Research Article **Open Access**

A Study on Perceived Stress among Undergraduate Medical Students of Bahir Dar University, Bahir Bar, North West Ethiopia, 2016: Institutional Based Cross Sectional Study

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Abstract

Background: Tertiary education has always been regarded as highly stressful environment to students. Medical and health science training further add to the already stressful environment. Awareness of the existence of stress in medical students by physicians will help in diminishing student's experience of stress. Therefore, identifying additional stressors in the clinical context is very crucial for providing measures to minimize students' stress to a tolerable level and helping them to cope better. And the aim of this study is to assess perceived stress and factors associated with it among Bahir Dar University medical students, North West Ethiopia, 2016.

Method: An institution-based cross-sectional study was conducted among 254 Bahir Dar University Medical students from June 30 to July 30 2016. A structured self-administered questionnaire prepared based on the Perceived Stress Scale was used to collect the data. Data were entered using EpiData version 3.1 statistical software and analyzed using SPSS version 20 statistical package. Bivariate and multivariable linear regressions were done to see the association between the predictor and the outcome variables.

Result: Among the total participants 204 (80.3%) were male, 22.89 was the mean age of participants, 33.9% were 4th year medical students. Of all participants 37.4% were stressed. Students were highly stressed from taking care for patients with mean score of (14.31±6.89) and the top stressors were lack of care and guidance from teachers. Sex of the respondent, age, manner in which students chosen their field of study, personal perception of being stressed were strong predictors of level of stress whereas pocket money was the weakest predictor.

Conclusion: More than 1/3 of respondents were stressed of which 24.4 had severe stress. Female are more stressed than male counter parts. Older students were less stressed, students who chosen their field of study by themselves were less stressed. It is imperative to have active mentor that guides, supports and listens students concern in their academic discourse. Medical school administrators should give emphasize on female students to design special support system.

Keywords: Medical students; Stress; Bahir Dar University; Perceived Stress Scale

List of Abbreviations: BDU: Bahir Dar University; CMHS: College of Medicine and Health Sciences; GQ: Graduation Questionnaire; LCME: Liaison Committee on Medical Education; PSS: Perceived Stress Scale; SD: Standard Deviation; SPSS: statistical package for Social Sciences

Background

Stress is defined by Gray-Toft and Anderson as 'an internal cue in the physical, social, or psychological environment that threatens the equilibrium of an individual' [1]. Stress has been identified as a 20th century disease and has been viewed as a complex and dynamic transaction between individuals and their environments [2]. Stress occurs when one is confronted with a situation which is perceived to be overwhelming and one cannot cope with such a situation [3]. Stressors can be broadly defined as situations or events that have the potential to affect health outcomes [2].

The topic of stress among university students has been the subject of much research for many years. Researchers have found that the perception of high stress levels in students can lead to poor academic performance, depression, attrition and serious health problems [4]. Studying in university is one of the stressful stages of life, because the person experiences stressful events such as education, moving away from home, separating from family members, and changes in friendship relations. In addition to stress

sources mentioned above, studying medicine, by itself, seems to be stressful [5].

Tertiary education has always been regarded as highly stressful environment to students. Medical and health science training further adds to the already stressful environment [6,7]. Medical schools have unique stressors beyond those of university education [8,9]. The incidence of stress and stress-related illnesses such as anxiety and depression among students and trainees internationally is increasingly reported in the literature [10]. Students are subjected to different kinds of stressors such as the pressure of academics with an obligation to succeed, an uncertain future and difficulties of integrating into the system. The students also face social, emotional, physical and family problems which may affect their learning ability and academic performance. As far as medical education is concerned, the various research findings indicate that stress exists for students in both the clinical and academic aspects of the program [4,11].

Healthcare systems usually provide many stimulus that produce stress due to the contact with illnesses, pain, suffering, disability, patients death, as well as the fact of developing a new role which they are not completely prepared for [12]. In many medical schools, the environment itself is an all prevailing pressure situation, providing an authoritarian and rigid system. The estimated prevalence of emotional disturbance found in different studies on medical students was higher than that in the general population [13].

Although some degree of stress is a normal part of medical training and can be a motivator for some individuals, not all students find stress constructive. For many individuals, stress arouses feelings of fear, incompetence, uselessness, anger and guilt and can be associated with both psychological and physical morbidity. High levels of stress may have a negative effect on mastery of the academic curriculum, by impeding concentration, problem solving, decision making, completion of work and other abilities necessary for student learning [14].

The excessive amount of stress in medical training predisposes students to be tempted to cheat on exams and to have difficulties in solving interpersonal conflicts, decreased attention, reduced concentration, loss of objectivity, increased incidence of errors, and improper behavior, such as negligence. Furthermore, stress among students results in impaired judgments, absenteeism, self-medication, and addiction to substances such as khat chewing, cigarette smoking, and alcohol drinking [15].

The Association of American Medical Colleges, Institute of Medicine, and the Liaison Committee on Medical Education (LCME) have promoted the need to address physician wellbeing in medical education, and wellbeing is now being formally evaluated as part of the widely referenced Graduation Questionnaire (GQ). As a result, many medical schools have designed and implemented programs to promote trainees' wellness; however the medical education community's experience in evaluating the impact of these interventions is still limited [16].

Many literatures indicated that there is rising of stress in many disciplines across the globe and this issues is unique in medical students. So assessing the existence of stress in medical students will help in diminishing student's experience of stress. Therefore, identifying additional stressors in the clinical context is very crucial for providing measures to minimize students' stress to a tolerable level and helping them to cope better.

Materials and Methods

The study was conducted in Bahir Dar University (BDU) which is found in the city of Bahir Dar, the capital of Amhara Regional State in Ethiopia. Currently the university is organized into faculty, colleges, institutes, schools and academy [17]. College of medicine and health sciences is among the colleges of BDU and it was established in October 2007 with an objective of training competent medical doctors and other health care professional. The study was conducted from June 30 to July 30 2016.

Sample size was calculated by applying a formula for estimating a single population proportion by taking prevalence of high level of stress (P=61.1%) which is done in India gives 365. After using correction formula and adding 10% non-response rate the final sample size was 254. Institution based cross sectional study was done and all 254 regular undergraduate sampled medical students who were available during the data collection period were included in the study. From the total 991 students obtained from BDU registrar office 626 were year three and above medical students. Then students classified into different academic years (3rd year to six year). From each year of study students were selected through simple random sampling technique using the master list of students' academic numbers.

Data collection Instrument

The measuring instrument has two parts:

Part one: Socio-demographic variables (Age, Sex, Family residence, Year of study, Average monthly pocket money, Marital status, having boy/girlfriend, Interested with your current department, How do you join your department and the like).

Part two: questions related to stress which was measured by Perceived Stress Scale (PSS). The Perceived Stress Scale (PSS) was developed in order to examine students' stress levels and types of stressors. It consists of 29 items of 5- point likert scale. The five possible responses range from "never" to "always" and are scored from 0-4. Items in the scale grouped into six factors related to

the sources of stress. The six factors include stress from taking care of patients (8 items), stress from teachers and medical staff (6 items), stress from assignments and workload (5 items), stress from peers and daily life (4 items), stress from lack of professional knowledge and skills (3 items), and stress from the clinical environment (3 items). The total score range from 0-116. A lower score means lower degrees of stress while the higher score means higher levels of stress [18,19].

The data collectors and supervisor were trained and oriented for one day on the questionnaires and how to orient the respondents. Pre-test was done using five percent of the sample in Debre Markos University and necessary comments and feedbacks were incorporated and all of the instruments in this study showed an acceptable reliability cronbach's alpha value (α>0.7) with PSS having α=0.92.

Data processing and analysis procedures: The collected data were edited, coded, categorized and entered into EpiData version 3.1 and exported to SPSS version 20.0 windows statistical software for analysis.

Each item of the overall stress were measured by a five point likert scale having a total of 29 items and their sum score ranging from a minimum of 0 to maximum of 116. The range of PSS scores were divided into stratified quartiles. Based on the scoring, the lower quartile was classified as not stressed, next quartile as borderline, the third quartile as mild stress and the fourth as severe stress (56 being the operational cut off value for the upper bound). This cut off value was selected in accordance to similar studies from Pakistan, Egypt and India [19].

After checking the assumptions Bivariate and multivariable linear regression were done to see the association between the predictor and the outcome variables. Variables with P-value less than or equal to 0.25 in the bivariate analysis were included in the multivariable regression model and P-value of less than 0.05 was considered as statistical significance. Then results were summarized and presented by tables, charts and graphs.

Results

A total of 254 students were involved giving a response rate of 100% and among the total respondents 80.3% were male, 60.6% of the respondent's family residence is rural areas. Seventy two point four percent of the study participants received their pocket money from their father/mother and 55.5% of the total respondents' fathers do not have formal education. Eleven point eight percent of the study participants were 6th year medical students and 88.2% were Christian Orthodox in religion, 81.1% were Amhara ethnicity. Seventy four percent were from Amhara region. Respondents were asked whether they have a boy or girl fried and 13.8% had boy/girlfriends (Table 1).

Socio-demographic characteristics			
Background variables		n	%
Sex	Male	204	80.3
	Female	50	19.7
Family residence	Urban	100	39.4
	Rural	154	60.6
Source of income	Father, mother	184	72.4
	Sister ,brother	22	8.7
	Others*	48	18.9
Father's education	No formal education	141	55.5
	Elementary education (1-8)	62	24.4
	Secondary (9-12)	19	7.5
	College & above	32	12.6
Year of study	3rd year	75	29.5
	4th year	91	35.8
	5th year	58	22.8
	6th year	30	11.8
Religion	Orthodox	224	88.2
	Muslim	20	7.9
	Protestant	10	3.9
Marital status	Single	251	98.8
	Married	3	1.2
Boy/girl friend	Yes	35	13.8
	No	219	86.2

*others= cousin, Aunt, peers

Table 1: Background characteristics of Bahir Dar University medical students, North West Ethiopia, 2016

The participant's age ranges from 20 to 29 with mean age of (22.89±2.2) years old. The average Cumulative Grade Point Average (CGPA) of the respondents was 3.16 with a minimum of 2.0 and maximum of 3.68 grade points. The average monthly pocket money was 598.9 EBR with minimum of no monthly pocket money and maximum 3000 ETB (Table 2).

Stress factors	Subscale rank	Item rank	Mean	Std. Deviation
Stress from taking care for patients	**1**		**14.31**	**6.889**
Unable to provide patients with good medical care		1	2.12	1.451
Lack of experience and ability in providing patient care		2	2.11	1.181
Unable to reach client's expectations		3	1.82	1.235
Do not know how to help patients with physio-psychosocial problems		4	1.76	1.213
Worry about not being trusted or accepted by patients or Pt's family		5	1.73	1.301
Unable to provide appropriate responses to hospital clinical staffs		6	1.67	1.276
Experiencing difficulties in changing from the role of a class room stud		7	1.61	1.177
Do not know how to communicate with patients		8	1.5	1.397
Assignments & workload	**3**		**8.65**	**4.354**
Pressure from the nature and quality of clinical practice		1	1.93	1.299
Worry about not to score low grades		2	1.79	1.4
Feeling that dull and inflexible clinical practice affects my family and		3	1.7	1.341
Feeling that the requirements of clinical practice exceed my physical anticipation		4	1.63	1.211
Feeling that my performance does not meet teachers' expectations		5	1.59	1.218
Stress from knowledge & skill gap	**6**		**5.74**	**3.264**
Unfamiliarity with patients' diagnoses and treatments		1	2.12	1.266
Unfamiliarity with professional skills		2	1.91	1.249
Unfamiliarity with medical history and terms		3	1.71	1.213
Stress from clinical environment	**4**		**5.91**	**2.583**
Feeling stressed from the rapid change in patient's condition		1	2.11	1.228
Feeling stressed in the hospital environment where clinical practice takes place		2	1.97	1.24
Unfamiliarity with the ward facilities		3	1.83	1.143
Stress from peers and daily life pressure	**5**		**5.75**	**3.714**
Pressure from teachers who evaluate my performance by comparison		1	1.74	1.302
Competition from peers in school and clinical practice		2	1.46	1.281
Being not in harmony with other peers in the group		3	1.28	1.318
Feeling that clinical practice affects my involvement in extracurricular		4	1.26	1.188
Stress from teachers & other hospital staffs	**2**		**11.35**	**5.085**
Lack of care and guidance from teachers		1	2.3	1.336
Discrepancy between theory and practice		2	1.96	1.194
Feel that teachers do not give fair evaluation		3	1.91	1.404
Doctors lack empathy and are not willing to help me		4	1.86	1.364
Feel stressed that teacher's instruction is different from my expectation		5	1.67	1.16
Do not know how to discuss patients' illness with teachers or medical an		6	1.65	1.218

Table 2: Stressors perceived by medical students, Bahir Dar University, North West Ethiopia, 2016

From all sampled 254 medical students 28(11%) were not interested in their current field of study (department) from this 3.9% were from 6th year medical students (Figure 1).
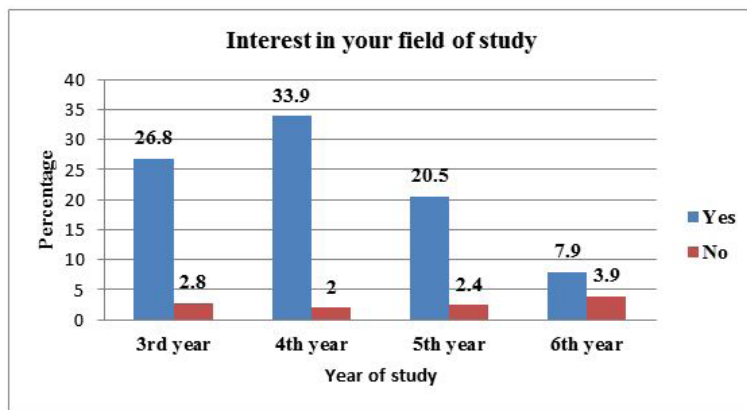
Figure 1: Medical student's interest with their current field of study, Bahir Dar University, North West Ethiopia, 2016

Descriptive finding for the sub scale category

Out of the six subscales, the highest mean stress score was found on the subscale of stress from taking care of patients having mean score of 14.31 followed by stress from teachers and nursing staff with mean score of 11.35. The major stress events experienced by the students were stress from Lack of care and guidance from teachers (M=2.3, SD=1.34), followed by stress from unfamiliarity with patients' diagnoses and treatments (M=2.12, SD=1.26) and unable to provide patients with good medical care (M=2.12, SD=1.45). Minor stresses the students' experienced were from feeling that clinical practice affects my involvement in extracurricular involvement (M=1.26, SD=1.18) (Table 2).

Level of stress

From the study participants 24.4% had severe stress while the 22.4% had borderline stress (Table 3).

Level of stress	n	%	PSS score
No stress	65	25.6	7-35
Borderline stress	57	22.4	36-49
Mild Stress	70	27.6	50-65
Severe stress	62	24.4	66-116

Table 3: Distribution of stress on medical students by PSS score, Bahir Dar University, North West Ethiopia, 2016

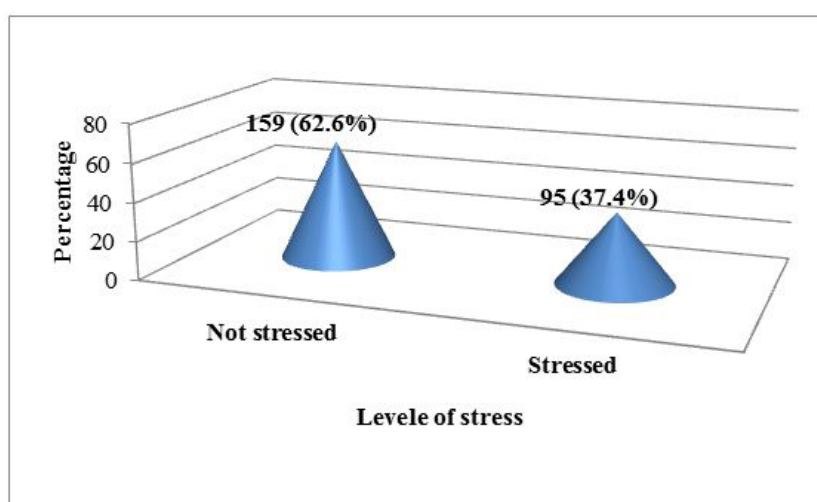Among the total 254 study participants 95 (37.4%) were stressed (Figure 2).

Figure 2: Level of overall stress among medical students Bahir Dar University, North West Ethiopia, 2016

Bivariate analysis

In order to select candidate predictor variables for the multiple linear regression models, first bivariate analysis was carried out. From the total 14 predictor variables four variable were not found to be entered to the multivariable linear regression model (Table 4).

Coefficients ᵃ						
	Unstandardized Coefficients				**95% CI for ß**	
	ß	**Std. Error**	**t**	**p**	**Lower Bound**	**Upper Bound**
Sex	-6.25	3.16	-1.97	0.049**	-12.48	-0.029
Age	-1.98	0.56	-3.5	0.001**	-3.09	-0.87
Residence	-3.43	2.58	-1.33	0.184*	-8.52	1.65
Monthly pocket money	-0.003	0.002	-1.77	0.077*	-0.007	0.00
Boy/girl friend	2.87	3.67	0.78	0.43(NS)	-4.35	10.1
Interest with current department	4.14	4.03	1.02	0.30 (NS)	-3.81	12.09
Personal perception of stress by the profession	-6.86	2.54	-2.7	0.007 **	-11.87	-1.85
Cumulative grade	5.57	4.11	1.35	0.17*	-2.52	13.68
Year of study	1.99	2.66	0.75	0.45(NS)	-3.23	7.23
Source of income	-9.71	2.76	-3.5	0.001**	-15.16	-4.25
Father's education	0.42	2.55	0.16	0.86(NS)	-4.60	5.44
Religion	5.09	3.91	1.30	0.19*	-2.61	12.8
Ethnicity	0.03	3.23	0.009	0.993(NS)	-6.34	6.40
Manner in which students chosen their field of study	3.38	2.86	1.17	0.23*	-2.26	9.02

ᵃ Dependent Variable: stress
* Candidate variables for multiple linear regression model
** Variables significant at the bivariate regression analysis
NS: Not significant
Table 4: Bivariate analysis for predictors of stress among medical students of Bahir Dar University, Bahir Dar, North West Ethiopia, 2016

Multiple linear regression analysis result

To assess the relationship between those candidate predictor variables from bivariate regression with stress, multiple linear regressions analysis was done. Even though eleven candidate predictor variables were significant ($p<0.25$) in the bivariate model (Table 5), only three of them were found to be significant to predict the outcome variable (stress) when they entered in to the multiple linear regression model in the first round. Then predictor variables with the largest p value were selected and then removed from the multiple linear regression analysis step by step till the final model was build.

Coefficients ᵃ							
	Unstandardized Coefficients		**Standardized Coefficients**			**95% CI for ß**	
	ß	**Std. Error**	**Beta**	**t**	**P**	**Lower Bound**	**Upper Bound**
(Constant)	141.695	18.445		7.682	0.000	105.366	178.025
Sex of the respondent							
Male	-11.045	3.378	-.218	-3.270	0.001	-17.698	-4.392
Female							
Age in years	-3.324	.753	-.363	-4.412	0.000	-4.808	-1.840
Average monthly pocket money	0.006	.003	.190	2.230	0.027	0.001	0.011
Do you think that learning this profession is stressful?							
Yes	-7.671	2.452	-.187	-3.128	0.002	-12.500	-2.841
No							
Manner in which students chosen their field of study							
Personal interest							
Peer/family pressure	5.188	2.743	.114	1.891	0.060	-0.215	10.592

Dependent Variable: Total stress score
Max VIF = 2.05, Adjusted R^2 = 0.11, CI = Confidence Interval
Table 5: Multivariable linear regression predicting stress among Medical students in Bahir Dar University, Bahir Dar, North West Ethiopia, 2016

Finally, after adjusting some variables into the model; five predictor variables were able to predict the outcome variable. The overall model was significant ($F=7.02$, $p<0.001$) and the value of the adjusted $R^2=0.11$. Sex of the respondent (ß=-11.045, p=0 .001), age in year (ß=-3.32, p<0.001), average monthly pocket money (ß=0.006, p=0.027), personal perception on their profession of causing stress (ß=-7.6, p=0.002) were significant variables predicting the overall stress score. The rest of the variables were not statistically associated with job satisfaction (Table 5).

In this model, those female medical students were 11 times more likely to be stressed than their male counterparts. Those study participants who perceived their department as not stress full were 7.67 times more likely to be stressed than their colleagues. And a unit increase in age score would result in reduction of the overall stress score by 3.32 units and a unit increase in average monthly pocket money would result in the overall stress score to increase by 0.006 units.

Discussion

Stress is a physical, mental, or emotional response to events that causes bodily or mental tension. In small amounts, stress is normal and can help us be more active and productive. However, very high levels of stress experienced over a prolonged period can cause significant mental and physical problems [20]. This study aimed on determining the level and to identify factors associated with stress among of Bahir Dar University medical students.

In this study 37.4% of medical students of Bahir Dar University faced stress where as a study done in Egypt and India showed relatively a lower level of stress which is 20.1% and 29.05% respectively [4,13]. On the contrary a study done in Iran stated that 83% had perceived stress [5]. The possible explanation for this difference may be setup difference, technological difference, and curricular approach.

A study done in Bangladesh revealed that the overall prevalence of stress of the study population was 54% [21]. A study done in Jimma University, Ethiopia, the proportion of medical students who had symptoms of stress was 52.4% [15]. Similarly a study done in Saudi medical students showed that the prevalence of stress was 53% [22]. Another study done in Jizan University, Saudi Arabia showed that the prevalence of stress among medical students was 71.9% [23]. A study done in India indicated that the proportion of students with stress was 61.1% [19]. And a systematic review done in Malaysia revealed that 56% of Malaysian medical students was stressed [24]. The varied results in different studies can be attributed probably due to factors like the settings of the medical school, the curricula, evaluation (examination) system. Also, these studies have used different instruments to measure stress.

In this study 24.4% had severe stress and 27.6% had mild stress whereas a study done in Iran stated that 20.8% had severe stress and 18% had mild stress and another study conducted in India revealed that 35.7% students scored in very high stress group whereas 3.5% students scored in low stress [9,14]. A study done in Saudi Arabia stated that students with severe stress constituted 33.8% [20]. And another study done in India showed that 59.9% of study participants had mild stress whereas 1.2% had severe stress [19]. Another study done in Pakistan revealed that high level of stress was found in 20.83% of the students and in 7.5% of the students found low level of stress [25]. These differences probably attributed due to differences in measuring tool, variations in student's year of study, hospital setup differences and exposure to clinical practices.

In this study medical students were highly stressed from taking care for patients with mean score of (14.31±6.89). The top stressors were lack of care & guidance from teachers, unfamiliarity with patients' diagnoses & treatments, unable to provide patients with good medical care and lack of experience & ability in providing patient care were the four top stressors mentioned by the students.

A study done in India revealed that high parental expectations, vast syllabus, long duration of course, frequency of examinations, performance in formative and summative examination and a study done in Egypt revealed that troubles with the instructors, excessive workload, problems with course mates, close contact with serious illness and personal injury or illness were the frequently mentioned source of stressors [4,26].

In this study female medical students were more stressed than their male counterpart's and this finding is supported by a study done in other areas which revealed that the proportion of female students who had stress was higher than their male counterpart [5,13,23,27].

In this study average grade point were not a significant predictor for stress which is congruent with a study done in Saudi Arabia [27]. No significant association was found between year of study and stress level this is consistent with a study conducted in India [14].

Year of study, parents' education level and place of residence had no statistical association which is supported by a study done in Saudi Arabia whereas a systematic review done in Malaysia revealed that year of study and financial problem were the significant determinants [23,24].

Limitations

This institution based cross-sectional study was based on self-reported information provided by medical students. Therefore, there may be reporting bias which may have occurred because of the respondents' interpretation of the questions or desire to report their emotions in a certain way or simply because of inaccuracies of responses. Further large, prospective studies are encouraged to identify the impact on affected individual.

Conclusion

Tertiary education, especially the medical education is highly stressful to students. The findings of the present study suggested that the overall stress level as 37.4% with an alarming concern of 24.4% of students had severe stress. Stress from taking care for patients, Stress from teachers & other hospital staffs, assignments & workload and stress from clinical environment were the top four subscale stressors for medical students of Bahir Dar University. In congruent with as most international researches findings in our study also stress was higher in the female students compared to the male counterparts. Students who were chosen their field of study by peer/family pressure were more stressed than those who chosen by their own personal interest. The study did not find a significant association between academic grades and level of stress.

It can be derived that stress is present among medical students and the reasons are plenty. The need of the hour is to establish counseling centers that are active and functioning to support students who need the support. It is imperative to have active mentor that guides, supports and listens students concern in their academic discourse. Medical school administrators should give emphasize on female students to design special support system.

Acknowledgement

Ethics approval and consent to participate

Ethical clearance and approval letter to conduct the research was obtained from BDU CMHS ethical review committee. Verbal consent was also obtained from each participant during data collection. They were told that participation is voluntarily and confidentiality and anonymity ensured throughout the execution of the study as participants were not required to disclose personal information on the questionnaire.

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