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RESEARCH ARTICLE

Gender awareness among the undergraduate medical students: A cross sectional study from Hyderabad, India

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Abstract

Background: *Physician trainees need to have robust gender awareness for better professional relationships and patient outcomes. A cross-sectional study was conducted among undergraduate (UG) medical students (MBBS) of a medical college in Hyderabad, India, in November 2022, to assess their gender sensitivity (GS) and gender-role ideologies.*

Methods: *A pretested, structured English questionnaire was used for the study, to compute the Nijmegen Gender Awareness Scale in Medicine (N-GAMS) of the participants.*

Results**:** *The mean age of the students was 20.51 years, with the majority being women (112, 61.2%). The mean GS score was 3.11, while the mean scores for gender-role ideology towards patients (GRIP) and gender-role ideology towards doctors (GRID) were 2.56 and 2.56, respectively. In the adjusted analysis, a significantly better GS score was seen among medical students from urban backgrounds. Significantly more egalitarian GRIP was found among women, participants from urban backgrounds, and among those whose mothers were employed. Significantly more egalitarian GRID was found among women and participants whose mothers were employed. There was a significant negative, but low, correlation between the GS domain and the GRIP ($r = -0.241$; $p < 0.001$) and GRID ($r = -0.192$; $p = 0.009$) scores. There was a high, positive correlation between GRID and GRIP ($r = 0.812$; $p < 0.001$).*

Conclusion: *Gender awareness is relatively low among Indian medical students and lower still among male students. It was higher among women, particularly among those whose mothers were employed and those who were from urban areas.*

Keywords: *gender bias; gender role; medical students; gender awareness; India.*

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Introduction

Gender is an important social determinant. In our society, there are deep-rooted biases related to gender, which have an enormous impact on the healthcare system. Gender-based inequalities have long been recognised as a major determinant of health [1]. Biases related to gender in medicine have played a significant role in increasing inequalities across the world [2]. In India, gender bias exists in various areas related to health, which include healthcare delivery, research, and medical education. Increased gender awareness among medical professionals — that is, favourable attitudes towards considering sex and gender issues in health and illness, along with the knowledge and skills required to incorporate them into clinical practice — may help to advance gender equity in healthcare [3].

Gender awareness is the "ability to view society from the perspective of gender roles and how this has affected women's needs in comparison to the needs of men" [4]. Building on this definition, gender awareness among medical students can make them sensitive and empathetic in their dealings with colleagues and patients. It helps close gender gaps in patient healthcare and helps physicians connect better with patients, thus contributing to quality and equity in healthcare [5]. Gender sensitivity (GS) is one of the sub-dimensions of gender awareness, the other two being "gender-role ideology" and "knowledge" [3]. GS is the "ability to perceive existing gender differences, issues and inequalities and incorporate these into strategies and actions" [3]. It enables medical professionals to be sympathetic to gender issues while making conscious efforts to avoid stereotyped generalisations [3]. Gender-role ideology is defined as "an individual's attitudes to how the roles of women and men are and should be shaped by

sex" [6]. It is the assigning of stereotypical roles to persons of a certain gender, which is linked to their biological sex. Gender-role ideologies may involve patients as well as fellow physicians of the other gender [3]. They may adversely affect the choices of the genders in choosing their specialisations [6]. Traditional gender roles might lead to inadequate and lopsided participation of women in certain medical specialisations [7], which in turn can result in gender inequity in such fields. Gender-role ideologies harboured by medical students and physicians towards patients may lead to differences in their approaches towards eliciting information regarding medical complaints [8] and manner of communication, which in turn could lead to differences in the diagnosis and treatment [3].

Medical students are the future physicians who will be dealing with patients and fellow physicians in their profession. The Indian medical graduate (IMG) is expected to obtain a history and make a diagnosis by taking gender into account, but in a non-judgemental and empathetic manner [9]. Gender-role ideologies and gender stereotyping can adversely impact the non-judgemental nature of medical students when they become practitioners. Empathetic practitioners may be more gender-sensitive, and empathy is one of the basic principles that underpin the National Medical Commission's (NMC) code of ethics [10]. However, it has been reported that the undergraduate (UG) medical curriculum and textbooks in India have been found to range from gender-blind to gender-biased [11]. This in turn might lead to medical students being gender insensitive and having traditional gender-role ideologies. Gender-blind and gender-insensitive healthcare providers have contributed to the male-centred nature of healthcare delivery and research [12]. The gender-blind approach in healthcare has reduced women's access to healthcare services, entrenching biases against women in evaluating symptoms and in providing treatment and care [12–15].

Thus, the gender awareness of physician trainees must be robust to ensure that they have better professional relationships and to improve patient outcomes. Improving the students' GS and perception can help them provide care that is tailored to the gender of the individual patient. In India, gender-sensitive and egalitarian gender-role ideologies can help physicians address issues such as intimate partner violence and gender-based violence perpetrated by others, improving access to and quality of healthcare for women. It can also result in better feedback from the patient because of a sense of emotional fulfilment [16]. Addressing and fighting gender biases in the work environment can help increase the recruitment and retention of women doctors [17], which in turn could improve gender equity among the workforce in healthcare.

Studies in the past have shown that male medical students have a relatively more gender-stereotyped opinion of patients, and older students have more egalitarian gender-role ideologies towards patients (GRIP) [16]. Gender stereotyping among medical students varied between countries as well [18]. Lower levels of gender stereotyping were linked to older age, more familiarity with gender medicine, and having had a teacher who took gender into account [19]. The above studies showed varied perceptions and levels of gender awareness among different countries, emphasising the importance of cultural effects on gender attitudes among medical students. In India, Rege et al, from Maharashtra, identified gaps in the UG obstetrics and gynaecology curriculum with regards gender-related sensitivity, framed a gender-sensitive curriculum, implemented the curriculum, and found that it inculcated significant positive attitudes among UG students pertaining to gender-related health issues [11].

It is vital to assess the level of gender awareness among Indian medical UGs, as this will help us identify gaps and frame strategies to imbibe positive gender attitudes in students. Hence, this study was conducted to assess GS and gender-role ideologies, which are the attitudinal dimensions of gender awareness, among UG medical students from Hyderabad, India.

Methods

A cross-sectional study was conducted among the UG medical students (MBBS) of a public-funded medical college in Hyderabad, India, in November 2022. The duration of the UG medical education course in India is four and a half years, followed by a year of internship. The present college included four batches, with a total of 450 MBBS students, who constituted the study population. The sample size was calculated based on the mean (3.65) and standard deviation (SD = 0.63) of the GS scores obtained from the Rrustemi et al study [16], which employed the same tool. We assumed an alpha error of 5%, 95% power, a 5% rate of relative error from the mean value (3.65), and a 5% non-response/missing data rate, which gave a sample size of 171. Therefore, we enrolled 200 students, so that 50 students from each year of the MBBS course could be included.

The study was done using a pretested, structured English questionnaire, which captured demographic data and used the validated (in high-income countries) Nijmegen Gender Awareness Scale in Medicine (N-GAMS) to capture gender awareness [3]. N-GAMS is a 32-item scale which measures three sub-domains of gender awareness among medical students. The domains are GS, GRIP, and gender role ideology towards doctors (GRID). Each item is rated on a 5-point Likert scale, from totally disagree to totally agree. The GS domain has 14 items, GRIP has 11 times, and GRID has 7 items. In the GS domain, the higher the score, the more gender-sensitive the students. In the GRID and GRIP domains, higher scores indicate greater gender stereotyping among the students. Pretesting of the questionnaire was done among 20 students, and cognitive interviews were conducted to ensure comprehension of the study tool. In the cognitive interviews, the first- and second-

year MBBS students expressed difficulty in understanding terms such as "inequity" in item 1, "bio-medical" in item 5, "physician's measures" in item 15, and "appeal to" in item 25, which were then replaced with equivalent terms identified based on the explanation given by the investigator regarding the intended meaning of the item and mutual agreement after a discussion between the interviewer and the participants. For item 8 in the GS domain, a couple of participants opined that the physician should treat men and women equally in order to not bring in external differences into healthcare settings. Since the tool has not been previously validated in Indian settings, Cronbach's alpha was calculated to test the internal consistency of the scale in the present settings, and it was found to be reliable. The Cronbach's alpha values of the GS, GRIP, and GRID dimensions of the N-GAMS were 0.743, 0.915, and 0.870, respectively. The data collectors were trained on the questionnaire through a three-hour practice session. Eligible participants were contacted by the investigators during class breaks or in the evening when they were in their hostels. The questionnaires were self-administered by the consenting participants. The participants were assisted by the data collectors if they had any doubts regarding the questions. The data collectors asked respondents about any missing data at the time of data collection. Validation of the collected data was done by the investigator (AGP) by checking 10% of the total data collected.

Data analysis was conducted in SPSS 26.0. The normality of the continuous variables was tested using the Kolmogorov-Smirnov test and was found to be skewed. The dependent variable was gender awareness scores. A univariate analysis was carried out between the gender awareness scores and categorical variables by applying the Mann-Whitney U and Kruskal-Wallis H tests. The generalised linear model (gamma with log link) was applied to adjust the variables, which were found to have a $p < 0.1$ in a univariate analysis. The Spearman correlation was applied to test correlations between the domains of gender awareness and age. A p-value <0.05 was considered statistically significant.

Written informed consent was taken from all the study participants. The research study was approved by the Institute Ethics Committee (Ref. no. 799/U/IEC/ESICMC/S0183/09/2022). Permission to adapt and use the N-GAMS was obtained from the original authors.

Results

The present analysis included data from 183 students, with a response rate of 91.5%. The socio-demographic characteristics of the participants are given in Table 1. The mean age of the students was 20.51 years, with the majority being women (112, 61.2%), from urban backgrounds (146, 79.8%), from Telangana state (108, 59%), and educated in co-educational schools (164, 89.6%). With regard to romantic relationships, 15 (8.2%) were either currently in one or had had a past relationship, while a considerable proportion (53, 29%) did not want to disclose their relationship status.

The mean GS score was 3.11, while the mean GRIP and GRID scores were 2.56 and 2.56, respectively (Table 2). The item-wise scores of the N-GAMS tool have been listed in Supplementary Table 1.

Based on the univariate analysis, coming from urban background, the respondent's father being a graduate or above, and having/having had a relationship were found to be related to significantly better GS among the students. However, in an adjusted analysis, the significantly higher GS persisted only for the urban background variable (Table 3). GS was significantly better among men whose mothers were graduates or above and among women who were in a relationship (Supplementary Table 2).

With regard to GRIP, the univariate analysis revealed that women students and those from urban backgrounds, whose mothers were employed, and who were aware of the term "gender awareness" were found to have significantly more egalitarian GRIP, which implies less stereotyping. However, in the adjusted analysis, the significantly more egalitarian GRIP persisted only for women, those from an urban background, and those whose mothers were employed (Table 4). Among women, those who were from urban backgrounds and had working mothers had better egalitarian GRIP than their counterparts (Supplementary Table 3).

With regard to GRID, the univariate analysis revealed that being female, having an employed mother, and having not yet decided on one's specialisation were related to significantly more egalitarian GRID among the students. However, in the adjusted analysis, the significantly better GRID persisted only for the female gender and having an employed mother (Supplementary Table 4). Men who had a female sibling had a significantly more egalitarian GRID than those without (Supplementary Table 5). Participants having a sibling of the other gender reported more egalitarian GRID (mean = 2.44) than those with siblings of the same gender (mean = 2.71), although it was not statistically significant ($p = 0.054$). Women whose mothers were employed had a more egalitarian GRID (Supplementary Table 5).

There was no significant correlation between age and gender awareness scores. There was a significant, negative but low correlation between the GS domain and GRIP ($r = -0.241$; $p < 0.001$) and GRID ($r = -0.192$, $p = 0.009$) scores. There was a high positive correlation between GRID and GRIP ($r = 0.812$; $p < 0.001$).

Discussion

The GS score was found to be 3.11 (men = 3.14; women = 3.10) among the Indian medical UG students in the present study. Medical students from Switzerland (men = 3.70; women = 3.62) [16], Sweden (men = 3.30; women = 3.37) [18], the Netherlands (men = 3.42; women = 3.43) [18], and Italy (men = 3.73; women = 3.86) [19] reported greater gender sensitivity than the Indian students in the present

Table 1: Socio-demographic profile of the study participants (N=183)

	Frequency	Percentage
Age [Mean (SD)], years	20.51 (1.48)	—
Gender		
Men	70	38.3
Women	112	61.2
Others	1	0.5
Religion		
Hindu	154	84.2
Christian	12	6.6
Muslim	13	7.1
Others	4	2.1
Year of study		
First	49	26.8
Second	48	26.2
Final Year Part 1	48	26.2
Final Year Part II	38	20.8
Place of origin		
Rural	37	20.2
Urban	146	79.8
State of origin		
Telangana	108	59.0
Kerala	32	17.5
Others	43	23.5
School Type		
Co-education	164	89.6
Same sex school (boys only/girls only)	19	10.4
Siblings		
Male	92	50.3
Female	91	49.7
None	20	10.9
Father Graduate & above	128	69.9
Mother Graduate & above	118	64.5
Mother occupation		
Homemaker	111	60.7
Employed	72	39.3
Future Specialisation		
Clinical (Medical branches)	46	25.1
Clinical (surgical branches)	78	42.6
No specialization at all	4	2.2
Not yet decided	55	30.1
Heard of gender awareness	164	89.6
Heard of gender sensitivity	123	67.2
Heard of gender role	153	83.6
Relationship status		
Yes	15	8.2
No	115	62.8
Did not want to disclose	53	29.0

Table 2: Gender awareness domain scores of the students (N=183)

Gender Awareness	Mean (SD)	Median (IQR)
GS	3.11 (0.62)	3.07 (2.71,3.57)
GRIP	2.56 (0.93)	2.64 (1.82,3.18)
GRID	2.56 (0.88)	2.63 (2.00,3.13)

GS: Gender sensitivity; GRIP: Gender Role Ideology towards Patients; GRID: Gender Role Ideology towards Doctors; SD: Standard Deviation; IQR: Interquartile range.

study. While the mean GRIP and GRID scores in the present study were 2.56 and 2.56, the scores for Swiss medical students showed that they harboured lesser gender stereotyping towards patients (1.92) as well as doctors (2.11) [16]. Dutch, Swedish, and Italian students also reported lower stereotyping of patients and doctors than the Indian students [18,19]. The differential findings between the countries reflect the influence of sociocultural backgrounds and the gender gap. In comparison with India, European countries are societies with better gender equality. India stands at 136 in the global ranking of gender parity, which indicates the political and economic inequality of men and women in the country. Sweden, Switzerland, the Netherlands, and Italy place much better in gender parity rankings — 5th, 13th, 28th, and 63rd, respectively [20]. Families and society outside of the medical school are the first points of socialisation, and medical students may acquire gender biases and stereotypes from the larger society [21]. Gender-biased norms are prevalent at both the societal and institutional level in India, with traditional gender-role ideologies persisting among the Indian public [22]. The curriculum in medical schools, which subtly reflects the societal and institutional culture, may promote and propagate gender insensitivity and gender stereotyping among young medical students [23]. A review of the textbooks commonly used by Indian medical UG students in obstetrics and gynaecology, forensic medicine, and preventive and social medicine revealed hidden content promoting misogynistic, patriarchal practices and stereotypical gender roles, restricting women's health to only reproductive and child health [1]. Curricular as well as extracurricular activities were found to harbour and consolidate the stereotyped sexism among medical students [24].

Men and women were found to have similar levels of gender sensitivity in India, which is in line with the findings of studies in Sweden, Switzerland, and the Netherlands [16,18]. The baseline gender attitude was similar between men and women in an interventional study conducted among the medical students of Maharashtra [12]. In contrast, female Italian students were significantly more gender sensitive than their male counterparts [19]. Women from Maharashtra showed a significantly greater improvement in gender attitudes than men after being exposed to a gender-integrated medical curriculum [12]. While age was a significant predictor of gender sensitivity among Swiss,

Table 3: Association between gender sensitivity and socio-demographic characters of the students

	Mean GS scores	Unadjusted p value	Adjusted p value*
Gender (N=182)		0.637	-
Men (n=70)	3.14		
Women (n=112)	3.10		
Religion (N=179)		0.193	-
Hindu (n=154)	3.12		
Christian (n=12)	2.79		
Muslim (n=13)	3.18		
Year of study (N=183)		0.991	-
First (n=49)	3.15		
Second (n=48)	3.09		
Final Year Part 1 (n=48)	3.09		
Final Year Part II (n=38)	3.12		
Place of origin (N=183)		0.048	0.083
Rural (n=37)	2.91		
Urban (n=146)	3.17		
State of origin (N=183)		0.093	
Telangana (n=108)	3.06		0.077
Kerala (n=32)	3.06		0.312
Others (n=43)	3.30		Ref
School Type (N=183)		0.876	-
Co-education (n=164)	3.11		
Same sex school (boys only/girls only) (n=19)	3.13		
Sex education at school (N=174)		0.623	-
Yes (n=113)	3.09		
No (n=61)	3.16		
Male Siblings (N=183)		0.876	-
Yes (n=92)	3.10		
No (n=91)	3.10		
Female Siblings (N=183)		0.475	-
Yes (n=91)	3.06		
No (n=92)	3.15		
Father Graduate & above (N=183)		0.033	0.706
Yes (n=128)	3.18		
No (n=55)	2.95		
Mother Graduate & above (N=183)		0.006	0.187
Yes (n=118)	3.21		
No (n=65)	2.94		
Mother occupation (N=183)		0.401	-
Homemaker (n=111)	3.08		
Employed (n=72)	3.16		
Future Specialisation (N=183)		0.386	-
Clinical (Medical branches) (n=46)	3.04		
Clinical (surgical branches) (n=78)	3.09		
No specialization at all (n=4)	3.48		
Not yet decided (n=55)	3.19		
Heard of gender awareness (N=183)		0.891	-
Yes (n=164)	3.12		
No (n=19)	3.09		
Heard of gender sensitivity (N=183)		0.436	-
Yes (n=123)	3.13		
No (n=60)	3.08		
Heard of gender role (N=183)		0.879	-
Yes (n=153)	3.11		
No (n=30)	3.14		
Was/is in a Relationship (N=130)		0.015	0.087
Yes (n=15)	3.51		
No (n=115)	3.08		

(Continued in right column)

**Predictor variables included in the model: place of origin, state of origin, father & mother graduation status, relationship status of the student*

Table 4: Association between Gender Role Ideology towards patients and socio-demographic characters of the students (N=183)

	Mean GRIP score	Unadjusted p value	Adjusted p value*
Gender (N=182)		<0.001	**<0.001**
Men (n=70)	3.01		
Women (n=112)	2.34		
Religion (N=179)		0.337	-
Hindu (n=154)	2.54		
Christian (n=12)	2.89		
Muslim (n=13)	2.82		
Year of study (N=183)		0.909	-
First (n=49)	2.50		
Second (n=48)	2.59		
Final Year Part 1 (n=48)	2.65		
Final Year Part II (n=38)	2.68		
Place of origin (N=183)		0.002	**0.010**
Rural (n=37)	3.04		
Urban (n=146)	2.49		
State of origin (N=183)		0.949	-
Telangana (n=108)	2.62		
Kerala (n=32)	2.53		
Others (n=43)	2.60		
School Type (N=183)		0.649	-
Co-education (n=164)	2.61		
Same sex school (boys only/girls only) (n=19)	2.51		
Sex education at school (N=174)		0.880	-
Yes (n= 113)	2.61		
No (n=61)	2.61		
Male Siblings (N=183)		0.888	-
Yes (n=92)	2.61		
No (n=91)	2.60		
Female Siblings (N=183)		0.819	-
Yes (n=91)	2.63		
No (n=92)	2.58		
Father Graduate & above (N=183)		0.395	-
Yes (n=128)	2.55		
No (n=55)	2.71		
Mother Graduate & above (N=183)		0.479	-
Yes (n=118)	2.56		
No (n=65)	2.68		
Mother occupation (N=183)		0.008	**0.004**
Homemaker (n=111)	2.76		
Employed (n=72)	2.36		
Future Specialisation (N=183)		0.130	-
Clinical (Medical branches) (n=46)	2.66		
Clinical (surgical branches) (n=78)	2.67		
No specialization at all (n=4)	3.59		
Not yet decided (n=55)	2.39		
Heard of gender awareness (N=183)		0.046	0.109
Yes (n=164)	2.55		
No (n=19)	3.00		
Heard of gender sensitivity (N=183)		0.659	-
Yes (n=123)	2.58		
No (n=60)	2.64		
Heard of gender role (N=183)		0.315	-
Yes (n=153)	2.58		
No (n=30)	2.72		
Was/is in a Relationship (N=130)		0.482	-
Yes (n=15)	2.73		
No (n=115)	2.59		

** Predictor variables included in the model: gender, place of origin, mother' occupation & aware of the term 'gender awareness'*

(Continued in right column)

Dutch, and Swedish students [16,18], no such relationship was found among the Indian students. Italian students also showed no significant relationship between age and GS scores [19]. The statistically similar gender awareness scores across the years for Indian MBBS students show that the current medical curriculum did not undo the insensitiveness and stereotypes harboured by the students at the time of entering medical school. Additionally, the current curriculum might have consolidated the existing stereotypes, which warrants scrutiny [1].

In the unadjusted analysis, students in the present study who were/had been in a relationship showed greater GS than students who were single. However, the adjusted analysis revealed no such association, which is in line with studies from other settings. Within the sub-group of women, relationships with the other gender had a positive association with GS, while no such association was seen for men. Andersson et al reported no significant association between civil status (single and cohabiting/married) and any of the gender awareness domains among Dutch and Swedish medical students [18]. Bert et al also reported no relationship between marital status and gender awareness among Italian medical students [19].

Women from India showed lower stereotyping towards patients (GRIP) and doctors (GRID) than men. A similar relationship between women and GRIP scores was reported among medical students in Switzerland, Sweden, and the Netherlands, but the GRID scores were similar between men and women [16,18]. Among Italian students, women had significantly lower GRID scores, while the GRIP scores were similar between men and women [19]. Female medical students might have significantly lower levels of stereotyping attitudes towards patients and their colleagues, since it is their own gender which is stereotyped against, making it easier for them to develop empathy [16].

Those who came from an urban background had greater GS and were less likely to have a gender stereotyping attitude towards patients in the present study. Homogeneity and limited exposure in rural areas, increased feminisation of labour, and better education in urban areas were reported as the major reasons for the differences in gender-role stereotyping between students from urban and rural settings [25]. Also, students whose mothers were employed had significantly better egalitarian GRIP and GRID scores than students who reported that their mothers were homemakers. This might be due to the lived experiences of the students because they see their mothers work jobs [26], breaking existing stereotypes in Indian society. In subgroup analyses, women whose mothers were employed had significantly more egalitarian GRIP and GRID scores, while men did not exhibit such an association. Studies have shown that children develop gender attitudes by observing how parents function and how labour is divided at home, and they have a more positive gender attitude when there are good role models at home [26]. In the present study, men who had female siblings reported significantly more egalitarian GRID scores than those without. Siblings of other genders, especially older ones, had a significant positive influence on their younger siblings in the domain of gender-role development [27,28].

Gender stereotyping by physicians can lead to differential attitudes when dealing with the symptoms reported by male and female patients [14,29], delayed diagnosis, and delayed treatment, ultimately impacting the prognosis for women [30]. Thus, it is essential to address this domain of gender awareness to ensure that female patients obtain timely treatment without judgment and bias. Gender stereotyping, gender bias [31–33], and a patriarchal culture with entrenched gender roles [34] can lead to decreased participation of women in medical practice, although the number of women in medical schools is higher than that of men. Thus, women's participation in the medical workforce may decrease, affecting gender equality further.

The gender-blind curriculum and teaching practices may foster the same negative values in medical students, who will then propagate the same attitudes when they become practitioners and teachers in the future. Thus, it becomes a vicious cycle. However, once it is recognised that gender norms and stereotypes are not permanent [14,23], the cycle can be broken. Gender-integrated curricula and teaching methods were implemented in obstetrics and gynaecology for UG medical students in a college in Maharashtra, India, which led to a significant improvement in the gender attitudes of medical students [11]. A similar attempt in Taiwan to incorporate a gender perspective into the curricula of medical students had a positive effect on gender awareness [35].

Gender medicine is an upcoming dimension of medicine that places gender at the heart of medical decisions and treatment. It has been reported that students who were better trained in gender medicine had significantly better gender awareness [19]. Gender awareness, which encompasses GS and reduced gender stereotyping, is crucial for the effective practice of gender medicine. Across the world, there have been discussions about introducing a gender-based approach to medical curricula, and it has also been implemented [16,36,37]. There is a need to review the entire Indian medical UG curriculum through the lens of gender to identify and amend hidden content that is gender insensitive and stereotypical. Although sensitivity towards gender differences has been emphasised in the preamble of the competency-based medical education (CBME) for IMGs [38], there is a lack of guidelines and action plans to implement and inculcate the same among medical students. The Attitude, Ethics and Communication (AETCOM) curriculum of the NMC specifies modules on patient-centric and responsive medical care. Yet, it falls short in the gender-centric domain. Modules on GS and egalitarian gender-role ideologies must be incorporated into the medical curriculum, starting from the AETCOM curriculum. Gender-aware medical curricula and training can enable medical students to practice medicine ethically in the future. Given

the patriarchal nature of Indian society, it would also take significant advocacy to bring in policy-level changes in the medical curriculum to incorporate GS content and training. The role of medical teachers and trainers in initiating and perpetuating gender biases also needs to be studied in Indian settings to comprehensively address the issue at the institute level [39]. Major challenges in reforming the medical curriculum to incorporate greater GS include an inadequate understanding of the concept of gender among medical teachers, resistance to including gender in the medical curriculum, and lack of awareness of the exact areas where gender can be discussed in medicine [40,41], scepticism towards including gender in the curriculum, lack of time/space in the existing curriculum, and unwillingness to learn about gender contexts in medicine on the part of teachers [36]. Medical teachers who come from a patriarchal society, harbouring gender stereotypes and insensitivity, are a major challenge to the successful implementation of a gender-sensitive curriculum in medical colleges. Hence, foremost, it is essential to improve gender awareness among medical teachers. To this end, capacity-building workshops and short-term courses on gender in health could be conducted that would equip them to teach and train medical students on gender awareness.

Clarity regarding the various concepts and terms used in the gender domain needs to be provided to medical students and teachers. The Supreme Court of India recently released *The Handbook on Combating Gender Stereotypes* to assist the legal community in understanding gender and combatting stereotypes against women [42]. A similar guide or handbook can be prepared and promoted by the Ethics and Medical Registration Board of the NMC to promote gender awareness among medical professionals, teachers, and students. Schools play a pivotal role in moulding the perceptions of young individuals regarding gender, biases, and the importance of gender equality. It is crucial to initiate gender awareness programmes and sessions as early as possible, especially focusing on teenage boys [43]. Hence, gender sensitisation should start at the school level.

To the authors' best knowledge, the present study is the first primary research in India, as well as in lower-middle-income countries, to quantify gender awareness among medical students. The study included medical students across all the years of undergraduation. However, it is not devoid of limitations. India is a large country, with extensive cultural diversity across states. Hence, a multi-centric study must be conducted that includes colleges from other states to improve the applicability of the findings and facilitate a better understanding of the predictors of gender awareness.

Conclusion

Gender awareness is relatively low among Indian medical students and lower still among male students. Women, particularly those whose mothers are employed, and students who are from urban areas, were likely to have more gender awareness. There is scope and an urgent need to review the CBME curriculum and textbooks through a gender lens to improve GS, remove gender stereotyping, and build a gender-informed medical curriculum for Indian medical students. Orientation programmes and training of medical teachers in the subject of gender awareness are also necessary for effective and sustainable implementation. Additionally, efforts must be made to widen the scope of the research to include non-binary genders, since those identifying as non-binary are more vulnerable and no study could be found that dealt with such issues in the domain of gender awareness among medical students.

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