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**This is an author accepted manuscript version of "Man up":
Medical students' perceptions of gender and learning in clinical
practice: A qualitative study**

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"Man up": Medical students' perceptions of gender and learning in clinical practice: A qualitative study

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Abstract

Introduction: Gender related inequality and disparity hinders efforts to develop a medical workforce that facilitates universal access to safe, just and equitable healthcare. Little is known about how medical students perceive the impact of their gender on their learning in clinical practice. Our aim in this study was to address this gap, establishing students' perceptions of the impact of their gender on learning in the clinical context as part of the wider medical education community of practice.

Methods: We undertook a qualitative study that simultaneously gathered data through narrative individual interviews and online case reports from male and female students (n=31) from different academic cohorts with prior experience of clinical practice in a Russell Group University medical school in the UK. Interviews were transcribed and analysed thematically alongside case report data.

Results and Discussion: The participants revealed that there was a culture in clinical practice where their gender influenced how they were taught and supported by senior medical/surgical colleagues. Gender was also said to determine the clinical learning opportunities afforded to students especially with regards to the care of patients of a different gender. The mentorship and support for learning provided to students in clinical practice was also said to be influenced by the medical student's gender.

Conclusion: Our findings suggest that students undergo a gendered clinical apprenticeship within what are in effect gendered communities of practice with some distinct features. These findings underscore the imperative for further work to establish how medical students of all genders can be supported to fulfil their potential in clinical practice.

Keywords

Gender, learning, Clinical practice, Medical education, Community of practice

Introduction

Gender related stereotypes, hierarchies and imbalances undermine efforts to develop doctors who are equipped to deliver safe, equitable and just care (1-6). Prejudice, inequality and/or injustice restrict universal access to safe high quality healthcare that underpins the sustainable development of nations (7, 8). The number of female medical students and doctors is increasing across the world, but socio-cultural factors relating to their gender limit their ability to participate in all aspects of medicine (9-12). Gender related inequalities have been cited as a factor that can lessen learning opportunities for medical students in clinical practice (1-3). Disparities in the assessment and evaluation of medical students and trainees relating to gender have been reported in different contexts (5, 6). Some studies (13, 14) show that nurses support for medical students and doctors' clinical education is contingent on their gender.

Gendered experiences in clinical practice influence the career choices of individual doctors and reduces gender diversity in the medical workforce (1-4, 12). Safe, high quality, equitable care which addresses the socio-cultural determinants of ill-health can only be achieved when doctors are educated to develop the requisite agency, nous and expertise (15). A gender diverse workforce helps to ensure patient safety (11, 16). It is thus imperative that medical students and doctors of all genders are supported to realise their full potential.

Research is urgently needed to address the dearth of literature on how medical students perceive the impact of their gender on learning clinical practice. Such research should be cognisant of the influence of the context on the manner in which learning takes place (17-19). In developing their knowledge and expertise in the clinical context, medical students and doctors become part of a community of practice. This education and professional development community of practice comprises people with shared ethos who provide each other with mutual support to improve what they do (19-21). Individuals in a community of practice learn from each other's experiences, knowledge and expertise through shared practice, as well as a repository of narratives and perspectives (20, 22, 23). This study sought to establish how medical students perceive the impact of gender on their learning in clinical practice within the wider medical education community of practice.

Aim

To explore medical students' perceptions about the impact of gender on learning in clinical practice.

Theoretical framework

Gender is a socio-cultural construct in which certain characteristics and traits are associated with different genders (24-26). However, a person's gender identity can contradict wider societal gender expectations and stereotypes which can give rise to bias, prejudice and discrimination (26-28). Gender is often conflated with a person's perceived or actual sexual characteristics and people can identify with more than one gender or as non-binary (24, 26, 28, 29). Gender can be conceptualised in a range of ways depending on the intellectual and philosophical position adopted, but the notion that certain traits are associated with a particular gender is increasingly outdated (11).

In our view, gender is best understood through research in the constructivist paradigm with an ontological outlook in which reality is conceptualised as a mental construct of individual actors who assign meaning to social phenomena that they encounter and experience (30-32). The concept of gender is also in line with an interpretivist epistemology which conceptualises social phenomena and/or actions with due recognition of their subjective meaning to the individual (30, 32, 33). Constructivist qualitative research is predicated on the notion of a socially constructed reality, so it has an inductive approach to theory generation from an emic perspective which recognises interaction between the phenomena of interest, the context as well as the insights and expertise of the researcher(s) (32, 34, 35). Therefore, we undertook this qualitative study with a constructivist ontology and an interpretivist epistemology. Our study was underpinned by a theoretical framework that we synthesised from the feminist and cognitive apprenticeship theories (36-38) (see Table 1). We synthesised this theoretical framework because feminist theory provides a lens to explore the socio-cultural influences on gender (39), while cognitive apprenticeship theory encompasses how people learn by observing, imitating and modelling (38, 40).

Table 1: Theoretical Framework

Based on feminist and cognitive apprenticeship theories (36-38)

Predominant gendered culture and career prospects	
Gender typing in medical practice	
Career expectations and aspirations	
Interactions with nurses and other healthcare professionals	
Patient consultations and examination	
Impact of gender on interactions	
Gender associated traits	
Females becoming 'medical men'	
Male doctor interactions	
Predominant gendered culture	
Patriarchal views	
Beliefs about women in medicine	
Rude or inappropriate language and behaviour	
Hierarchy of grades in medicine	
'Old boys club' mentality or behaviour	
Healthcare professionals more excited to work with male students	
Explicit gender bias	Implicit gender bias
Belief that students of different genders cannot act in the same way	Hesitance to report gender bias
Belief that female students must work harder to gain respect	
Belief that students of certain genders should act a certain way to progress	
Belief that students of certain genders should act a certain way to progress	
Feeling confident to report gender bias if it is explicit	
Gendered attributes in mentorship	
Good role model	
Lack of scaffolding	
Gender preference	
Shared gender-related experiences	
Gendered support and mentorship	
Differences in learning opportunities	
Impact on student confidence in participation in learning opportunities	
The medical student's gender reducing their ability to engage in different aspects of certain specialisms	
In male-dominated specialties, senior colleagues favour students of the same gender as them	
Impact on future behaviour	
Normalisation of gender bias	
Impact choice of specialty	
Impact on intrinsic motivation	
Student awareness of potential biases, especially implicit bias	
Denial of gender bias despite discussion of being treated differently	

Methods

We adopted a qualitative study design to explore medical students' perceptions of the impact of gender on learning in clinical practice.

Setting and study population

We recruited participants from a UK Russell Group University medical school where most medical students identify as female. Students in this medical school are taught about gender related differences and gender related healthcare issues from their first year of education prior to undertaking clinical practice. We invited medical students in their 3rd, 4th, 5th year of study on the conventional medical degree as well as intercalating students to take part. Intercalating students are those who take the 4th or 5th year out of the conventional medical degree to undertake an intercalated Bachelor's degree in a specific aspect of medicine. These student groups were selected because they had completed clinical placements as part of their training and would have some insight into gender and learning in practice.

Sample selection and recruitment

Prospective participants were approached by the academic year tutors who sent emails with information about the study and an invitation to participate. Potential participants were asked to contact two members of the research team (YP and KW) if they wished to be interviewed. Initially we adopted a purposive sampling approach to interviews to ensure that we obtained the perspectives of all genders. As the study progressed, we shifted to a snowball sampling approach to enhance participant numbers because most of the medical students in this university identify as female and it initially proved challenging to recruit students of other genders.

Data collection and instruments

We gathered qualitative data through concurrent individual semi-structured, narrative face-to-face interviews and online accounts of specific learning experiences (case reports). The questions in the interview schedule and online case reports were informed by a literature review of *a priori* research on gender and medical education (see Online appendix 1 and 2). Both forms of data collection focused on medical students' perceptions of the impact of gender on learning in clinical practice. The online case report tool was a structured proforma designed to gather qualitative data which had predominantly open-questions and free-text boxes to allow participants to express themselves. We used case reports with open questions and free text boxes rather than a series of tick-box questions as we sought to obtain qualitative data from detailed accounts of specific experiences (cases) of learning in practice. The specific gendered interactions that we were seeking to explore are inherently sensitive and not suited to data collection through a questionnaire with a series of tick-box questions.

Those submitting online case reports were given the option to disclose their gender identity or 'prefer not to say'. Since a person's gender identity may be different from how they are perceived by wider society, we felt that it was important to afford participants an opportunity to take part in

study anonymously via the online case reports. Combining online case reports and individual narrative interviews is recognised an appropriate way of exploring sensitive topics (41, 42). A further reason for adopting these dual methods was because some of the students in our population were preparing for examinations, on placements in the UK or on elective placements overseas which meant that they would not be available for interview at the time the study was conducted. Other studies have shown that qualitative data obtained from written accounts or electronically through a smartphone application respectively can be successfully integrated with interview data to generate novel insights into aspects of healthcare (43, 44). Therefore, our approach to data collection was apt as it took in account the sensitivity relating to gender identity and afforded students the opportunity to participate in the study as they saw fit irrespective of where they were in their studies.

Individual narrative interviews were conducted by YP, an intercalating medical student. The case reports were set up and managed online using Online Surveys (formerly Bristol Online Surveys) software by another member of the research team (KW). The online case reports included a question asking respondents if they wished to be interviewed. This question was included in case the students who completed the online case reports wished to provide more detail about their perceptions. Five participants who completed the online case reports also took part in the individual interviews. Information about which participants had completed case reports and had expressed an interest in being interviewed was separated by KW and was not disclosed to YP until the final stage of data analysis and integration. This blinded YP to information provided by participants in their case reports to avoid undue influence at interview. Data saturation was achieved after 13 individual interviews and 23 online case report had been completed at which point recruitment ceased. We defined data saturation as the point at which no novel insights or themes were identified from the accounts of new participants (32, 33). Therefore, this study had 31 participants in total [(13+23)-5]. Interviews were audio recorded and transcribed verbatim, with an average duration of 29 minutes.

Data analysis

After data collection had been completed, YP and KW combined the qualitative data from the five participants who submitted both and online case report and were interviewed. We subjected the data from all participants (n=31) to thematic analysis (34, 45), informed by our theoretical framework (see Table 1). Initial analysis of data from six participants was undertaken by YP, which was independently reviewed by the wider research team and agreement reached on a coding framework. RS and YP then undertook independent analysis of all data, which was reviewed by KW and AB and a consensus was reached on the main themes. We used NVivo software (version 11) to manage the analysis.

Reflexivity

The beliefs and expertise of the researcher have a direct impact on the analysis and interpretation of data in constructivist qualitative studies (34, 35, 46). Reflexivity enhances the rigour and trustworthiness of qualitative studies because it compels researchers to set out the impact of their views on their research (32, 46, 47). Reflexive journals are an effective way of surfacing the underlying assumptions and perceptions which influence the world view that informs the

researcher's approach to a study (47). During the analysis RS and YP kept a reflexive journal in which they documented their thought processes, decisions and emotions.

Further, reflexive dialogue amongst the members of a research team facilitates a higher level of conceptual thinking and theoretical abstraction in comparison to studies by a lone researcher, as there is greater scope to consider a diverse range of perspectives (48, 49). We held fortnightly team meetings in which we had a reflexive dialogue about how our individual gender, values, beliefs and intellectual perspectives impacted on our understanding and interpretation of data. Our research team comprised three women (YP, KW, AB) and one man (RS) with different intellectual outlooks and from different professional backgrounds. One member of the research team (YP) was a medical student and novice researcher, while RS, KW and AB were non-clinical medical educators with expertise in qualitative research. The world views of the experienced members of the research team were informed by philosophy and the social sciences (RS), psychology (KW) and education (AB) which reflected their different professional backgrounds.

Our reflexive dialogues also explored the impact that our professional standing had on the extent to which we may have been considered as insiders and outsiders at the time of the study. In our view, the medical educators in the research team were likely to have been considered as outsiders by the participants, due to our roles as academic medical educators while YP was likely to have been perceived as an insider. YP's background would also have helped to reduce the social distance between the researcher and the participants, potentially generating richer responses during the interviews than if they had been conducted by the other members of the research team. As YP's outlook would have been biased by her being embedded in the student population under study, we ensured that all other members of the research team played a direct role in data analysis and set out the basis for their interpretation of the findings during the reflexive dialogues in our team meetings.

Ethical considerations

Ethical and research governance approval was granted by the Russell Group University's School of Medicine's Medicine Research Ethics committee in December 2017. We obtained written informed consent from all interviewees and took completion of the online form as consent to participate in the case reports. All data gathered were anonymised and stored in line with data protection legislation.

Results

Twenty-three case reports were completed by eight male and 15 female students who were in their 3rd, 4th, 5th or intercalating year of training. Six male and seven female students in their 3rd, 4th or intercalating year of training were interviewed. Five 5th year medical students completed the online case reports, but no 5th year students volunteered to be interviewed. Participation from 5th Year students may have been affected by the data collection period falling during exams and electives. (Student pseudonyms and demographics are set out in Online Appendix 3). The students recounted covert and overt gendered interactions with members of the interprofessional healthcare team. We integrated the students' accounts into two main themes relating to predominant gendered culture

and career prospects and gendered support and mentorship. Although these themes and associated subthemes are set out separately, the students' accounts indicated that the themes and subthemes interacted in a variety of ways in their experiences with the interprofessional team.

Predominant gendered culture and career prospects

Every participant described interactions related to learning in clinical practice which assumed that they possessed certain traits or were suited to pursue certain aspects of medicine because of their gender. Some male and female participants stated that they believed that the gendered interactions that they described would have unfolded in another way if they were of a different gender. All the participants maintained that women in medicine were assumed to be more empathetic, but less emotionally stable than their male counterparts, which meant that there were lower expectations for them in intellectually and emotionally demanding specialisms such as surgery. The ability to work in emotionally taxing specialisms, which require clear thinking under pressure was said to be a trait associated with male doctors, as it was assumed that female doctors were unable to thrive in this environment. This expectation manifested by which male students were expected to display stoicism and emotional detachment when they encountered distressing scenes, as showing emotion was perceived to be a sign of weakness and a female trait:

Owen (Y4M): *"During surgery whenever I saw a very horrific scene the male surgeons always used to say, 'Come on, you're a man, take it like a man', even though it was my first time seeing it ... I was also told that I should man up and shouldn't be as feminine."*

Male doctors and surgeons with dominant characteristics in male dominated specialisms were accepted as the norm by all the students, but dominant female doctors and surgeons were said to be more memorable because the students were unaccustomed to meeting strong, dominant female doctors and surgeons. However, the view expressed by one participant about female doctors working in male dominated specialisms suggests their behaviour may have been influenced by unconsciously held gender related stereotypes:

Benjamin (Y4M): *"Females are low in number in some specialties such as surgery, which makes them feel like they need to raise their voice to be heard or even be more aggressive with their tone."*

Some participants and respondents stated that senior medical and surgical colleagues assumed that male medical students were more intelligent than their female counterparts. Some female students also reported that when they demonstrated their knowledge to senior male counterparts, they were subject to "banter" in which they were described as 'nerds' i.e. highly studious and intelligent but lacking in social skills, unlike male students who did not receive any such comments in similar circumstances. As a result of these experiences, some female participants said that they often feigned a lack of confidence in their knowledge as this was something that senior male doctors responded to favourably:

Sarah (Y3F): *"It's an ego thing, for male doctors, they like being nice to young girls ... If they ask a question and I say 'oh I think it's this', they like you better because you show them a lack of confidence."*

Most participants reported that assumptions about gender traits and career expectations were evident in the way students of different genders were 'guided' towards certain aspects of medicine.

Most female participants said they were discouraged from pursuing a career in specialisms perceived to be challenging, like surgery, if they wanted to have children. Instead these female participants recalled being encouraged to pursue careers in specialisms such as general practice that are associated with 'female traits' such as good interpersonal skills and empathy. All male participants maintained that they were strongly encouraged to pursue a career in specialisms like general surgery or orthopaedic surgery even if this was not their interest because surgery required a high level of physical strength that female doctors were said to lack. Male participants stated that they were reluctant to pursue a career in female-dominated specialisms such as obstetrics and gynaecology because of how they might be perceived by their male counterparts:

Charlotte (ICF): *"As females, we are guided towards specialities like GP (General Practice). We don't tend to get guided towards surgery..."*

Ryan (Y3M): *"A lot of men who go into obstetrics and gynaecology don't feel comfortable about how they might be viewed by other men for doing so."*

All the participants asserted that gender associated traits had an impact on how they were guided towards certain aspects of medicine in clinical practice, but they expressed a range of views about their confidence in challenging overt gender bias. From the case report data, most of the participants maintained that they would have low to moderate confidence in challenging another colleague in clinical practice whom they felt was subjecting them to gender related bias. Proportionally more female than male participants stated that they had low to moderate confidence in challenging instances of gender bias. However, it must be noted that the sample is small and this disparity in reported confidence maybe due to a greater number of female (n=20) than male participants (n=11).

Some participants said they would challenge gender bias regardless of its perceived severity. Others suggested that they would challenge gender bias only if they perceived it to be severe. However, most participants said that they would not feel comfortable challenging gender bias when they personally encountered it, especially if it involved senior male colleagues due to the sense of hierarchy. In addition, these participants indicated that they would be hesitant to challenge a senior medical colleague about gender bias for reasons of self-preservation and fear of getting a 'bad sign off'. However, most of the participants and respondents reported that they would be more likely to speak up if they observed an interaction in which someone else had been subjected to gender bias, than if they experience gender bias themselves:

Lydia (ICF): *"If the doctor's the one that's assessing you or you're trying to get a mini-CEX [a workplace assessment] filled, you don't wanna get on their bad side."*

Ryan (Y3M): *"I'd probably feel far more confident challenging someone who was making a grossly inappropriate comment against someone else ... because a lot of things said are hurtful or rude."*

Gendered support and mentorship

Every participant asserted that the predominantly gendered medical culture had a direct impact on their ability to learn in clinical practice with support from and mentorship from by senior medical

colleagues and other healthcare professionals. Both male and female participants reported that senior doctors, senior surgeons and other healthcare professionals had an inherent preference for medical students of the same gender as they had a shared understanding of gender related experiences and expectations. However, in the case report data some participants stated that their interactions with regards to learning in practice with healthcare professionals of different disciplines were or may have been influenced by their gender but other students opined that their gender did not have an impact on their learning-related interactions.

The unanimous view of every participant was that a lack of mentors, scaffolding and coaching from senior doctors and healthcare professionals of the same gender affected their learning and motivation in certain aspects of medicine. Participants felt as though they had no role model of the same gender that they could relate to in this specialty. The participants' accounts suggest that this view was manifest in medical specialities in which they were unable to find a role model of the same gender. The students suggested that the reason some women in medicine are not interested in some specialties is because they do not have enough female role models in those specialties:

Hazel (Y4F): *"We were each given a consultant to follow and one of the boys, his consultant was away that week. [He]... joined me with the male consultant I was following, and I noticed that every single time there seemed to be an opportunity for learning I kept getting turned away from clinics when the other guy was there."*

Caroline (Y3F): *"Having one or two female T&O (Trauma and Orthopaedics) surgeon role models that are inspirational and good at teaching would encourage more women to go into it, it's a snowball effect."*

Some female participants stated that female nurses treated male medical students more favourably than female medical students with regards to supporting learning in practice. One female participant said that, in her experience, nurses were more supportive of female medical students because they were perceived to be more vulnerable, while two other female participants maintained that male nurses treated female medical students better than female nurses:

Charlotte (ICF): *"Nurses look after female students more, because females tend to be more vulnerable than males"*

Penelope (Y5F): *"Male staff nurses are more friendly and helpful than female staff nurses."*

Most participants stated that they had received some preclinical teaching about gender differences, which they felt would enable them to deliver care in an appropriate manner to patients of all genders. However, these participants maintained that there were some aspects of their preclinical education on gender differences that needed to be improved, most notably in relation to the physical assessment of patients. Most students highlighted that their preclinical education on patient examination invariably involved role play in which the part of the patient was always played by a male student. The participants acknowledged that it was possible that this was due to concerns about protecting the modesty of female students. However, the students felt that this aspect of preclinical education affected their confidence and ability to undertake physical examinations of patients of another gender:

Caroline (Y3F): *"Whenever we were doing chest examinations in teaching sessions, they'd ask for a male student to be the model and they wouldn't ask a female student. I guess that's quite an obvious difference."*

Lucas (Y3M): *"When you're taught respiratory and cardiac examinations in university you do a lot of touching of the chest... A guy touching a guy's chest is fine, a woman touching a guy's chest is fine, but a man examining a female's chest... it's quite difficult because you don't know what's overstepping the boundary. I think females are probably more relaxed when they are examined by another female."*

A few male and female participants felt that the gender of the senior doctor influenced the extent to which they allowed medical students of a particular gender to engage with patients during consultations and examination. These participants stated that senior female doctors presumed that female patients would not want male medical students present during their consultations while senior male doctors presumed that male patients would not want female doctors present during their consultations. The reported presumptions about patients' preferences with regards to having a medical student of a different gender present during a consultation or examination were reflected in the way consent was sought from patients:

Lydia (ICF): *"In the urology clinic, the (male) doctor seemed a little bit iffy about having female students present during patient examination, but it wasn't the patient that said 'no' (to me being present) it was the doctor that was like, 'It would be best if you sat on the other side of the curtain.' It's a very intimate examination but the patient should have decided (if I could observe) instead of the doctor."*

Lucas (Y3M): *"When a female patient was next ... I was told 'Oh, well she may not want you to be there' because I was male, and it was a bit of a surprise when a female patient would say it was fine for me to be there. She (the senior female doctor) expected them to say no to me (being present during the consultation)."*

It is possible that the senior medical colleagues in the interactions cited by the participants were mindful of patient sensitivities and acted out of a desire to protect what they perceived to be the patient's best interest based on their past experience of patient choice in relation to sensitive consultations and examination. However, the student felt that the reported assumptions about patient's preferences with regards to having medical students of a different gender and the manner in which questions about this topic were put to patients limited the number of learning opportunities that they had in relation to the care of patients of a different gender.

The gendered workplace culture was said to impact on female and male students' learning in practice in different ways. Female students were said to have to conform to more expectations with regards to dressing and behaving in a certain way to gain their senior colleagues' respect and to be taken seriously in clinical practice. Some female participants revealed that on occasion male colleagues had suggested that they should use their sexuality to progress by flirting with senior male doctors. Some male participants said that senior male colleagues suggested that they should date female medical students while they were on placement:

Sophia (ICF): *"I was on surgery rotation and the female registrar said I needed to 'behave better than the other male students' because I was a woman and would not be taken seriously if I was seen crossing my arms or leaning but it would be okay if a male students did this."*

Hazel (Y4F): *"A male medical student said to me that I should flirt with an F1 (junior doctor) and get them to sign me off on stuff... This made me feel quite uncomfortable."*

Ryan (Y3M): *"I've had comments like 'when are you going to take her out for dinner?' about another student on placements who's female."*

Discussion

Our findings suggest that students perceive a gendered culture in clinical practice, and this has an impact on how they learn. The participants reported encountering a clinical environment in which they were taught, socialised and mentored in different ways depending on their gender. The notion of a gendered culture in clinical practice has been previously reported in relation to the impact that it had on the development of professional identity of third year female medical students (12). The participants' descriptions of the transmission of specific values, identity and lore in line with their gender reflect many of the features of a community of practice as set out in wider literature (19, 20, 22, 23). We integrated our findings into a gendered apprenticeship theory (see Figure 1) which summarises the process by which gendered culture is transmitted to students within what appear to be male and female communities of practice. Our gendered apprenticeship theory draws upon the premises of the cognitive apprenticeship theory (37, 38) in which expertise is developed through modelling, coaching and scaffolding. Our findings suggest that students develop their expertise in clinical practice through experiences of modelling, coaching and scaffolding which are gendered. The sentiments of our participants highlight that gendered modelling, coaching and scaffolding in clinical practice has a direct impact on students' learning opportunities, which in turn can result in the internalisation of a gendered perspective of medical education. Therefore, the gendered apprenticeship theory that we have integrated builds upon cognitive apprenticeship theory by surfacing the impact that gendered experiences may have on students' learning.

Our gendered apprenticeship theory accounts for the challenges that students of a different gender to that of the senior figures in clinical practice are said to face in accessing support to develop their careers in this study and wider literature (12, 16). This nascent gendered apprenticeship theory needs to be developed and tested in further research as our findings do not preclude students' experiences that are gender neutral or counter stereotypical experiences in which they are supported by senior colleagues of a different gender. In our conceptualisation, the senior medical colleagues utilise narrative, modelling, scaffolding and coaching to foster the growth and development of students of the same gender within a male or female community of practice. Our findings point to the existence of gendered communities of practice appear which function in a way that results in the internalisation and normalisation of unconscious gender bias amongst students who are then primed to perpetuate it, albeit unintentionally, when they become doctors. However, our findings in this regard are counterintuitive as they suggest that there are in effect two communities of practice, one that supports men's learning in the clinical workplace, and one that supports women. These gendered communities of practice have a direct impact on mentorship and

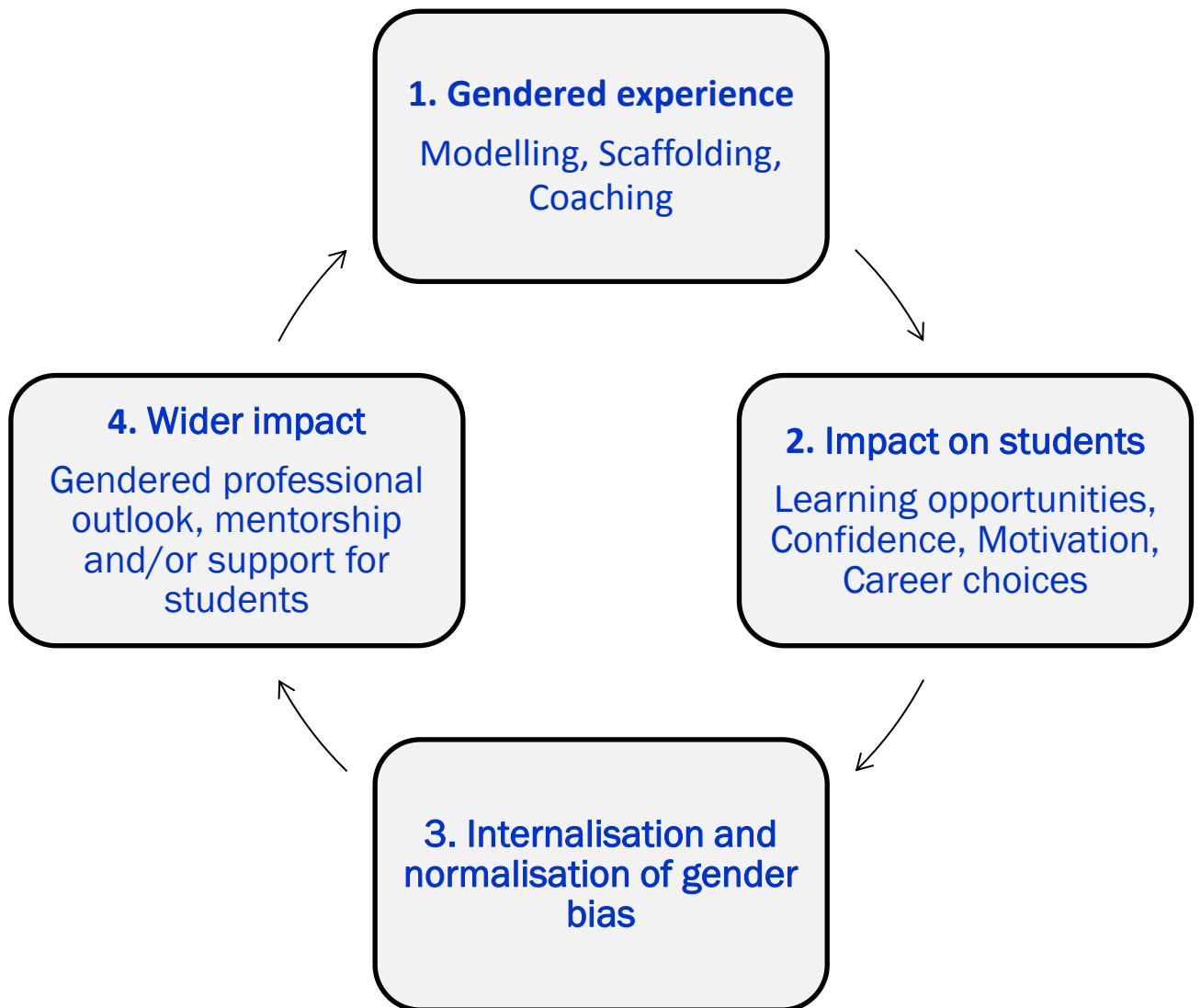
learning opportunities in clinical practice and appear to have an impact on students' motivation to learn, confidence in their abilities and career choices.

Buckley et al. (50) maintain that the reference to the notion of a community of practice requires conceptual depth and clarity that can only be achieved through a detailed explanation of which aspects are relevant to learning in a defined context. Conceptual clarity and depth are important because the notion of a community of practice is increasingly contested and debated (50). Therefore, we clarify which aspects of our findings are consistent with community of practice theory and justify our use of the concept. We draw upon the notion of a community of practice as a social context in which the members of a group have a shared commitment to learning (20, 22, 23, 50, 51). In our view, our conceptualisation of our results as indicative of gendered communities of practice is apt; as the male and female subcultures described by the participants have some shared and distinct features that are explored in this discussion.

Gendered clinical culture and learning

A salient finding of this study is the way students reported being socialised to learn and behave in different ways depending on their gender in a clinical culture which appears to have female and male communities of practice. It has long been established that communities of practice are comprised of people who share their knowledge, expertise and wisdom through narratives to achieve a shared objective (20, 22, 23). Our study indicates that the gendered culture in clinical practice may give rise to what in effect are female and male communities of practice that focus on supporting students of the same gender to do well in a certain specialism. We found that senior doctors and surgeons tell students certain narratives which appear to function as atrocity stories in order to transmit certain values and expectations about behaviour to students within the gendered clinical culture. Our finding about the transmission of gendered narratives that are akin to atrocity stories is congruent with other studies (52-54), which report that such stories are used to demarcate and maintain the boundaries between different communities or professions primarily with regards to the organisation of work or the division of labour in healthcare. Atrocity stories reinforce boundaries between different professions and communities in healthcare because communities of practice tend to be unidisciplinary (52, 54, 55). Our finding that female and male students in our study were told about acting in a 'ladylike' manner and the need to 'man up' respectively suggest that these narratives as used as atrocity stories to maintain the predominant culture within what we describe as the gendered communities of practice in different specialisms. It could be argued that differing gendered narratives given to students perpetuate the boundaries in what appear to be female and male communities of practice with their own distinct identity and folklore which may have other shared characteristics. The differing narratives that are given to students depending on their gender as they learn in clinical practice are a novel finding to the best of our knowledge. However, there have been some reports (12) of the differing expectations of female medical students compared to their male counterparts in clinical practice. The notion that there may be male and female communities of practice within the same profession has not been previously reported as the received wisdom is that there is one overarching medical education community of practice.

Figure 1: Gendered Apprenticeship theory



Mentorship

Our findings about the gendered nature of student mentorship highlight the nature of learning in practice and add credence to our notion of male and female communities of practice. Students reported that the mentorship and support that they received from senior colleagues was largely contingent on their gender. Senior doctors and surgeons were said to provide greater support and learning opportunities for students of the same gender. Students are reported to imitate the behaviour of senior medical colleagues who they aspire to be like because they view them as role models (12, 56). Learning in within a community of practice takes place in a variety of implicit and explicit ways such as through narratives and observation (20, 22, 23). These findings about gendered mentorship merit further exploration given that they appear to be part of the hidden curriculum (57, 58) in which norms, values and behaviours relating to gender are tacitly transmitted to students.

There is some evidence which suggests that gender specific mentorship in medicine may be beneficial for some students (59-61). Some have opined that female mentors help to challenge gender related stereotypes in medicine and encourage women to pursue careers in all specialisms (60-62). Some men are said to be reluctant to mentor women because they are worried about contravening prevailing social norms about interacting with people of other genders and are afraid of false accusations of sexual harassment (63). However, the notion of formal gender specific mentorship for all students in medical education is untenable for two main reasons. Firstly, there are an increasing number of female students but there are some aspects of medicine and surgery that dominated by men or women (11, 62, 64, 65). There is also a risk that gender specific mentorship in medical education may inadvertently give rise to 'hostile sexism' and 'benevolent sexism' which entrench gender stereotypes that reduce mentorship opportunities (63).

The experiences recounted in this study about senior colleagues' mentorship and support for students of the same gender suggest that there may be some value in conceptualising learning in clinical practice through a lens which acknowledges gendered communities of practice. Such an approach has merit in our view, as our findings suggest that what we describe as quasi female and male communities of practice have some distinct features but are similar in terms of how gender specific values, behaviours and attitudes are transmitted to students. However, there may be other similarities between what we perceive to be in effect female and male communities of practice, such as hierarchy or hard work, which permeate medical culture and educational communities of practice but that are not supported by our findings.

Learning opportunities

The students in our study maintained that senior doctors tended to assume that patients would refuse permission for students of the opposite gender to be present during a consultation or examination which had an impact on their learning opportunities. Some patients express a preference for having consultations and examinations conducted by a doctor of the same gender because of socio-cultural norms relating to the context of care delivery (13, 66). In other studies (12, 13), female students have asserted that that undertaking a consultation or examination of a patient of a different gender could expose them to unwanted sexual advances or inappropriate sexual behaviour. There is a view that female students are deprived of opportunities to fully engage in key aspects of practice such as examination and consultation because of the sexist view that they are

less competent than male students (13). This study's finding that male students have limited opportunities to take part in consultation and examination of patients of a different gender is consistent with the evidence from a number of other studies (1-3).

Most of the participants in our study recalled receiving preclinical education on gender related differences but felt that it provided them with insufficient insight to enable them to be confident to carry out key aspects of care such as completing the physical examination of patients of a different gender. Our findings pointed to the impact that the lack of opportunities to examine women playing the role of a patient in preclinical scenarios have on the confidence of male medical students in examining female patients in practice. It may be prudent therefore, to ensure that all students are provided with the opportunity to practise examining men and women as part of the education on gender differences prior to clinical placements. Our findings about the impact that a student's gender on learning opportunities with regards to patient examination and consultation raise concerns about patient care and safety in the long term. If students have limited opportunities to fully engage with patients of different genders in clinical practice, then they are less likely to have an insight into the differing sex and gender related presentations of different conditions. The calibre of medical care that patients receive is likely to be diminished because there are many diseases and illnesses which present in a way that differs from received wisdom as a result of the person's sex and/or gender, such as cardiovascular disease in women and uterine cancer in transgender men (16, 67, 68).

Support from nurses

We found that the gendered clinical culture transcends medicine as the participants revealed that there are differences in the nature of the support that nurses provide to female and male medical students in relation to learning in practice. Gender and sexual identity have been found to have an impact on medical students' and doctors' interactions with nurses in different studies (5, 69-71). Empirical evidence from different contexts (5, 6) highlights that nurses are more likely to evaluate women in medicine more negatively and to provide them with harsher feedback than their male counterparts. The reported disparity in nurses' perceptions of women and men practicing medicine is thought to be due to differing gender related expectations with regards a person's behaviour, demeanour and characteristics (5, 6).

In this study, some female nurses were said to treat male students more favourably than female students. Wider literature provides a range of plausible alternative explanations for this finding. The evidence from some older studies (69, 70) suggests that in the past, wider social stereotypes of dominant male doctors and passive female nurses resulted in a 'sexual or erotic game' with flirtation or sexual tension in interactions between male doctors and female nurses. Some female doctors argue that absence of flirtation and sexual tension between female doctors and female nurses affects their working relationships in a negative way in comparison with male doctors (69). Studies in different contexts (13, 69, 71) indicate that nurses seek to minimise the disparity in status between doctors and nurses which has a disproportionately more negative impact on female doctors who end up being less supported, respected and trusted by nurses than male doctors. There have also been reports of female nurses having greater expectations of female doctors relative to their male

counterparts in relation to undertaking procedures independently which creates tension as some of these tasks are part of nursing work (13, 69, 71).

A few female nurses were said to be more supportive of female students because they were viewed as being more fragile, while male nurses were reported to provide relatively more support to female students than male students. The notion that male nurses provide more support to female students than male students has not been previously reported to our knowledge. It is possible that a few male and female nurses provide extra support to female students because they view them as more fragile than male students and have a genuine desire to help them do well. However, it could be argued that such views by nurses constitute 'benevolent sexism' (63) because they reflect the erroneous but widely reported view that somehow women in medicine are less competent or capable than their male peers (13, 59, 72). It is also possible that a few male nurses support female students in a parallel of the 'sexual or erotic game' between male doctors and female nurses which has been reported in earlier studies (69, 70).

Strengths and limitations

The findings must be interpreted with due consideration of the study's limitations and strengths. Our findings are predicated on a sample of students from a medical school in a UK Russell Group University where most students identify as female, which affects the extent to which our findings relate to other settings with a different gender mix. Further, we recruited a self-selecting sample of students who recounted their experiences of gendered interactions which means that the study may have been affected by selection bias and our findings may have been subject to recall bias. However, the participants were from the 3rd, 4th, 5th or intercalating year of study and they described similar experiences with regards to the impact of gender on learning in clinical practice. Gathering data through individual interviews and online case reports facilitated the collection of rich, detailed accounts. We mitigated the risk of giving undue weighting to the views of the five students who completed online case reports and were interviewed by integrating the data from these students during data analysis.

Davies (51) argues that communities of practice have a shared focus on a specific enterprise in which gender is constructed through different sociolinguistic devices. Therefore, it is possible to misconstrue gender related differences between individuals as a sign that there are different gender specific communities of practice (51). The view that gender related differences can be misconstrued in relation to communities of practice merits further consideration given our novel proposition about the existence of female and male communities of practice in medicine. There are often different levels of participation in community of practice as some individuals are potentially marginalised on an outward trajectory to be part of the out-group on the margins of the community, while individuals on an inward trajectory are permitted to participate fully as they set out to become part of the in-group within the wider community (23, 51). Consequently, it may be argued that our findings are indicative of clinical culture in which educational communities of practice in some medical specialities are dominated by one gender and medical students of a different gender are on an outgroup trajectory. However, our notion that there are in effect two gendered medical education communities of practice with some distinct features is supported by students describing

how gender influenced their learning, socialisation and mentoring in different ways in the same speciality.

Conclusion

In summation, the salient finding of this qualitative study is that medical students perceive that there is a gendered culture of learning in clinical practice which has an impact on the mentorship that they receive, their learning opportunities and working relationships with nurses. The gendered culture that has been described by the participants is sustained by what in our view appear to be female and male gendered communities of practice. However, further research is needed to establish the extent to which what we conceptualise as female and male communities of practice are truly distinct or have some distinct and some shared characteristics. Our gendered apprenticeship theory accounts for how gender associated norms are said to be transmitted, normalised and perpetuated in clinical practice. In clinical practice, students are primarily socialised by senior colleagues of the same gender to manifest certain traits and behaviours in what we propose are in effect female or male communities of practice. Our findings about how female and male students' learning opportunities and training are influenced by gender related expectations of senior doctors, and how most senior doctors are inherently disposed to be more supportive of students of the same gender raise important questions about the training and formation of the doctors and surgeons of tomorrow. This study underscores the need to think at a system level about how medical education, especially in clinical practice, can be transformed to provide medical students of all genders with the support that they need to thrive and flourish in all aspects of medicine. Our study also raises questions that merit further exploration in subsequent research such as what medical students who recognise that their support for learning in practice is gendered do with that information and what factors determine whether medical students overcome or succumb to gender related stereotypes or gender related stereotype threat in relation to learning in practice. This study will be of interest to an international audience of medical educators, students and others with an interest in delivering medical education which is fair, just and equitable to students of all genders.

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Author contributions

Conceived and designed the study: RS, KW and AB. The study was undertaken by RS, YP, KW and AB. The data were analysed by: YP, RS, KW and AB. The authors that contributed to data analysis and interpretation: RS, YP, KW and AB. The first draft of the manuscript was written by RS and YP. Authors who contributed to the writing of the manuscript: RS, YP, KW and AB. ICMJE criteria for authorship read and met: RS, YP, KW and AB. Agree with manuscript results and conclusion: RS, YP, KW and AB. Read and approved the manuscript as submitted: RS, YP, KW and AB.

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Online Appendix 1: Outline semi-structured interview schedule

The participants in this study will be asked the following stem questions in the individual interviews. Additional questions may be asked in order to further clarify specific points that the participants make. Please note that these stem questions may change as the study progresses and new theoretical insights emerge.

1. Please tell me a bit about yourself;
 - a. What year of study are you in?
 - b. Which gender do you identify with?
2. What role have healthcare professionals played in your academic training so far?
3. What other members of the interprofessional team have you worked with in clinical practice?
4. I'd like to explore your experiences and interactions with the interprofessional team. Thinking back on your time as a medical student so far, could you tell me about the most memorable interaction you have had with a healthcare professional? (Can be positive or negative)
 - a. How did you feel during the event?
 - b. What role do you think your gender played in this interaction?
 - c. Do you think this interaction would have been different if you were a different gender? If so, why?
5. How do you feel this experience has affected your perceptions and views about the impact of your gender on your interactions with other healthcare professionals?
6. Before this experience, what impact did you think your gender had on your interactions with members of the interprofessional team?
 - a. Have your views changed since this experience?
7. How do you think your interactions with healthcare professionals will change as you progress through your medical training?
 - a. To what extent do you think the curriculum has prepared you for working in a multi-disciplinary team?
8. When you have been in clinical practice, what have your colleagues told you about the impact of gender on interprofessional teamwork?
9. When you are on placement, how do you think healthcare professionals perceive medical students of different genders?
10. Do you think male and female medical students are treated differently by healthcare professionals in clinical practice?
 - a. In what way are they treated differently?
 - b. Why do you think this is the case?
 - c. How could this be changed/challenged?

- 11.** Do you think some members of the multi-disciplinary team interact with you differently because of your gender?
 - a. If yes, which professional and why do you think this is the case?
 - b. Would you feel comfortable challenging interactions where you thought there was gender bias? If not, why not?

- 12.** Should medical students have any teaching regarding gender differences prior to their clinical experiences?
 - a. Why do you think this is important?

- 13.** Is there anything else that you would like to add about the role of gender on interactions with members of the interprofessional team?

Online Appendix 2: Online case report questions

Q1: What is your current year of study?

Q2: Which gender do you identify with?

Q3: What members of the interprofessional team have you worked with in clinical practice? Please list those you have worked with below:

Q4: Thinking back on your time as a medical student so far, what is the most memorable interaction you have had with a healthcare professional? Please describe below, these examples can be positive or negative:

Q5: How did you feel during the interaction? Please describe below:

Q6: What role, if any, do you think your gender played in this interaction? Please describe below:

Q7: Do you think this interaction would have been different if you were a different gender?

Q7a: if Yes or Maybe, please describe below:

Q8: Reflecting on your “memorable interaction” example, do you feel you have learned anything from it? Please specify below:

Q9: On a scale of 1-10 how confident do you feel about challenging interactions where you thought there was gender bias? 1 = no confident at all, and 10 = very confident:

Q10. Do you think there are healthcare professionals of a particular discipline that interact with you differently because of your gender?

Q10a. If Yes or Maybe, please describe which healthcare professionals you refer to and how you feel they interact with you differently.

Q11. How do you think your interactions with healthcare professional have changed as you progress through your medical training? Please describe below:

Online Appendix 3: Summary of participant and respondent characteristics

Pseudonym	Year of Study & Gender	Role in study
1. Lucas	3 rd year Male (Y3M)	Completed Case report & Interview Participant
2. Caroline	3 rd year Female (Y3F)	Interview Participant only
3. Sarah	3 rd year Female (Y3F)	Interview Participant only
4. Ryan	3 rd year Male (Y3M)	Interview Participant only
5. Connor	3 rd year Male (Y3M)	Interview Participant only
6. Ava	3 rd year Female (Y3F)	Completed Case report only
7. Isabella	3 rd year Female (Y3F)	Completed Case report only
8. Abigail	3 rd year Female (Y3F)	Completed Case report only
9. Hazel	4 th year Female (Y4F)	Interview Participant only
10. Owen	4 th year Male (Y4M)	Interview Participant only
11. Kylie	4 th year Female (Y4F)	Interview Participant only
12. Emily	4 th year Female (Y4F)	Completed Case report only
13. Elizabeth	4 th year Female (Y4F)	Completed Case report only
14. Grace	4 th year Female (Y4F)	Completed Case report only
15. Victoria	4 th year Female (Y4F)	Completed Case report only
16. Scarlett	4 th year Female (Y4F)	Completed Case report only
17. Benjamin	4 th year Male (Y4M)	Completed Case report only
18. Daniel	4 th year Male (Y4M)	Completed Case report only
19. Oliver	4 th year Male (Y4M)	Completed Case report only
20. Charlotte	Intercalating Female (ICF)	Completed Case report & Interview Participant
21. Noah	Intercalating Male (ICM)	Completed Case report & Interview Participant
22. James	Intercalating Male (ICM)	Completed Case report & Interview Participant
23. Sophia	Intercalating Female (ICF)	Completed Case report & Interview Participant
24. Lydia	Intercalating Female (ICF)	Interview Participant only
25. Amelia	Intercalating Female (ICF)	Completed Case report only
26. Michael	Intercalating Male (ICM)	Completed Case report only
27. Natalie	5 th year Female (Y5F)	Completed Case report only
28. Zoe	5 th year Female (Y5F)	Completed Case report only
29. Penelope	5 th year Female (Y5F)	Completed Case report only
30. Anna	5 th year Female (Y5F)	Completed Case report only
31. Henry	5 th year Male (Y5M)	Completed Case report only