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'I wouldn't know what to do with the breasts': the impact of patient gender on medical student confidence and comfort in clinical skills

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ABSTRACT

Background: Previous research has found a relationship between students' gender and attitudes surrounding peer physical examination, but relationship between patient gender and confidence/comfort is less clear. We explored whether patient gender affects medical students' levels of confidence and comfort in clinical examination skills.

Methods: An electronic survey and focus groups were conducted with medical students from one UK institution. Students reported levels of confidence/comfort when carrying out clinical examinations on men/women. An inductive thematic analysis was performed.

Results: Of a total of 1500 students provided with the opportunity to participate, ninety (6%) responded. For cardiovascular and respiratory examinations, confidence/comfort were higher when examining male-presenting patients. The opposite was true for mental state examinations. Barriers to confidence/comfort included perceiving males as a norm, difficulty navigating breasts, tutors' internalised gendered attitudes and a wider sociocultural issue. Facilitators of confidence/comfort included students relating to patients, embodying a professional role, gender blindness, and authentic clinical environments. Fewer than 20% ($n = 18$) of students felt they had enough opportunity to practice clinical skills on women, versus 90% ($n = 82$) on men.

Conclusion: Our study identified an area where students' confidence and comfort in clinical examinations could be enhanced within medical education. Changes were implemented in the institution under study's vocational skills teaching, which is rooted in general practice. Information on gender and clinical skills was provided within course handbooks, time was scheduled to discuss gender and clinical skills in small group settings, and equitable gender representation was ensured in clinical assessment.

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Introduction


Gender bias costs lives: in the last decade, deaths of more than 8200 women in England and Wales could have been prevented had they received the same standard of care as men, equating to two preventable gender gap-related deaths daily [1]. In healthcare, gender bias is attributable to both gender blindness [2], the false assumption of women's and men's health situations being the same where there are differences, and the converse, the assumption of differences where there are none [3].

Gender bias's implications on patient care [2,3] are multifaceted. Gender-stereotyping may result in doctors attributing coronary heart disease symptoms to psychological causes in women, increasing mortality [4]. Gendered communication styles lead to a reduced awareness of mental health pathology in men [4]. Gendered social expectations see the normalisation of menstrual pain resulting in an

endometriosis diagnosis taking an average of 7 years [5]. Medical education, too, can be androcentric [4,6,7] – resources, including textbooks and CPR dummies [8,9] centre on the male body. Although progress has been made regarding the participation of women in clinical trials [10] and the Scottish Government 'Women's Health Plan' [11] and England's 'Women's Health Strategy' [12] aim to combat biases, inequalities remain; men still overrepresented in trials [13,14] and research into how sex and gender bias may be reduced is lacking [15].

Gender bias in healthcare, whether implicit or explicit, is perpetuated by healthcare professionals. The education and training that they receive, thus, may be paramount in combating gender bias, for, when doctors are gender aware, they can contribute to equity and equality [4]. Gender equality is the absence of discrimination based on gender, whilst gender equity is the

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identification of gender differences and rectification of gender imbalance [16].

The importance of medical education is emphasised by the UK government's pledge for women's health-specific assessments to become mandatory in medical training, as part of its first women's health strategy for England [12]. The strategy also commits to commission research by the National Institute for Health and Care Research (NIHR) on women's health and establishes a new policy research unit on reproductive health [12]. The strategy lends a specific focus to primary care and general practice – pledging to expand general practice capacity, establish women's health hubs, piloted in one primary care network and commissioning research into healthcare professionals' perspectives of listening to women in primary care [12]. In medical education, primary health care too has been highlighted as a discipline of specific suitability to communicate the importance of gender issues to students, due to its multidisciplinary character [17].

A scoping review on interventions to reduce gender disparities in clinical care found only 22 studies, of which only two were based in primary care [15]. Primary care, however, may provide a unique opportunity for educational interventions which address gender disparities in the curriculum. Indeed, at the institution under study, all early years' clinical skills and all communication skills are general practice. Furthermore, previous research also advocates that general practice may have an integral role in promoting professionalism [18], which is closely intertwined with issues concerning gender equity [19]. Additionally, many of the health impacts of gender bias are often first encountered in primary care, including, but not limited to, domestic violence, reproductive healthcare services and cardiovascular health [15].

Whilst there has been considerable research regarding gender discrimination within medicine [20–27], there has been less research examining the impact of patient gender on medical student comfort and confidence when practising clinical skills. Given this, we asked: 'Does patient gender affect medical students' levels of confidence and comfort in undertaking clinical examination skills, and, if so, why?'

Table 1 outlines key terminology in this study and emphasises the limitation in only identifying gender as

perceived gender-presentation of individuals as male and female, thereby limiting applicability of the work.

Methods

Research approach

A mixed methods study design was used, consisting of an anonymous online questionnaire and focus groups. A multi-paradigmatic approach was adopted – quantitative aspects were interpreted using a post-positivist approach and qualitative aspects using a socio-constructivist ontology and interpretivist epistemology. We understand gender as a concept for which individuals possess personal mental constructs influenced by subjective social experiences [28,29].

Study context and study population

All medical students at one UK institution were eligible for inclusion. The institution has a 5-year integrated syllabus with the option to undertake an intercalated degree after year 3.

Sample selection and recruitment

Students were invited to participate through the institution's digital learning environment. Links were provided to a questionnaire, and contact details given if students wished to be part of a focus group. Participation was non-incentivised and voluntary.

Surveys were sent out once to students via Moodle, the institution's online learning environment and via year group social media pages. This study was done as a part of a student selected component, with only 1 week for data collection, and all survey responses dated between 28/01/2020 and 3/02/2020, which was a major limitation to recruitment attempts.

Ethical considerations

Ethical approval was granted by the institution's Ethics Committee (*approval number: 200,190,082*). Written informed consent was obtained from participants.

Table 1. Definitions of terms used in this study.

Patients	In this study, 'patient' refers to peers, in the case of peer physical examination, volunteer or simulated patients, such as actors, as well as true patients encountered in the authentic clinical environment.
Men/ women	Given that this research concerns students' perceptions of their encounters with patients of different genders, gender likely refers to the gender presentation of individuals, i.e. phenotypically male or female characteristics, rather than gender identity, which cannot be presumed to be concordant with gender presentation. It is also important to note that gender is not a binary which can be reduced to men/women and that transgender patients may experience additional challenges. In only identifying gender as the perceived gender presentation of individuals as male and female, this limits the applicability of this work.

Data collection

The questionnaire consisted of quantitative Likert scales and qualitative open text items. Questions were constructed with reference to issues highlighted by existing literature and teaching staff, in line with guidelines for developing questionnaires for educational research [30]. Face validity was assessed by independent faculty. No formal reliability analysis was conducted.

Examinations included in the questionnaire were those that are taught as a part of a peer-based examination in the institution under study – cardiology, respiratory, gastro-intestinal, neck, neurology, ENT, back MSK, upper limb MSK, lower limb exams and mental health history. Those that are taught on models as opposed to peers, such as the genitourinary exam, were excluded from this research.

Students were also asked how much the following factors influence their confidence examining patients – age, religion, ethnicity, weight, sexuality and whether they are transgender.

Additional qualitative data to explore students' perspectives were gathered through two semi-structured hour-long focus groups, each composed of five students. Focus group question stems (*Supplementary Materials I*) were drawn with reference to existing literature [31,32] and issues highlighted by teaching staff. Focus groups were conducted by two medical students not otherwise involved in the study – it was hoped that, as fellow medical students, they would be viewed as insiders in relation to the study topic by participants, facilitating richer responses. Recordings were transcribed verbatim by the research team and anonymised. Focus group and survey data were analysed separately, then triangulated.

Data analysis

Quantitative Likert scale data were analysed using descriptive statistics in Microsoft Excel.

Qualitatively, separate inductive thematic analyses were performed on textual survey responses and focus group transcripts using Braun and Clarke's framework [33] to identify themes relating to students' experiences of

gender regarding clinical examinations. The authors familiarised themselves with data and generated initial descriptive codes through manual coding (MP and MB), leading to the creation of a codebook, which was used to recode all data (MP and MB). Codes were abstracted to themes (MP, MB and CH), data were triangulated and presented narratively as a whole (all authors).

Theoretical framework

Theoretical framework Sensitising concepts that informed data analysis are the facets of gender bias in medicine described by Verdonk et al – gender blindness, androcentrism and gender role ideology (4) (Table 2). These sensitising concepts were applied as lenses to the thematic analysis to deepen understanding of data [37]. This approach has been described by Varpio et al. as a theory-informing inductive data analysis[38].

Reflexivity

Researchers kept reflexive journals to explore implicit assumptions and internalised beliefs that influenced interpretation [39]. As a medical student, MP is a member of the community under study. The rest of the research team consists of educational researchers (MB), medical school academics (CH) and clinical academics (LC, LH). CH, LC and LP have teaching roles in the medical school under study. To minimise potential issues with insider research, member-checking was carried out with focus group participants to ensure agreement with the representation of views within the study's results – no new points or disagreements were raised.

Results

Study demographics

A total of 1500 students were provided with the opportunity to participate. Ninety students (6%) responded. Ten students took part in two focus groups (five students per group) (Table 3). Participants were

Table 2. Verdonk's facets of gender bias [4].

Facet of gender bias	Conceptualisation within this theoretical framework
Gender blindness	Gender blindness is described as the false assumption of women and men being the same despite important differences [4]. Despite gender's standing as a social determinant of health, it is often not considered in medicine – medicine, thus, is gender-blind by not recognising gender where relevant [4]. Gender blindness is highlighted through the lack of focus on women's health in domains beyond reproduction and the exclusion of women from clinical studies [4].
Androcentrism	Androcentrism describes a 'male-centred' perspective, where knowledge of health and illness predominantly focuses on men [4].
Gender role ideology	Gender role ideology defines gendered attitudes a healthcare worker displays towards patients and professionals [4]. These are often intersectional, meaning that categories of difference [34], e.g. race, gender, social class, sexuality and disability status, interact to produce different power outcomes [34]. Gender also goes beyond the male/female binary, where gender refers to socio-cultural differences between individuals [35], whilst 'sex' refers to biological differences [36].

Table 3. Participant demographics.

Characteristics	Value	Frequency (questionnaire)	%	Frequency (focus groups)	%
Gender	Female	60	67	9	90
	Male	20	22	1	10
	Non-binary	1	1	0	0
	Not given	9	10	0	0
Year of study	First year	4	4	2	20
	Second year	34	38	7	70
	Third year	17	19	1	10
	Intercalated	2	2	0	0
	Fourth year	6	7	0	0
	Final year	16	18	0	0
	Not given	11	12	0	0
Sexuality	Heterosexual	64	71	N/A	N/A
	Bi/pansexual	11	12	N/A	N/A
	Lesbian/gay	7	8	N/A	N/A
	Asexual	2	2	N/A	N/A
	Not given	6	7	N/A	N/A

predominantly female, which is representative of the gender ratio of medical students within the institution under study (60% F: 40% M).

Survey Likert scale responses

Certain examinations showed gender variations (Figure 1). The greatest differences were within respiratory and cardiology examinations, where participants felt more confident and comfortable on male-presenting patients. Indeed, not a single participant felt more confident on women for these examinations (yellow and blue bars, Figure 1). The converse was observed for the mental state examination, the only examination where male students reported being more confident examining women than men. Similar trends were seen regardless of the participants' own genders in cardiorespiratory examinations, unlike previous literature which suggests that female students are more likely to correctly perform cardiovascular examinations on women [40]. However, it is important to note that this study measured perceived ability (i.e. self-confidence), which does not necessarily correlate with actual performance.

Only 8% (n = 5) of participants in years 1–3 felt that they had had enough opportunity to practice all clinical examinations on women, whereas 87% (n = 53) felt they had had enough opportunity to practice clinical examinations on men. This may indicate that perceived opportunity to practice may be linked to the reduced confidence and comfort felt by students when examining female patients. Fisher's exact test gave a P-value of 0.0000000000004148.

Including data from year 4 and 5 participants, who are ward-based and have the opportunity to practice on patients of all demographics, the figures rose to 19% (n = 17) and 90% (n = 80) for examining women versus

examining men, respectively. This suggests that students may not be comfortable to take advantage of these learning opportunities, perhaps due to earlier male-centric teaching. Fisher's Exact Test gave a P-value of 0.000000000000951.

Perceived confidence was highest in year 1, dropped in year 2, then rose over the next 4 years (Figure 2), but the proportion of people more confident on males was still higher in year 5 than year 1.

Qualitative questionnaire and focus group data

Thirty-four descriptive open codes were identified after triangulating qualitative survey and focus group responses. Thematic sufficiency, Page 3 of 3 'the stage at which categories appear to manage new data without requiring further modifications' [40], was achieved after 90 survey responses and two focus groups involving 10 participants. Two major themes and nine categories were identified (Table 4).

Theme 1: Barriers to developing equal confidence and comfort in carrying out examinations in male and female patients

(a) Males as standard:

Participants felt they had more opportunities to practice on males and that resources favoured males as a normative standard.

I think when it comes to respiratory and cardio exams we are often taught with male patients and models. Anatomy textbooks have a tendency to use male bodies as the standard which also makes this hard. (P41, F, Y5)

Students vocalised a need for more teaching on women. Given a lack of focus within teaching, formative and summative examinations were sometimes the first-time students were required to examine a female patient.

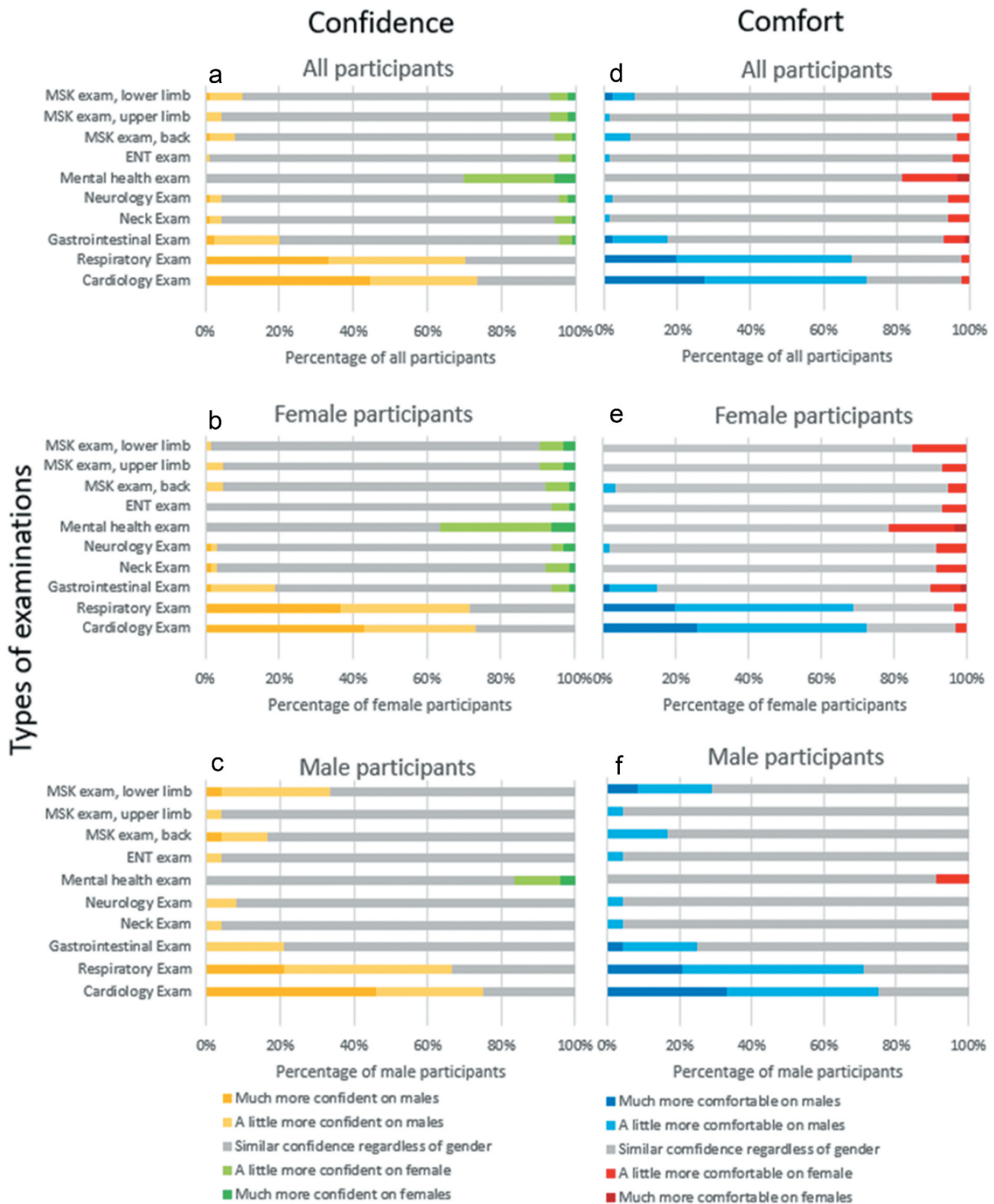


Figure 1. Online survey answers to the questions ‘How *confident* do you feel in carrying out:’ (a-c) and ‘How *comfortable* do you feel in carrying out:’ (d-f). Participant answers are presented for all participants (a and d), female participants (b and e), and male participants (c and f). There were not sufficient participants of non-binary genders to allow production of charts for non-binary participants.

In my very first station for the mock OSCE . . . it was CV exam and it was a woman and they'd never even discussed how to approach it so I just assumed they would just give you a male patient because they just teach them. They didn't. And I kind of freaked out . . .
(P4, F, Y3)

(b) Difficulty navigating breasts:

Proposed reasons for medical students' differing confidence and comfort levels often involve variations in anatomy, with teaching not providing clear guidance on how to vary techniques based on differences.

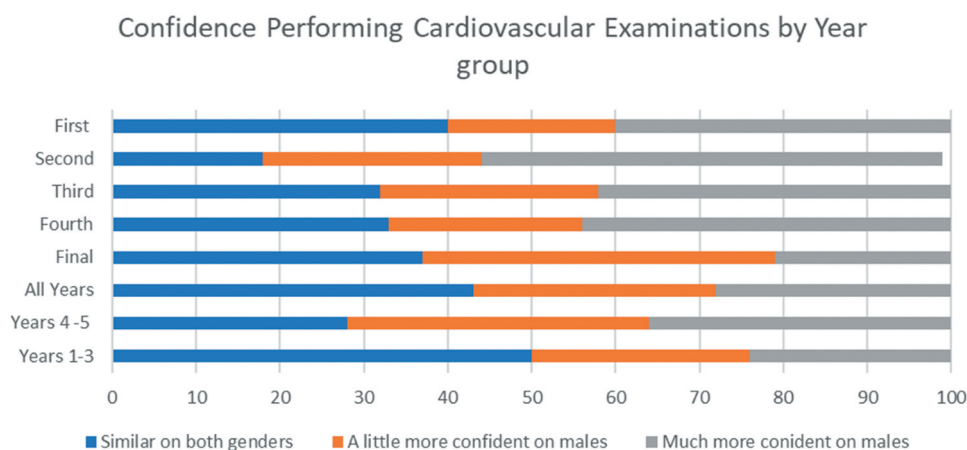


Figure 2. Confidence performing cardiovascular examinations by year group.

Table 4. Major themes, categories and corresponding codes obtained from inductive qualitative analysis of open-text responses in the electronic questionnaire and two focus groups.

Major themes:	Categories:	Open codes:
1. Barriers to developing equal confidence and comfort in carrying out examinations in male and female patients	a. Males as standard	<ul style="list-style-type: none"> • Male-only practice • Male-only textbooks • Male models • Majority of simulated patients are male
	b. Difficulty navigating breasts	<ul style="list-style-type: none"> • Working around breasts • Logistics surrounding the bra • Manoeuvring the breasts • Large breasts • Breasts make it more difficult to visualise structures • Teaching assumes bare chest, e.g. diagrams of heart valves/ECG placements on male, bare chest • Fear of exposing patients • Social awkwardness surrounding breasts
	c. Tutors' internalised gendered attitudes	<ul style="list-style-type: none"> • Segregated teaching • Female students discouraged from volunteering • Male students pressured to volunteer.
	d. A wider socio-cultural issue	<ul style="list-style-type: none"> • Tutors ignoring gender-specific teaching points • Stereotypical assumptions about the nature of patients, e.g. female patients as passive • More accepted to talk to women about mental health and emotions • Male students worry about how they are perceived when examining women • Opportunities to practice on women often found through friend groups.
	f. Intersections of identities	<ul style="list-style-type: none"> • Students felt less confident examining overweight patients and more confident on underweight patients. • Students preferred patients who were not of a similar age to them, as distance in age was felt to facilitate professional practice. • Some students felt less confident examining patients of ethnicities or religions different to their own. Religious garments such as hijab and a white norm presented barriers. • LGBTQIA+ patients were identified as an area of lesser confidence, especially related to transgender medicine.
	2. Facilitators of developing equal confidence and comfort in carrying out examinations in male and female patients	a. Students relating to the patients on an individual level
b. Role as a professional		<ul style="list-style-type: none"> • Growing up in a sex-segregated society makes same gender exams more accepted • Professionalism seen as a key outcome for graduates • Professionalism enabled students to distance themselves from viewing a patient as a peer. • Equal comfort/confidence seen as an inherent and necessary part of the role as a medical student or doctor
c. Gender blindness		<ul style="list-style-type: none"> • Deem the exam the same regardless of gender • Feel that all patients should be treated the same
d. Authentic clinical environments		<ul style="list-style-type: none"> • Hospital placements are more equal in the spread of genders encountered • Real hospital setting is a more natural environment regardless of gender.

I wouldn't know what to do with the breasts! (P24, F, Y2)

It's all males we learn with so it's difficult to know how to manage and where to position. (P3, F, Y2)

Some participants juxtaposed the professional responsibilities of a doctor with the limited clinical skills teaching received regarding examining women.

Despite the fact that we are expected to deal with the female body of patients in a professional behaviour as doctors it is perceived that we will not be able to do this with our peers as medical students. (P65, M, Y2)

Participants desired clear, practical advice regarding the examination of women.

Frank explanation by a doctor telling you how to handle it (I was told to ask the woman to move her breast out the road for you and it has helped a great deal). (P68, F, Y5)

(c) Tutors' internalised gendered attitudes

Participants vocalised how tutors' behaviours reinforced the narrative that males were a normative standard.

[In clinical skills] it is always the males that are encouraged to volunteer. I have had ... tutors in the past be a bit skittish about using females, which doesn't help us and it can be detrimental to female health. (P8, F, Y2)

I know many females who wouldn't have minded being the patient but often find it is the tutors too awkward to ask the girls. (P49, F, Y3)

Participants wanted staff to be trained regarding any biases they may have.

... giving training to all staff who teach clinical skills ... on how to approach this subject correctly, not using language that assumes that women/females will not want to be simulated patients or even encouraging them to do so (without pressuring them). (P65, M, Y2)

(e) A wider socio-cultural issue

Many students referenced experiences outside of medical school as influencing their comfort and confidence.

Social norm suggests it is more acceptable for a male to be topless therefore when practising we always practise on male colleagues. (P80, F, Y3)

Some students also made stereotyped generalisations about the nature of patients, for example:

... female patients are typically more co-operative, and this makes it easier. (P16, M, Y2)

(f) Intersections of identities

Some patients' characteristics, across both genders, amplified student discomfort. Students felt less confident examining overweight patients and more confident on underweight patients.

Overweight patients are challenging to examine regardless of gender. (P25, F, Y5)

For an underweight person it will be easier to feel things on their body (P64, F, Y3)

Students preferred patients who were not of a similar age to them, as distance in age was felt to facilitate professional practice.

... examin[ing] a patient at my same age or a bit younger I feel uncomfortable as I could feel attracted by him. (P29, F, Y3)

Religion and ethnicity also influenced comfort and confidence. Some students felt less confident examining patients of ethnicities different to their own.

[I am] worried about being insensitive if e.g. a woman wears religious garments such as hijab. (P31, F, Y5)

Ethnicity plays a role [in confidence and comfort] because I am used to see[ing] white people. (P29, F, Y3)

LGBTQIA+ patients were also identified as an area of lesser confidence, due to perceived gaps in teaching.

We have been taught next to nothing on transgender medicine. (P75, F, Y3)

Theme 2: Facilitators of developing equal confidence and comfort in carrying out examinations in male and female patients

(a) Relating to patients

Students felt more confident examining patients of the same gender although treating men as the norm within clinical skills meant some female medical students also felt more at ease examining men.

As a female I find it easier to connect with another female, however, in [the] case of respiratory and cardiac exam males are easier to examine as we were made to practice on males. (P18, F, Y2)

(b) Role as a professional

Participants dissociated themselves from discomfort by emphasising their professional role as a future doctor.

I remind myself I should be as professional as possible so I shouldn't feel uncomfortable. (P29, F, Y3)

(c) Gender blindness

Some students attributed their comfort in examining all genders to 'not seeing' gender within clinical skills.

Gender does not matter in an examination. (P35, F, Y5)

(d) Authentic clinical environments

Students noted that differences were alleviated by the placement environment, which offered a more authentic way to practice.

When initially being taught particular examinations especially respiratory and cardio[vascular] examinations, we would always practise on male students. I have gained confidence in examining women since then on hospital placements. (P5, F, Y5)

Discussion

Our data suggest that patient gender can impact medical students' levels of confidence and comfort. The described barriers and facilitating factors to equal comfort and confidence in examination skills may provide guidance for educators contemplating how gender disparities within examination skills may be addressed.

Students surveyed perceived clinical skills instruction as androcentric, centring upon the male body. The portrayal of men as the norm has been previously noted within medical textbooks, which frequently underrepresent women in all areas bar those with sex-specific content and promote traditional gender stereotypes [41]. This study adds to these findings by moving beyond textbooks to considering the bodies students practice on, demonstrating how students may internalise what is presented to them within teaching sessions as the 'norm'. This suggests that there is scope for demonstrating examination skills on willing female students as, in doing so, examinations on women may become more 'normalised' for students. Students' desire for learning how to handle sex-specific differences in anatomy is supported by previous research, which shows that emphasis on sex-specific examination manoeuvres, such as lifting the left breast to facilitate mitral valve auscultation, may begin to address gender bias [42].

Students perceived tutors as reinforcing stereotypes related to gender. In this way, gender attitudes can become part of the 'hidden curriculum' within medical education – the 'set of influences that function at the level of organisational structure and culture' [43], which represent unintended learning experiences [43]. This reported gender bias may be a form of benevolent sexism [20], which, although well intentioned, propagates stereotypes [44]. Achieving gender-sensitivity within medical education must, therefore, address both implicit bias within curricula, e.g. through adaptation of content, language and representation of women in education resources [20], and the implicit biases held by educators, e.g. through implicit bias education programmes [45] and systemic action [46]. Importantly, just as the barriers to gender equity are intersectional [47], approaches to addressing biases should be intersectional, as evidenced by participants also emphasising weight, gender identity and ethnicity/religious attire.

All placements and teaching described by the early years students in this study are part of the clinical skills and vocational studies teaching, which is GP-led at our institution. This emphasises how teaching-interventions may also be suitably placed in primary care. Since data collection took place for this study, GP teaching in the later years has increased for all students, and a special GP track has been developed in parallel. Further research is required to investigate the impact of the changes made to GP teaching at our institution in response to this study, in both preclinical and clinical phases.

Gender blindness was apparent in several students' accounts, who related disregarding gender to achieving greater comfort and confidence in examination skills. Although well intentioned, Risberg et al.'s theoretical model illustrates that gender-blindness *prevents* gender equity in medicine, which requires that doctors recognise differences in experience and biology when they exist [4,48]. Students perceiving 'gender blindness' as a promoter of gender equity rather than as a contributor to gender inequity show a need for education regarding gender within medical institutions. Risberg et al.'s model recommends reflections on gender-based attitudes alongside 'consciousness-raising activities' to combat gender-blindness [48].

Limitations

The low response rate of 6% may limit the validity and generalisability of the results. Despite significant P-values when performing Fisher's test, given the small sample size, confidence intervals should be interpreted with caution. The study was timebound utilising only the original data set for analysis. Although thematic sufficiency was achieved, it is important to acknowledge that further research may reveal new themes. In particular, the focus groups consisted of early years students, reflecting the concurrent exam period for later years. Survey data, however, showed that later years also showed a gap in confidence and comfort (Figure 1). Further research ought to ensure all years are reflected in focus groups. Further research is required to determine if the confidence and comfort gap identified in later years by the survey is perpetuated by similar or emerging themes. The complex issues of 'how many qualitative interviews are enough?' is explored by Baker [2012, 49] with the conclusion being that 'it depends' and that practical issues can be legitimate factors in deciding, including the amount of time available. The qualitative data offers richness and, according to Charmaz (2014), 'reveals participants' views, feelings, intentions and actions as well as the contexts and

Table 5. Practical proposals to promote gender equity.

Finding	Recommendation
Provide information on gender and clinical skills in course handbook	Following this study, information regarding gender and clinical skills was incorporated into the year 1 vocational skills course handbook. This highlighted gender disparities in healthcare and the history of preferentially using male students in OSCEs to students and prompted them to reflect on whether this surprised them, how gender may influence a situation and how they themselves may feel being examined. Providing detail and context about gender and its importance in formal course handbooks may improve student awareness and tutor engagement.
Schedule time to discuss gender and clinical skills in small group setting	To further support the above initiative, dedicated time for discussion and reflection in small group settings on patient gender and clinical skills may provide a safe space for students to untangle their own biases and receive clarification on how to perform clinical examinations on female patients.
Ensure assessment supports practice of clinical skills on female patients	Changes were made to the institutions' OSCEs to ensure equal representation of male and female patients in assessment. In the past, OSCEs explicitly requested male students for chest examinations or used a 'gender neutral' role – this, in fact, perpetuated androcentrism as male students are more likely to volunteer as OSCE patients [48–50]. OSCE invitations have now been revised to include male and female students for all stations and OSCE stations now specify gender to ensure equitable gender representation and encourage students to practice clinical skills on female patients.

structures of their lives' [50]. Morse (1995) emphasised the importance of data richness and variation over quantity which can lead to the development of a plausible and convincing theory [51].

Participants were from a single institution, which may limit transferability. There may be a selection bias in the demography of our sample, given the over-representation of women; however, this is a recognised phenomenon [52], and we sampled a breadth of student experience from all years. Furthermore, triangulation of data deepened the analysis and is likely to have enhanced transferability.

Although well aligned with the study's research question, this study only investigated student perceptions of confidence and comfort in carrying out examinations – how this translates to practice is a necessary direction for future research. Other areas for future research may concern specific examinations which show differences in confidence or comfort but do not feature prominently within our results, such as mental state examinations. Furthermore, additional examinations such as the genitourinary exam could be included, as well as histories as well as examinations. Multi-institutional research, and evaluation of gender equity changes implemented by institutions, would also be worthwhile.

A major limitation is that this study only identifies gender as the perceived gender-presentation of individuals as male and female, which limits the applicability of this work. Given that gender is not a binary issue, a further area of study is transgender identities and to include comfort and confidence working with non-binary and transgender patients. Although students were asked about the areas of intersection in this study – age, religion, ethnicity, weight, sexuality and whether they are transgender – these topics warrant exploration in their own right, rather than solely as secondary questions.

Recommendations to promote gender equity

Previous research has emphasised a need to clarify how gender issues may be integrated into the curriculum [4] – our research suggests examination skills training as a key domain in which gender can be explicitly discussed and that vocational skills, or equivalent GP-based teaching, may be a relevant part of the curriculum to implement such changes. We offer the following practical proposals to promote gender equity (Table 5), drawn from changes established at the institution at which this research was conducted.

Conclusion

This study set out to investigate whether the gender of an individual to be examined influences medical students' levels of confidence and comfort when carrying out various types of examinations and, if so, why this was the case.

Recommendations for change include the need for additional information on gender and clinical skills and the promotion of resources which feature all genders. Differences in gender, and gender biases, must be explicitly acknowledged and discussed throughout medical school curricula as the ability of medical students to understand clinical presentations in all genders is essential to ensuring that the doctors of tomorrow are adequately prepared for clinical practice. Although clinical ability is not in direct question, addressing confidence and comfort is a learner-centric response and these recommendations may help medical schools meet their dual obligations to patients and learners. This aligns with the Scottish Government's Women's Health Plan long-term aim to improve awareness and education among healthcare professionals of sex-related differences in presentation and management of heart

disease in women of all ages [11] and changes such as ensuring gender-representation in OSCEs align with England's Women's Health Strategy's aim that women's health-specific assessments are to become mandatory in medical training [53].

In making such changes, medical education can begin to move away from the androcentric status quo that has negatively impacted patient outcomes for generations.

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