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Transphobia rather than education predicts provider knowledge of transgender healthcare

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Abstract:

Purpose: Transgender and gender diverse (TGD) patients face significant hurdles in accessing affirming, knowledgeable care. Lack of provider knowledge presents a substantial barrier to both primary and transition-related care, and may deter patients from seeking healthcare. Little is known about factors that affect provider knowledge or whether exposure to TGD health content during training is associated with improved knowledge among providers. Using the TGD Healthcare Knowledge Scale, this study aimed to determine whether prior education on TGD health predicts clinicians' current knowledge regarding healthcare for TGD patients.

Methods: An online survey examining exposure to TGD content and knowledge of TGD healthcare was distributed to all primary care providers in an integrated healthcare system in the Midwestern United States. Multivariable linear regression was used to predict provider knowledge, controlling for demographics, transphobia, and other potential confounders.

Results: The response rate was 57.3 % (n=223). The mean knowledge score was 7.41 (SD=1.31) on a 10-point scale. Almost half (48.4%, n=108) had no formal education on TGD healthcare, yet half (49.7%, n=111) of providers reported previously caring for at least one transgender patient. In regression analysis, provider knowledge of TGD healthcare was associated with transphobia ($\beta=-0.377$, 95% CI=-0.559 – -0.194, $p<0.001$), but not with hours of formal education ($\beta=-0.027$, 95% CI=-0.077 – 0.023, $p=0.292$) or informal education ($\beta=-0.012$, 95% CI=-0.033 – 0.009, $p=0.259$).

Conclusions: Increasing hours of education related to TGD healthcare may not be sufficient to improve providers' competence in care for TGD individuals. Transphobia may be a barrier to learning that needs to be addressed. Broader efforts to address transphobia in society in general, and in medical education in particular, may be required to improve the quality of medical care for TGD patients.

Introduction

Transgender and gender diverse (TGD) people comprise 0.5-0.6% of U.S. adults (1). This population faces multiple barriers accessing healthcare services (2), which may contribute to significantly increased rates of morbidity and mortality (3). Compared to cisgender individuals, TGD people suffer poorer health outcomes that largely stem from societal discrimination and violence (3). For example, rates of serious psychological distress in this population are 39%, compared to 5% in the general population (2). TGD people have a 40% lifetime suicide attempt rate—nine times that of the general U.S. population (2). Many of these disparities arise from systemic transphobia (bias towards transgender people) within society, including hurdles within the healthcare system, such as discrimination, harassment, and the inability to find a knowledgeable and affirming provider (4, 5). TGD people often avoid needed medical care due to fear of mistreatment (6). Lack of provider knowledge has emerged as a leading factor in TGD individuals' inability to access appropriate care, with 33% reporting having to teach their

medical providers about TGD healthcare (2); this factor was found to be significantly associated with care delay or avoidance (7).

Primary care providers (PCPs), including practitioners of Family Medicine, general Internal Medicine, or Obstetrics and Gynecology (8), play a central role in increasing TGD people's access to care and reducing their healthcare costs (9) through preventive care, coordinating with affirming specialists, addressing health disparities, and providing gender-affirming hormones. Other specialties, such as Pediatrics and Emergency Medicine, may play similar roles for younger patients, in acute situations, or as a safety net for patients who are unable to access primary care.

Descriptive studies reveal that medical education, both graduate and postgraduate, on TGD healthcare tends to be absent or minimal (10-14). Many providers lack the knowledge, skills, or willingness to care for TGD patients (15, 16). Professional associations, including the Institute of Medicine (17), the Association of American Medical Colleges (18), and the American College of Obstetricians and Gynecologists (19) have identified the need to improve provider knowledge in the care of TGD people.

Educational programs such as medical student or resident elective rotations show promise by increasing knowledge and comfort among program participants (20-22). However, research regarding practicing PCPs' knowledge of TGD healthcare, and ways to improve such knowledge, is lacking. Moreover, prior studies have mostly used subjective outcomes (e.g., comfort level in treating TGD patients (15, 22, 23)), rather than objective and reproducible measures, as indicators of knowledge. Additionally, little is known about provider or educational factors associated with TGD care knowledge. Such data are crucial to the development of effective educational interventions.

Based on prior research (6, 11, 22-25), we hypothesized that personal factors including prior contact with and attitudes about transgender people, as well as educational exposure, are associated with TGD healthcare knowledge (Figure 1 - conceptual model). Using an objective knowledge scale created for the study, the TGD Healthcare Knowledge Scale, we explored PCPs' knowledge of TGD healthcare. Specifically, we aimed to determine whether formal

education on TGD health predicts knowledge regarding care for TGD patients, while controlling for provider characteristics, personal and clinical contact, informal education, and transphobia.

Methods

Study Design:

A cross-sectional online survey was distributed to all adult outpatient PCPs—the population for whom the knowledge scale was designed—within a large Midwestern U.S. integrated health system. Eligible participants (N=389) included attending physicians, advanced practitioners, and residents from the departments of Internal Medicine, Family Medicine, and Obstetrics and Gynecology.

Procedures:

Health system records were used to identify eligible providers. A survey link was sent by electronic mail with up to two reminders to non-respondents. Participants received a \$30 gift card and were entered into a drawing to receive one of three \$100 gift cards. Data were collected and stored using the secure Research Electronic Data Capture (REDCap) software (26).¹ All data were de-identified prior to analysis. The study was approved by the health system's Institutional Review Board.

Measures:

We used measures from four domains: 1) knowledge of issues pertaining to caring for TGD patients, the outcome variable; 2) exposure to TGD people and educational content; 3) transphobia; and 4) provider characteristics. The survey consisted of 66 items. All researcher-created items were pilot-tested for clarity and appropriateness with a small sample of providers with and without experience in TGD patient care, from the specialties included in the study. Changes were made based on feedback.

Outcome variable: The TGD Healthcare Knowledge Scale (Appendix A) was constructed for this study, in consultation with experts in the field and based on training assessment questionnaires

¹ REDCap is a secure, web-based application designed to support data capture for research studies, providing (1) an intuitive interface for validated data entry; (2) audit trails for tracking data manipulation and export procedures; (3) automated export procedures for seamless data downloads to common statistical packages; and (4) procedures for importing data from external sources.

(27, 28). The 12-item scale explored knowledge in three domains relevant to core competencies in primary care for TGD individuals (29). Four questions assessed social aspects of TGD healthcare (e.g., pronoun use and social determinants of health), as understanding those aspects has been deemed essential to culturally appropriate interaction with TGD patients; two questions evaluated preventive care (breast cancer screening and mental health) of TGD people; and six questions evaluated knowledge regarding transition-related care, including hormone prescription and criteria for surgery, based on widely used published guidelines (30-32). We divided the number of correct answers by 12, and multiplied the result by 10, in order to create a knowledge score on a scale of 0-10. Higher score reflects greater knowledge. Unanswered questions were scored as incorrect.

Predictor variable: Formal educational exposure was measured as the number of hours of transgender health education received as part of one's clinical training ("About how many hours of formal education about transgender health have you had in a medical educational setting (i.e., medical school, nursing or PA school, residency, CME, CEU, etc.)?").

Control Variables

Informal educational exposure was measured as the number of hours of self-directed learning (e.g., reading) about transgender health the respondent had undertaken.

Contact was evaluated in two areas—personal and clinical—and questions were adapted from prior studies (22, 24). Personal contact was measured using the question "have you ever met a transgender person." Clinical contact was evaluated using two questions: whether the provider was currently caring for a transgender patient and whether they had cared for one in the past five years.

Provider characteristics were medical specialty, experience (years in practice), and provider type (resident, advanced practitioner or attending physician), as well as demographics including age, sex/gender, race/ethnicity, sexual orientation, continent of origin, religious identity, religiosity, and political views. Continent of origin was assessed using the question "Where did you attend high school?" (as high school is often tightly linked to acculturation) (33). Religious identity was

categorized as Atheist/Agnostic, Christian, Muslim, Jewish, Hindu, and Other. Religiosity was measured using the question “To what extent do you consider yourself a religious person?” with a 4-point Likert scale (1=not at all religious; 4=very religious). Political views were categorized as liberal, moderate, or conservative.

Transphobia was measured by an 8-item scale (Appendix B) which was an adapted from a previously validated scale assessing for gender differences in correlates of transphobia (34). Respondents answered using a 7-point Likert scale (1=strongly disagree; 7=strongly agree). A transphobia score was calculated as a mean of the score for answered questions (range 1-7), with higher scores indicating a greater degree of transphobia. Respondents missing >25% of the items were excluded from the analysis (Cronbach’s alpha, 0.847).

Analysis

We analyzed data using Stata SE, version 14.0 (StataCorp, College Station, TX). Descriptive statistics were generated for all study variables. Bivariate linear regressions were used to estimate mean differences in knowledge score by each predictor and control variable.

We used multivariable linear regression to examine associations between educational exposure (number of hours of formal education) and knowledge scores, while controlling for potential confounders. Alpha was set at .05.

Confounders were added to the regression model based on our conceptual model (Figure 1) (6, 11, 21-25, 28) and included demographics (age, sex, race, and continent of origin (6, 22-24) and other provider characteristics (provider type, specialty, and experience (years in practice) (11, 25), that were likely to affect both the predictors and the outcome. The model was also controlled for self-directed (informal) education, given the anticipated correlation with the outcome, with potential confounding effect amongst providers who opted into elective educational programming. We tested for transphobia as a potential moderator of the effect of education on knowledge using an interaction term. We used Stata margins for probability predictions. Gender identity and sexual orientation were not included as controls due to low prevalence of gender and

sexual minority groups in our sample. Additionally, personal and clinical contact, as well as religion and political view variables, were theorized to have a potential effect on transphobia and knowledge (35, 36), but not directly on the primary predictor (hours of formal education) or on the predictor-outcome relationship. We tested for the effect of these variables on the model, but they did not significantly change our final results and were not included in the final regression model.

Respondents who answered fewer than 10 of the 12 knowledge questions were excluded from analysis. The sample was not large enough for imputation. For the education (formal and informal) variables, outliers more than two standard deviations away from the mean were excluded (24 hours of formal education reported, n=10; and 152 hours of informal education reported, n=3, respectively). These extreme cases would have had significant leverage on the regression results and are not in a range that would be practical from the perspective of educational curriculum development. Hence, analysis without outliers was performed, ensuring that any associations found would be both reliable and generalizable to a broad group of learners.

Results

Demographics:

A total of 223 respondents (57.3%) completed the survey. The mean age was 41.3 years (SD 13.57). More than half (59.2%, n=132) of the respondents were female and 55.6% (n=124) were white. Approximately half (50.6%, n=113) were internists, 22.4% (n=50) were family physicians, and 26.9% (n=60) were obstetrician-gynecologists. Respondents included attending physicians (47.5%, n=106), residents (42.1%, n=94), and advanced practitioners (physician assistants and nurse practitioners, 10.3%, n=23). A majority (69.7%, n=154) had completed their high school education in North America or the Caribbean.

Outcome and primary predictors:

A TGD Healthcare Knowledge Score was calculated for 203 (91.0%) of respondents; the mean score was 7.41 (SD=1.31) on a scale of 1-10. The mean number of hours of formal education on

transgender healthcare was 2.49 (SD=4.41); for informal education, it was 6.13 hours (SD=12.41).

Half (50.2%, n=111) of providers had cared for at least one transgender patient in the past five years. The mean transphobia score was 3.06 (SD=1.09)—indicating that on average, respondents had moderate levels of transphobia, responding that they “somewhat disagree” with transphobic statements.

Bivariate associations:

The TGD Healthcare Knowledge Scale scores were not significantly associated with formal educational exposure ($\beta=-0.040$, SE=0.022, $p=0.067$) (results not shown) nor with sex, age, type of provider, experience of provider, or informal education. It was significantly associated with race ($p=0.019$ for the overall difference); the difference was attributable to the Asian and white comparison, with the average TGD Healthcare Knowledge Score 0.669 points lower among Asian respondents compared to white respondents (SE=0.212, $p=0.002$). Respondents who attended high school in North America had higher scores than those who attended elsewhere ($\beta=0.813$, SE=0.195, $p<0.001$). Scores were higher among obstetrician-gynecologists by 0.506 points (SE=0.216, $p=0.02$) and 0.775 points (SE=0.262, $p=0.003$) compared to internists and family physicians, respectively. People who identified as Atheist had higher scores than those who were religiously identified ($\beta=0.813$, SE=0.320, $p=0.012$), and those who had liberal political views had higher scores than those with conservative views ($\beta=0.849$, SE=0.262, $p=0.001$). Respondents who had met a transgender person had higher scores by 0.469 points than those who had not (SE=0.218, $p=0.033$). Higher transphobia scores predicted lower TGD Healthcare Knowledge Scores ($\beta=0.491$, SE=0.079, $p<0.0001$).

Multivariable regression:

The overall multivariable regression model was statistically significant ($p<0.0001$, adjusted $R^2=0.1859$) (Table 2). Number of hours of formal education was not associated with level of knowledge ($\beta=-0.027$, 95% CI=-0.077 – 0.023, $p=0.292$). Only transphobia predicted the TGD Healthcare Knowledge Score ($p<0.001$). Controlling for both formal and informal education and other confounders, for each 1-point increase in the transphobia score, the TGD Healthcare

Knowledge Score decreased by 0.377 (95% CI, -0.559 – -0.194). We tested whether transphobia moderated the relationship between formal education and knowledge. The interaction effect was not significant, and was not included in the final model.

Discussion

We found that half of the providers surveyed had cared for transgender patients, but a majority of respondents had received no more than minimal education on the topic. This finding is consistent with previous studies showing low rates of provider education on TGD care (11, 12, 14, 23). However, we found that increased hours of education (whether formal or informal) were not associated with improved knowledge. The only factor in the multivariable model predicting knowledge was transphobia. This is the first study to our knowledge to show a negative association between transphobia and objectively measured provider knowledge. This result is a concerning addition to the accumulating literature regarding transphobia as a major barrier to knowledgeable provision of care. As described by McPhail and colleagues, “education alone that simply fills gaps in knowledge without addressing the systematically socialized transphobia of healthcare professionals... will not likely be effective” (37).

Previous studies that have evaluated the effectiveness of educational efforts to improve transgender health knowledge among providers have reported mixed findings. In a Canadian study, medical students who were exposed to transgender-health curricular content had similar knowledge to students who did not have such curricula (12). In Safer and Pearce’s study, some student groups, but not all, showed a decrease in anticipated discomfort in treating transgender patients, following a curricular addition (22), and notably, there was no change in the proportion of students believing that transgender care was not a part of conventional medicine. In other studies, results showed improvement in trainee competence (21, 38). However, these studies evaluated short-term, self-reported outcomes of educational interventions such as clinical exposure and online modules (21, 22, 38). For example, medical students who participated in an elective on transgender health had improved self-assessed knowledge, skills, and comfort in caring for transgender patients *immediately* following the elective (21); trainees in pediatrics showed an improvement in their *perceived* knowledge following a transgender youth curriculum (38). Our study uses objectively-measured knowledge amongst practicing providers, rather than

short-term recollection following an intervention (which may not represent long-term knowledge retention). This additional feature may explain our unique findings.

Limitations

Our study has several limitations. The cross-sectional nature of this survey prohibits us from making causal inferences. Generalizability of the findings from this study may be limited by respondent selection bias. Selection bias will likely have favored responses by less transphobic respondents, which may have attenuated the association we found between transphobia and knowledge. Additionally, our survey respondents, while professionally and demographically diverse, were all employed by one healthcare system, thereby limiting generalizability. Our results are also not generalizable to other providers caring for TGD patients, such as pediatricians and emergency providers.

Our measure of educational exposure only assessed hours spent and not content areas addressed. Future research should investigate particular types of educational interventions or collect information about key content areas.

Interventions to improve knowledge and competence

Recent years have seen a sharp rise in awareness of TGD people's healthcare needs, as well as acknowledgment of current gaps in medical education on the topic. An increasing number of medical education programs are instituting trainings on transgender health (22, 28, 38, 39). These are timely efforts to address a dire need. As educators and others work toward improving provider competence in TGD care, it is important to acknowledge that the effectiveness of such programs may depend not only on increasing informational knowledge, but also on addressing providers' biases, whether conscious or unconscious. Educational initiatives will need to take learners' backgrounds into account, directly address prejudice, and enhance cultural humility. These efforts will resonate beyond TGD patients, to improve the readiness of trainees to provide care for a broad array of underrepresented minorities and stigmatized populations. Prior studies show improved attitudes toward marginalized populations (40-42) following direct patient contact, experiential training (43, 44), and standardized patient encounters (45). Specific to transphobia, research highlights the utility of fostering understanding and awareness of

transgender issues through a webinar in reducing biased attitudes among undergraduate students and mental health practitioners and trainees (46). Exploring the effectiveness of a webinar for PCPs is recommended.

Some surprising results emerged, which may be related to the design and focus of our study. We did not find an association between social contact or professional exposure to transgender people and knowledge, which may be due to the retrospective nature of our study, and the fact that we did not assess the effects of a specific, educational encounter. In addition to formal curricula to address implicit bias in medical education (47), many have stressed the importance of addressing informal instruction (or “the hidden curriculum”, including institutional culture) in medicine in order to decrease implicit bias (48-50). Interventions which address norms (51), such as increasing medical student diversity, experiences that promote empathy, and role modelling have been suggested specifically in caring for stigmatized populations (52). Finally, in our efforts to improve the care of TGD patients through decreasing implicit bias, we should remember that transphobia in medicine is not simply a reflection of societal transphobia. Rather, the construction of current social conceptions of gender and sex as binary, permanent, and objectively identifiable, derive directly from the psychiatric construction of transgender identity as a distinct, pathological, and medicalized entity (53). Thus, addressing the root causes of transphobia as they relate to medical culture requires reconceiving the role of medicine in the construction of gender and gender diversity (54). It is therefore also possible, that addressing the culture of medicine will likewise have positive effects on decreasing societal transphobia.

As new forms of interventions are developed, evaluations must assess long-term outcomes, ideally utilizing objective knowledge measures, as we have used in this study, as well as incorporating patient-reported outcomes. Future studies should further operationalize formal education by asking about participation in particular types of training.

The eventual goal of medical education is the improvement of health outcomes. While direct measurement of the effects of education on these outcomes is a complex endeavor, the

evaluation of proxy measures should be enhanced. This would include assessment of patient engagement in care and, importantly, patient-reported outcomes. Using community-based participatory approaches in the development of educational interventions may have the dual effect of bringing patient insights to medical education, as well as engaging TGD individuals and empowering them to take part in their own health and care.

Conclusion:

We found that increased hours of education were not associated with improved provider knowledge of transgender healthcare. The only factor predicting knowledge in the overall model was transphobia. Research is needed to evaluate which interventions are effective in increasing knowledge, and ultimately lead to improved care.

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Figure 1: Conceptual Model

A model of hypothesized relationships between the outcome and predictor variables and major potential confounders. The conceptual model, informed by prior literature (6, 11, 21-25, 28), was used in construction of the regression models. We hypothesized that increased hours of formal education would lead to greater knowledge, as expressed by higher score on the TGD Healthcare Knowledge Scale. This relationship may be confounded by participant characteristics, informal education, and transphobia which we controlled for in the model. Transphobia was hypothesized to moderate the effect of education on knowledge, with increased transphobia decreasing the effect. Models with and without informal education were evaluated, given potential correlation with both formal education and knowledge. Due to the cross-sectional nature of our study, causality cannot be inferred from our results.

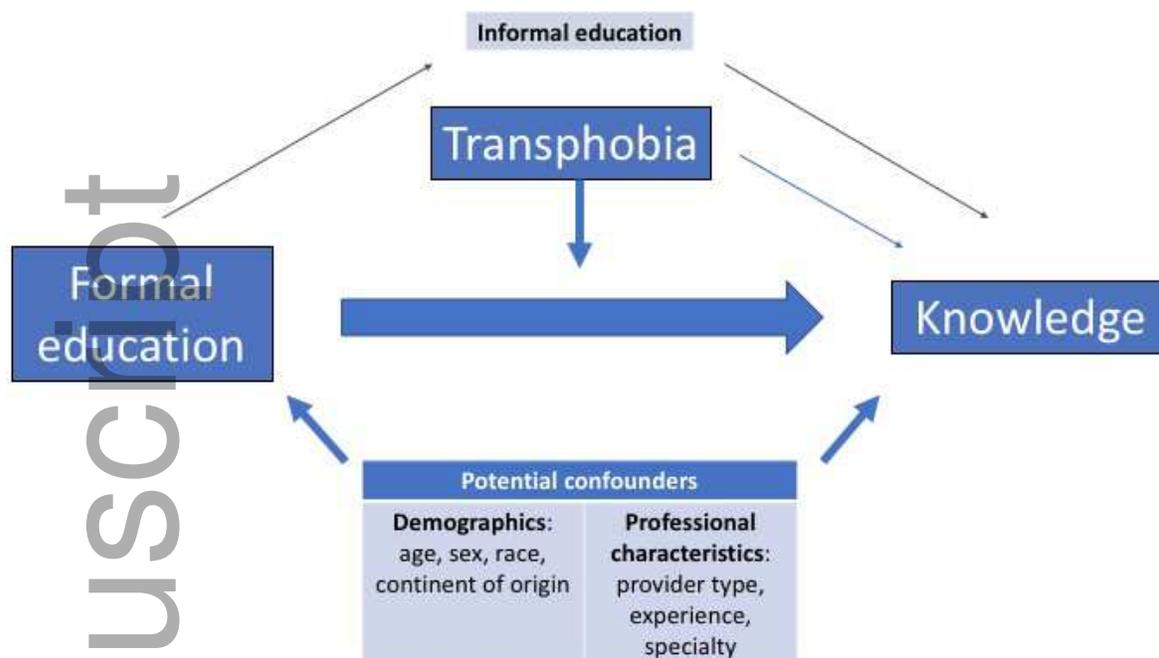


Table 1 - Provider characteristics and study variables

Variable	n (%)
Categorical Variables	
Gender	
Male	90 (40)
Female	132 (59)
Race	
White	124 (55.6)
African American	17 (7.6)
Asian	60 (26.9)
Other	22 (9.8)
Continent of Origin	
North America/Caribbean	154 (69)
Other	69 (31)

Specialty	
Internal Medicine	113 (50.6)
Family Medicine	50 (22.4)
Ob/Gyn	60 (26.9)
Experience (years in practice)	
Resident	94(42.15)
0-4	16 (7.1)
5-9	24 (10.7)
10-14	14 (6.2)
15-19	13 (5.8)
>20	62 (27.8)
Provider Type	
Resident	94 (42.1)
Advanced Practitioner	23 (10.3)
Attending MD	103 (47.5)
Religion	
Christian	110 (49.3)
Muslim	38 (17)
Hindu	27 (12)
Atheist	19 (8.5)
Jewish	13 (5.8)
Other	16 (7.1)
Religiosity	
Not at all religious	44 (19.7)
Slightly religious	48 (21.5)
Moderately religious	105 (47)
Very religious	26 (11.6)
Political views	
Conservative	38 (17)
Moderate	81 (36.3)

Liberal	104 (46.6)
Has met a transgender person	
Yes	173 (78)
No	50 (22)
Transgender patient in past 5 years	
Yes	111 (49.7)
No	112 (51.3)
Currently have a transgender patient	
Yes	56 (25.11)
No	167 (74.8)
Continuous Variables	
Variable	Mean (SD, Median)
Age	41.3 (13.57, 37.5)
TGD Healthcare Knowledge Score *	7.41 (1.31, 7.5)
Transphobia**	3.06 (1.09, 3)
Informal education	6.13 (12.41, 2)
Formal education	2.49 (4.41, 0)

* TGD Healthcare Knowledge Score range, 0-10

**Transphobia score range, 1-7

Table 2: Coefficients for predictors of TGD Healthcare Knowledge Score adjusted for confounders in a multivariable linear regression

Coefficient	β	95% CI	P value
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Formal education	-0.027	-0.077 – 0.023	0.292
Confounders			
Transphobia	-0.377	-0.559 – -0.194	<0.001
Informal education	-0.012	-0.033 – 0.009	0.259
Age	0.0003	-0.038 – 0.039	0.988
Sex (compared to men)			
Women	-0.336	-0.726 – 0.053	0.090
Race (compared to white)			
African American	0.036	-0.67 – 0.74	0.919
Asian	-0.255	-0.716 – 0.205	0.275
Other	-0.006	-0.66 – 0.65	0.985
Continent of origin (compared to North America)			
	0.44	-0.012 – 0.9	0.056
Specialty (compared to Internal Medicine)			
Family Medicine	-0.249	-0.727 – 0.229	0.305
Ob/Gyn	0.389	-.095 – 0.873	0.115
Provider type (compared to residents)			
Advanced Practitioner	-0.012	-0.91 – 0.886	0.979
Attending	0.073	-0.599 – 0.745	0.830
Experience (years, compared to <10)			
10-20	0.282	-0.465 – 1.03	0.458
>20	-0.351	-1.33 – 0.623	0.478

p>F<0.0001, adjusted R²=0.1859

Ob/Gyn, Obstetrics and Gynecology

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Informal education

Transphobia

Formal education

Knowledge

Potential confounders	
Demographics: age, sex, race, continent of origin	Professional characteristics: provider type, experience, specialty

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