding than female patients

1   2   3   4   5

6. Women are larger consumers of health care than is actually needed

1   2   3   4   5

7. Men do not go to a physician for harmless health problems

1   2   3   4   5

8. Medically unexplained symptoms develop in women because they lament too much about their health

1   2   3   4   5

9. Female patients complain about their health because they need more attention than male patients



1   2       3       4       5

10. It is easier to find causes of health complaints in men because men communicate in a direct way

1   2       3       4       5

11. Men appeal to health care more often with problems they should have prevented\*

1   2       3       4       5

**Gender role ideology toward doctors (1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, 5 – strongly agree)**

1. Male physicians put too much emphasis on technical aspects of medicine compared to female physicians

1   2       3       4       5

2. Female physicians extend their consultations too much compared to male physicians

1   2       3       4       5

3. Male physicians are more efficient than female physicians

1   2       3       4       5

4. Female physicians are more empathic than male physicians

1   2       3       4       5

5. Female physicians needlessly take into account how a patient experiences disease

1   2       3       4       5

6. Male physicians are better able to deal with the work than female physicians\*

1   2       3       4       5

7. Female physicians are too emotionally involved with their patients

1   2       3       4       5

8. Compared to female physicians, male physicians are too hurried in their consultations

1   2       3       4       5