

Stress among Postgraduate Students and Its Association with Substance Use

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Abstract

Background: Postgraduate studies are stressful and challenging that may affect the academic performance, physical and mental wellbeing of students. Stress is a risk factor for alcohol consumption, smoking and drug abuse. However, the magnitude and its association with substance use among postgraduate students has not yet assessed in Ethiopia.

Objective: The purpose of this study was to assess prevalence of stress among postgraduate students and its association with substance use.

Methods: A cross-sectional study design was conducted among a sample of 360 postgraduate students at Jimma University. The study participants were recruited by using computer generated simple random sampling method after stratification and proportionally allocated into colleges. The data were collected by using self-administered structured questionnaires that contain socio-demographic characteristics, the General Health Questionnaire (GHQ-12) and Postgraduate Stressor Questionnaire (PSQ-28). Data analysis was done using SPSS Version 20.0 for Windows. Descriptive statistics, bivariate analysis and multivariable logistic regression analysis were applied to identify determinants of stress. Statistically significance was declared at $p < 0.05$.

Result: Majority of the respondents 256(74.0%) were males and the mean age of the participants was 29.34 (SD=4.7) years. The current prevalence of stress was 46.2% [95% CI 40.75%-51.25%]. Academic Related Stressor domain was the main source of stress 184(53.2%). Stress was significantly associated with female students [AOR=1.90, 95% CI (1.12-3.22)], among unmarried (single) students [AOR=1.74, 95%CI(1.09-2.77)], khat chewers [AOR=1.99, 95%CI(1.09-3.64)], and cigarette smokers [AOR=2.10, 95%CI (1.07- 4.38)]. The level of stress was significantly reduced [AOR=0.44, 95% CI, (0.25-0.77)] among moderate alcohol users.

Conclusion: Over all, postgraduate students experience high level of stress that may affect their psychological wellbeing. Academic burden is the main source of stress. Unmarried and female students were at risk of stress. Khat chewing and cigarette smoking were predictors of stress. Moderate alcohol intake may reduce the level of stress. Therefore, counseling, coping and preventive measures are recommended to control the risk factors of stress among students.

Keywords: Stress; Stressor domains; Substance use

Abbreviations: GHQ: General Health Questionnaire; SD: Standard Division; CI: Confidence Interval; AOR: Adjusted Odds Ratio; PSQ: Postgraduate Stressors Questionnaire; JU: Jimma University; PhD: Philosophy of Doctor; HPA: Hypothalamus Pituitary Adrenal axis; SAM: Sympathetic Adrenal Medulla

Introduction

The existence of stress depends on the presence of stressors which is defined as anything that challenges an individual's adaptability or an individual's body or mentality [1]. Stress can be caused by environmental factors, psychological factors, biological factors, and social factors and it can be negative or positive to an individual, depending on the strength and persistence of the stress, the individual's personality, cognitive appraisal of the stress, and social support [2].

The body defenses against stressors are mobilized through activation of the Sympathetic Nervous System (SNS). Arousal of the sympathetic nervous system releases hormones (adrenaline) that help prepare the body to meet stress and danger. SNS is highly adaptive short term response to an emergency situation which brings about the fight-flight response. This syndrome is characterized by several behavioural and physiological adaptations, including increased attention, suppression

of appetite, increased flow of oxygen and nutrients to the brain, and increased respiratory rate [1].

The second and most studied part of the stress-response system is the hypothalamic Pituitary-Adrenal Axis (HPA). The HPA axis helps prepare the body for action in response to a variety of events, including stressors [3]. When the stress response is initiated by the detection of a threatening event, the neurons in the Para Ventricular Nuclei (PVN) of the hypothalamus releases corticotrophin-releasing factor (CRF), among other chemicals. CRF then causes the pituitary gland to release Adrenocorticotrophic Hormone (ACTH), which travels through the

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bloodstream. Eventually, ACTH reaches the adrenal cortex (located in the adrenal glands on the kidneys), which is responsible for synthesizing and releasing stress hormones (glucocorticoids), particularly cortisol [4].

Cortisol, often called the stress hormone, has a variety of biological functions, including mobilizing energy for action and modulating the cardiovascular and immune systems. Cortisol influences our emotional and cognitive responses to life events [1]. The release and circulation of cortisol is necessary for normal functioning, but chronic exposure to stressors can induce long-term activation of the HPA and subsequent cortisol release, which is associated with a variety of harmful outcomes, including depressive symptoms, memory problems, immune system suppression, and the development of chronic diseases [5].

Many studies in the world revealed that the prevalence of stress among post graduate students is very high. In India post graduate medical school, the prevalence was 52% [6], in South Eastern USA 48.9% [7], in Gujarat University (India) 45% [8], 54% among international postgraduate students [9], and 55.1% in Pakistan [10]. Similarly multi institution based study conducted in Indian University among post graduate students by using Depression Anxiety and Stress Scale (DASS-42) found that the prevalence of stress was higher than depression and anxiety. They found that the students experienced mildly elevated levels of depression and anxiety (11 ± 5.1 and 8.2 ± 4.1 , respectively) and a moderately elevated level of psychological stress (22 ± 5.2) from the general population [11].

The findings of several studies elsewhere revealed that students of higher institutions pass through a number of difficulties. Cross-sectional study conducted in Jimma University under graduate students revealed that students face many kinds of problems. The most prevalent problem was found to be psychological problem, which includes attention problem (49.0%), anxiety (41.0%) and depression (23.0%). Besides, the students did face academic, social and economic problems [12]. A recent Study conducted in Jimma University medical students also showed that Prevalence of stress accounts 52.4% [13].

There are many studies which assessed the magnitude of stress among undergraduate students [14–18]. These studies indicated that there is a high prevalence of stress among the students. As far as post graduate students are concerned, there are also a number of studies that assessed the magnitude of stress among postgraduate students in several countries except Ethiopia. The findings of these studies indicate that high levels of stress and burnout were detected among the students [6,19–22]. Therefore, the main aim of the present study was to determine the magnitude of stress and its association with substance use among postgraduate students.

Methods

The study was conducted from March 20 to April 20, 2016 in Jimma University. It is located 352 km South West of Addis Ababa at Jimma town with an Area of 409 Hectares. Currently there are a total of 2116 regular postgraduate students (1900 males and 216 females) enrolled in eight colleges and 103 postgraduate programs as obtained from Records and Statistics Units in the Registrar's Office.

The study utilized institution based cross-sectional study design with quantitative data collection method. The study population included all regular postgraduate students attending at Jimma University. Students who were seriously ill, PhD candidates, clinical residents, summer

and distance students were excluded from the study because of their infrequent availability in place.

The sample size was calculated using single population proportion formula with the following assumptions; prevalence of substances use 50%, Using 5% margin of error at 95% confidence level, the sample size was 360 after considering 10% non-response rate.

Numbers of study subjects were allocated by proportion to population size in to colleges/Strata. There are 8 colleges in JU. Then, Stratified simple Random Sampling technique was used to select the required study subjects. This was done using computer generated random numbers to select study subjects.

Data were collected using structured self-administered questionnaire having the following parts: Socioeconomic and demographic characteristics of students, Substance use (khat chewing, alcohol and cigarette smoking habits), and General Health questionnaire 12 (GHQ-12) and Postgraduate stressors questionnaire (PSQ).

The GHQ-12 was used to determine the prevalence of stress and the PSQ was used to identify sources of stress and intensity of stress. It is one of the most widely used measurement tool to measure stress prevalence. The items of GHQ- 12 represent 12 manifestations of stress and respondents were asked to rate the presence of each of the manifestations in themselves during recent weeks. This was done by choosing from four responses, typically being 'not at all', 'no more than usual', 'rather more than usual' and 'much more than usual'. The scoring method was a binary scoring method where the two least symptomatic answers were score 0 and the two most symptomatic answers were score 1 – i.e., 0- 0-1-1. The GHQ-12 scores range from 0 to 12. Participants who scored GHQ-12 equal to 4 and above were considered as having significant distress and taken as 'case' in this study [23,24].

The PSQ is a modified stressor questionnaire which have 28 items with 7 domains; The seven stressors analysed were Academic related stressors (ARS), Poor relationship with superior related stressors (PRRS), Bureaucratic constraints related stressors (BCRS), Work family conflicts related stressors (WFRS), Poor relationship with colleagues related stressors (PCRS), Performance pressure related stressors (PPRS) and Poor Job prospects related stressors (PJRS). Each of these domains consists of four items. The items of PSQ was rated under five categories of responses (causing no stress at all, causing mild stress, causing moderate stress, causing high stress, causing severe stress) to indicate intensity of stress [25].

The dependent variable was stress while the following factors were included in the model as independent variables: Socio- demographic characteristics (age, sex, marital status, religion and ethnicity), years of study, family history of mental illness and presence of chronic disease.

The operational definition of some words and phrases are stated as follow: Life time prevalence of substances use is: the proportion of students who had ever used substance in their life time; current prevalence of substances use is: the proportion of students who were used substance within 30 days preceding the study; and Ever substances used are: Students who self-reported that they had used the substances on one or more than one occasion/s.

Data were collected by pretested, pre-coded and self-administered questionnaires. The collected data were cleaned, coded, entered into EPI-INFO version 3.5.1 software and transferred and analysed using

SPSS computer software package version 20. Reliability analysis showed that the Cronbach's alpha value for The PSQ was 0.936 (95% CI). Whereas, Cronbach's alpha values for Academic, Performance Pressure, Work family Conflicts, Bureaucratic Constraints, Poor relationship with Superior, Poor relationship with Colleagues, and Poor job prospect domains were 0.85, 0.80, 0.81, 0.85, 0.82, 0.81, and 0.80 respectively. The analysis showed the PSQ were a reliable tool in identifying postgraduates' stressors. Descriptive statistics like frequency distribution, percentages, measures of central tendency and dispersions, tables and charts were applied for description of the Socio-demographic variables, the percentage of stressed students, and stress intensity caused by the stressors.

Bivariate analysis was done to assess the crude association between explanatory variables and outcome variable of the study. All variables with a *p*-value of <0.25 in bivariate analysis were included in to multivariable logistic regression model in which odds ratio with 95% confidence intervals was estimated to identify independent predictors of stress. *P*-value <0.05 was employed to declare the statistically significance. The variables were entered to the multivariate model using the Backward LR regression method. Model fitness was checked using Hosmer and Lemeshow goodness of a fit test (*p*>0.05).

To assure the quality of the data high emphasis was given in designing data collection instrument for its simplicity and pre-tests followed by modifications were made. Seven BSc nurse data collectors and one supervisor (psychiatric nurse) were recruited and trained for two days.

The study was reviewed and approved by Institutional Review Board of Jimma University, College of Health Science. The purpose and the importance of the study were explained and written consent was obtained from each participant. Moreover, confidentiality of the information was assured by using anonymous questionnaires and by keeping the data in a secured place.

Results

There were 346 complete responses from the total of 360 sampled students with the participation rate of 96.1%. Majority of the respondents 256 (74.0%) were males while 90 (36.0%) were females. Age of respondents ranged between 22 and 48 years old with the mean of 29.34 (SD=4.7). One hundred eighty eight (54.3%) sampled students were first year and 208 (60.1%) students were married. One hundred twenty seven (36.7%) students were from College of Health Science and 89 (25.7%) were from Jimma Institute of Technology. Eighty one (26.1%) students had monthly income of 4666- 5500ETB (1\$USD=22.50 ETB, Ethiopian Birr). With regard to ethnicity and religious composition of respondents, 127 (36.7%) of them were Oromos and 185 (53.5%) of them were Orthodox believers. Seventy four (21.4%) of the respondents have a family history of mental illness and 75(21.7%) had suffered from different chronic illnesses. There was significant association between gender and stress in the present study. Detail description is shown below in Table 1.

The proportion of postgraduate students who had symptoms of stress, according to the cut-off point of the General Health Questionnaire (GHQ-12), was 46.2% [95% CI (40.75%- 51.25%)] as shown in Table 1. The distribution of GHQ-12 showed a mean score of 3.40 (SD=2.32) ranging from 0 to 12. In the present study, the highest prevalence of stress was observed in the first year students (54.3%) and

it is also high among females (56.7%) than males as shown in Table 1. The highest prevalence of stress was observed among students of the College of Agriculture and Veterinary Medicine (65.6%), followed by students of the College of Social Science and Humanity (55.0%).

According to PSQ, among the seven stressor domains, Academic Related Stressor (ARS) was the leading cause of stress on students. One hundred eighty four (53.2%) postgraduate students had ARS. Of these, 118(34.1%) had high stress, and 66 (19.1%) had severe stress. Performance Pressure Related Stressors (PPRS) and Poor relationship with Superior related stressors (PPRS) were the second and third causes of stress. One hundred fifty two (43.9%) Students had PPRS. Of these, 121(35.0%) had high stress and 31(9.0%) had severe stress. Similarly, 133(38.4%) had PPRS. Of these, 104(30.1%) had high stress and 29 (8.4%) had severe stress.

As shown in Table 2, stressor domains were rated by participants based on 28 questions listed in the PSQ. According to their mean calculated and rated, the top ten stressors were large amount of content to be learned, tests/examinations, lack of time to review what has been learnt, work overload, time pressures and deadlines to meet, difficulty understanding content, Unfair assessment from superiors, fear of making serious mistakes, my life is too centered on my work, advancing a career at the expense of home life.

Life time prevalence of khat chewing, alcohol drinking and cigarette smoking were 37.6%, 54.0%, and 15.3% respectively. The current prevalence of khat chewing, alcohol drinking and cigarette smoking were 66.15%, 77.54%, and 67.92% respectively and 73.85%, 53.79% and 61.10% of postgraduate students are regular khat chewers, alcohol drinkers and cigarette smokers respectively as shown in Table 3.

Concerning the association between substance use and stress, khat chewing, cigarette smoking, and alcohol drinking were commonly practiced habits among students who had stress as presented in Table 4.

Regarding the factors associated with stress among postgraduate students; gender of the respondents, field of study, marital status, presence family history of mental illness, presence of chronic disease, khat chewing, alcohol drinking and cigarette smoking were significantly associated with stress at bivariate analysis. Those variables with *p*<0.25 were further tested using multivariate analysis. Finally from multivariate analysis: gender, marital status, fields of study, khat chewing, alcohol drinking and cigarette smoking were found to be determinants of stress (Table 5). Age, year of study and monthly income were not significantly influence stress among postgraduate students.

Regarding the association between stress and sex, stress was higher among females [AOR = 1.90, 95% CI (1.12-3.22)] than males as seen in Table 5. The odds of single in marital status was 1.74 times higher [AOR= 1.74 (95% CI 1.09-2.77)] than those married PG students.

There was a significant association between fields of study and the stress prevalence. The odds ratios were 16.03 for students from the College of Agriculture and Veterinary Medicine, 5.18 for students from the College of Health Science, and 5.67 for students from the Institute of Technology. Students of the College of Natural Science were considered the reference category (Table 5).

Regarding the association between stress and substance use: khat chewer students were 2 times more likely to have stress than non-chewers [AOR=1.99, 95% CI (1.09-3.64)]. Cigarette smoker students were 2 times more likely to have stress than non-smokers [AOR=2.102,

Socio-demographic variables	Stress			COR 95% CI	p-value
	Total N (%)	Yes (n=160) N (%)	No (n=186) N (%)		
Age					
20-24	23(6.6)	9(39.1)	14(60.9)	0.69(0.25-1.92)	0.487
25-29	194(56.1)	88(45.4)	106(54.6)	0.90(0.47-1.69)	0.750
30-34	81(23.4)	40(49.4)	41(50.6)	1.06(0.51-2.16)	0.872
>34	48(13.9)	23(47.9)	25(52.1)	1.00	
Sex					
Male	256(74.0)	109(42.6)	147(57.4)	1.00	
Female	90(26.0)	51(56.7)	39 (43.3)	1.76(1.08-2.86)	0.022
Year of study					
1st year	188(54.3)	90 (47.9)	98 (52.1)	1.15(0.755-1.76)	0.507
2nd year & above	158(45.7)	70 (44.3)	88(55.7)	1.00	
Religion					
Orthodox	185(53.0)	76(41.1)	109(58.9)	1.09(0.40-2.95)	0.857
Muslim	54(26.0)	37(68.5)	17(31.5)	3.42(1.12-10.35)	0.03
Protestant	89(16)	40(44.9)	49(55.1)	1.28(0.45-3.61)	0.63
Others*	18(5)	7(38.9)	11(61.1)	1.00	
Ethnicity					
Oromo	127(36.7)	51(40.2)	76(59.8)	0.53(0.19-1.28)	0.15
Amhara	113(32.7)	55(48.7)	58(51.3)	0.71(0.28-1.82)	0.47
Tigray	37(10.7)	18(48.6)	19(51.4)	0.71(0.24-2.08)	0.53
Wolaita	24(6.9)	11(45.8)	13(54.2)	0.63(0.19-2.06)	0.45
Gurage	24(6.9)	13(54.2)	11(45.8)	0.88(0.27-2.88)	0.84
Others**	21(6.1)	12(57.1)	9(42.9)	1.00	
College of study					
College of Agriculture & Veterinary	32(9.2)	21(65.6)	11(34.4)	8.90(2.10-37.77)	0.003
College of Health Sciences	127(36.7)	54(42.5)	82(64.6)	3.45(0.94-12.61)	0.061
College of Law & Govern.	12(3.5)	6(50.0)	6(50.0)	4.66(0.86-25.13)	0.073
College of Business & Econ.	33(9.5)	18(54.5)	15(45.5)	4.66(1.35-23.23)	0.018
Institute of Technology	89(25.7)	41(46.1)	49(53.9)	3.98(1.07-14.84)	0.039
College of Education & Behav. S	16(4.9)	6(37.5)	10(62.5)	2.800(0.56-13.95)	0.209
College of Social Sciences	20(5.8)	11(55.0)	9(45.0)	5.704(1.23-26.25)	0.025
College of Natural science	17(4.7)	3(17.6)	14(82.4)	1.00	
Monthly income (ETB)					
1450-3800	90(26.1)	44(48.9)	46(51.1)	1.22(0.67-2.22)	0.513
3801-4665	83(24.1)	41(49.4)	42(50.6)	1.247(0.67-2.30)	0.480
4666-5500	91(26.1)	39(42.9)	52(57.1)	0.958(0.52-1.75)	0.890
5501-9111	82(23.7)	36(43.9)	46(56.1)	1.00	
Marital status					
Married	208(60.1)	83(39.9)	125(60.1)	1.00	
Single	138(39.9)	77(55.8)	61(44.2)	1.190(1.23-2.93)	0.004
Family History of mental illness					
Yes	74(21.4)	41(55.4)	33(44.6)	1.59(0.95-2.67)	0.076
No	272(78.6)	119(43.8)	153(56.2)	1.00	
Presence of chronic disease					
Yes	75(21.7)	41(54.7)	34(45.3)	1.54(0.92-2.57)	0.100
No	271(78.3)	119(43.9)	152(56.1)	1.00	

Note: Significant at p-value <0.25; Current exchange rate- \$1USD = 21.00 ETB; ETB = Ethiopian Birr; Others* Catholic, Adventist, and Pagan; Others**- Hadiya, Dawro and silte

Table 1: Socio-demographic characteristics and their association with stress among PG students. Bivariate logistic regression analysis, n=346.

S No.	Variables	Intensity of Stress Among PG students	
		Mean	Standard deviation
Academic related stressors		2.79	0.81
1	Tests/Examinations	2.90	1.24
2	Lack of time to review what has been learnt	2.80	1.16
3	Difficulty understanding content	2.56	1.22
4	Large amount of content to be learned	2.91	1.22
Performance pressure related stressors		2.54	0.70
5	Time pressures and deadlines to meet	2.66	1.12
6	Work overload	2.72	1.07
7	Fear of making serious mistakes	2.48	1.10
8	My work is mentally straining	2.33	1.13
Work family related stressors		2.37	0.70
9	Work demands affect by personal life	2.33	1.05
10	Advancing a career at the expense of home life	2.40	1.04
11	My life is too centered on my work	2.45	1.12
12	Absence of emotional support from family	2.32	1.15
Bureaucratic constraints related stressors		2.33	0.76
13	Lack of authority to carry out my job duties	2.32	1.16
14	Unable to make full use of my skills and ability	2.37	1.17
15	Cannot participate in decision making	2.30	1.15
16	Having to do work outside of my competence	2.35	1.11
Poor relationship with superior related stressors		2.38	0.77
17	Lack of support from superiors	2.40	1.19
18	Difficulty in maintaining relationship with superior	2.32	1.19
19	My beliefs contradict with those of my superior	2.31	1.65
20	Unfair assessment from superiors	2.50	1.25
Poor relationship with colleagues related stressors		2.23	0.70
21	Working with uncooperative colleagues	2.31	1.14
22	Working with incompetence of colleagues	2.23	1.03
23	Relationship problems with colleagues	2.24	1.09
24	Competition among colleagues	2.15	1.12
Poor job prospects related stressors		2.30	0.75
25	Feeling insecure in my job	2.25	1.19
26	Society does not think highly of my profession	2.20	1.12
27	Lack of promotion prospects	2.37	1.19
28	Feeling of being underpaid	2.38	1.21

Table 2: Stressor domains rated by participants based on 28 questions listed in the PSQ in JU April, 2016. n=346.

Substance use	Categories	Frequency	Percent (%)
Life time Khat chewing	Yes	130	37.57
	No	216	62.43
	Total	346	100
Current khat chewing	Yes	86	66.15
	No	44	33.85
	Total	130	100
Regularity of khat chewing	Regular chewers	63	73.26
	Non regular chewers	23	26.74
	Total	86	100
Lifetime Alcohol drinking	Yes	187	54.05
	No	159	45.95
	Total	346	100
Current alcohol drinking	Yes	145	77.54
	No	42	22.46
	Total	187	100

Regularity of alcohol drinking	Regular drinkers	78	53.79
	No regular drinkers	67	46.21
	Total	145	100
Life time Cigarette smoking	Yes	53	15.32
	No	293	84.68
	Total	346	100
Current cigar ate smoking	Yes	36	67.92
	No	17	32.08
	Total	53	100
Regularity of cigarette smoking	Regular smokers	22	61.10
	Non regular smokers	14	38.90
	Total	36	100

Table 3: Shows substance use characteristics of PG students in JU April 2016.

Substance use	Stress			COR (95%)	p-value
	Total N (%)	Yes(n=160) N (%)	No(n=186) N (%)		
Khat chewing					
Yes	130(37.57)	68(52.3)	62(47.7)	1.47(0.95-2.28)	0.080*
No	216(62.43)	92(42.6)	124(57.4)	1.00	
Alcohol drinking					
Yes	187(54.05)	81(43.3)	106(56.7)	0.77(0.50-1.58)	0.237*
No	159(45.95)	79(49.7)	80(50.3)	1.00	
Cigarette smoking					
Yes	53(15.32)	31(58.5)	22(41.5)	1.79(0.99-3.24)	0.054*
No	293(84.68)	129(44.0)	164(56.0)	1.00	

Note: * Significant at p-value <0.25

Table 4: Association between stress and substance use among PG students. Bivariate logistic regression analysis, n=346.

Predictor variables	Stress			AOR (95%)	p-value
	Total N (%)	Yes(n=160) N (%)	No(n=186) N (%)		
Sex					
Male	256(74.0)	109(42.6)	147(57.4)	1.00	0.017
Female	90(26.0)	51(56.7)	39 (43.3)	1.90(1.12-3.22)	
Marital status					
Married	208(60.1)	83(39.9)	125(60.1)	1.00	0.018
Single	138(39.9)	77(55.8)	61(44.2)	1.74(1.09-2.77)	
College of study					
College of Agri & Vet. Med.	32(9.2)	21(65.6)	11(34.4)	16.03(3.56-72.87)	0.000
College of Health Sciences	127(36.7)	54(42.5)	82(57.5)	5.18(1.36-19.77)	0.016
College of Business and Econom.	33(9.5)	18(54.5)	15(45.5)	5.00(1.16-21.51)	0.031
Institute of Technology	89(25.7)	41(46.1)	49(53.9)	5.67(1.46-21.93)	0.012
College of Social Sciences	20(5.8)	11(55.0)	9(45.0)	5.29(1.10-25.30)	0.037
College of Natural sciences	17(4.9)	3(17.6)	14(82.4)	1.00	
Khat chewing					
Yes	130(37.57)	68(52.3)	62(47.7)	1.99(1.09-3.64)	0.024
No	216(62.43)	92(42.6)	124(57.4)	1.00	
Alcohol drinking					
Yes	187(54.05)	81(43.3)	106(56.7)	0.44(0.25-0.77)	0.004
No	159(45.95)	79(49.7)	80(50.3)	1.00	
Cigarette smoking					
Yes	53(15.32)	31(58.5)	22(41.5)	2.10(1.00-4.38)	0.048
No	293(84.68)	129(44)	164(56.0)	1.00	

Table 5: Association between stress and predictor variables among PG students in JU April, 2016. Multivariate logistic regression analysis, n= 346.

95% CI (1.00-4.38)]. Whereas Alcohol drinkers were 0.44 times less likely to have stress than non-drinkers [AOR=0.44, 95% CI (0.25-0.77)] as shown in Table 5.

Discussion

Stress during tertiary education and advanced academic training is inevitable. The present study tried to address four research questions. First, what is the level of stress among postgraduate students in Jimma University? Second, what are the major sources of stress among postgraduate students? Third, is there a relationship between stress and substance use? Fourth, is there any relationship between stress and Socio-demographic variables?

This study found that a high prevalence of stress among postgraduate students which was 46.2%, based on GHQ scores. Although it is slightly lower compared to different studies done in the world, such as in India postgraduate medical school the prevalence was 52% [6], in South Eastern USA 48.9% [7], among international post graduate students 54% [9], and in Pakistan 55.1% [10]. But it is still higher than the results

of a study done in Malaysian (29.6%) [26] and in Nepal (20.9%) [22]. The difference could be attributed to the socioeconomic, cultural and environmental factors as well as the different instrument used in other studies. Further, most of these studies were done among medical school students where the medical education environment is thought to be stressful and contributes to emotional and psychological disturbances.

Similarly, the prevalence is relatively lower than to the stress prevalence in undergraduate medical students' population (52.6%) which was done in Jimma University [12]. Even though both undergraduate and postgraduate students faced similar training environment, the discrepancy might be due to age maturity of PG students and the amount and complexity of the material to be learned in medical students. This prevalence of stress is also relatively higher among students of the College of Agriculture and Veterinary Medicine compared to that of other students. The possible reasons for the variability in the levels of stress among different college students could be due to certain differences in the curricula, teaching facilities, qualification and experience of the instructors, and the levels of care given to the students.

The prevalence of stress in this study was higher among female students as compared to their male counter parts. This finding is consistent with other studies done in Malaysia [27] and Saudi Arabia [28]. The possible causes for higher prevalence of stress among female students might be affective nature of their response to stressors, domestic violence, cultural and religious restrictions and hormonal changes during menstruation. Compared to males, females experience much more fluctuation of hormone levels that are associated with symptoms of stress.

First year postgraduate students were found to have high GHQ scores (52.1%) compared to second year & above students. Other studies have also demonstrated a high prevalence of stress among first year students [13,29]. It may be due to extended hours of study, increased work load and adjusting themselves to the new environment in first year students may initiate the stress response of sympathetic nervous system. In response to stressors, Corticotrophin Releasing Hormone (CRH), Arginine and adrenal medullary hormones are released at higher concentrations and it probably changes the ratio of acetylcholine, adrenaline and serotonin that gives a higher stress score.

According to PSQ in this study, among the seven stressor domains, academic related stressor (ARS) was the leading cause of stress on students. This finding is consistent with the result found in Pakistan [10] and in Indian [11] also showed that from all the stressors, academic related stressors were found to have the greatest impact and intensity on post graduate programs. Major academic stressors in postgraduate Students might be due to tests/examinations, grade competition, time demands, problematic professors and classroom environment, and concerns about career and future success.

Among 28 questions listed under stressor domain of PSQ, the top ten stressors were Large amount of content to be learned, tests/examinations, lack of time to review what has been learnt, work overload, time pressures and deadlines to meet, difficulty understanding content, unfair assessment from superiors, fear of making serious mistakes, my life is too centered on my work and advancing a career at the expense of home life. It is noteworthy that the stressors rated highly by postgraduate were relatively similar to those rated highly by other studies in Malaysia [18] such as tests and examinations, large amount of content to be learnt and time pressure to meet deadlines. Most of the stressors were related to academic and performance pressure. However a study done in India physiotherapy students showed that top ten stressors were the society does not think highly of the profession, unfair assessment by the superiors, unable to make full use of my skill, difficulty in maintaining relationships with superiors, fear of making mistakes that can lead to serious consequences, having difficulty in understanding content, lack of support from the superior, lack of promotion prospect in future, feeling of being underpaid and competition among colleagues [30]. The major stressor was the attitude of the society towards the profession suggesting a lack of awareness of the physiotherapy field in the society which was causing the stress to the students. This study identified six significant determinants of stress namely gender, marital status, fields of study, khat chewing, alcohol drinking, and cigarette smoking.

Stress was more prevalent among single unmarried students as compared to married students. This is in line with the academic staff of Malaysia University [27]. The possible explanation is that unmarried single students may exhibit more frequent, more prolonged and greater activation of the Hypothalamus Pituitary Adrenal (HPA) axis and Sympathetic Adrenal Medulla (SAM) systems. Consistent with increased HPA and SAM activation, single individuals have been linked with a greater post awakening rise in cortisol [4].

The prevalence of khat chewers among postgraduate students was 37.57% in the present study. Among khat chewer students, 52.3% had manifested stress symptoms. Khat chewer students were 2 times more likely to have stress than none chewers. This finding is consistent with the report from Kenya [31], result of community based study in Jimma Town [32] and the finding of a study done among undergraduate medical students at Jimma University [13]. People chew khat to stimulate the brain to get alert and excitement due to the active ingredients of khat called cathinone and cathine. The sympathomimetic effects of cathinone and cathine induce symptoms such as euphoria and hyperactivity, increased level of alertness, ability to concentrate, confidence, friendliness, pleasure and flow of ideas. During khat chewing session, initially, there is an atmosphere of cheerfulness, optimism, and a general sense of well-being. After about 2 hours, tension, emotional instability, and irritability begin to appear, later leading to feelings of stress and lethargy. Again due to the fact that substance use leads to in efficiency in life function, impaired relationship and sleep difficulty [33]. Furthermore, substance use is associated with increased absenteeism from class and poor academic performance, which can further lead to mental distress in students. However, since the study design is cross sectional, it is difficult to ascertain the direction of causality.

The prevalence of cigarette smoking among postgraduate students was 15.32%. This is higher than the study finding reported from Axum University [34]. In the present study, among cigarette smokers, 58.5% had stress symptoms. Cigarette smokers were 2 times more likely to have stress than non-smokers. This is due to far from acting as an aid for mood control; nicotine dependency seems to exacerbate stress. This is confirmed in the daily mood pattern described by smokers, with normal moods during smoking and worsening moods between cigarettes. The apparent relaxant effect of smoking only reflects the reversal of the tension & irritability that develop during nicotine depletion. Dependent smokers need nicotine to remain feeling normal.

The prevalence of alcohol drinking among postgraduate students was 54.05% and among alcohol drinkers, 43.3% had stress symptoms which are higher than the result reported from Axum University [34]. In the present study, there was a significant association between stress and alcohol drinking, but with a protective role, indicating that those who drink moderate dose of alcohol are less likely to be affected by stress. Alcohol drinkers were 0.44 times less likely to have stress than non-drinkers. Drinking alcohol in moderate amounts may have positive influences on physical and mental health. While alcohol is one of the most widely abused substances in the study area, it is also one that gives certain benefits for drinkers who consume it in safe amounts. For individuals who consume moderate amount of alcohol, benefits like reduced stress, increased cardiovascular health and decreased risk of developing type 2 diabetes offer a wealth of reasons for consumers to drink in moderation. Moderate levels of alcohol can trigger stress reduction, easy feelings of anxiety and help consumers to reduce tension. In addition, moderate levels of alcohol consumption can also cause the consumer to feel more pleasant and relaxed. However, Liver disease and certain cancers are undoubtedly related to alcohol intake, especially heavy drinking [35].

Conclusion

The prevalence of stress among PG students was found to be high. This may lead to emotional disturbance that can affect the professional competency of the students. Academic related stressor (ARS) was the leading cause of stress on students followed by performance pressure related stressors (PPRS) and poor relationship with superior related stressors (PRRS). Unmarried and female students were at risk of stress.

Khat chewing and cigarette smoking were predictors of stress. Moderate alcohol intake may reduce the level of stress. Therefore, counselling, coping and preventive strategies are recommended to control the risk factors of stress among students.

Limitation of the Study

This study has the following limitations. As it was a self-administered, cross-sectional questionnaire-based study, there could be a chance of response bias that may affect the finding. Furthermore, the study was also restricted to include small sample size which it may affect the generalizability of findings. The influence of stress on academic achievement of students was not included in this study.

Competing Interests

The authors declare that they have no competing interests.

Author's Contributions

Abriham Zegeye involved in preparing the study designed data analysis and manuscript drafting. Andualem Mossie generated the original idea and involved in manuscript write up. Alemu Gebrie and Yohannes Markos were responsible for data interpretation and manuscript revision. All authors reviewed and approved the final manuscript.

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