Multi-disciplinary double-blind peer review journal
ISSN:2976-1077 (Online)
https//doi.org/10.58196/jhswn/v12.1.2212024.

Stress and Anxiety Among Grade 12 Science Students in Lalitpur, Nepal: Prevalence, Associated Factors, and Insights

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Publishing Process. Received on: Nov 15, 2024
Finalized to publish: Dec 24, 2024

Abstract

Introduction: Adolescence is a critical transitional phase marked by significant physical, emotional, and social changes, often accompanied by increased susceptibility to mental health challenges such as stress and anxiety. For grade 12 science students in Nepal, particularly in the Lalitpur district, the academic pressure and societal and personal expectations exacerbate these challenges. Stress and anxiety during this formative period can adversely affect educational performance and long-term mental well-being. Understanding the factors influencing these issues is crucial for designing interventions to support adolescents' mental health. The study aimed to investigate the factors associated with stress and anxiety among grade twelve science students of Lalitpur district.

Method: All interested 12th-grade science students (from probability proportionate sampling (PPS) of the class selection from 10 schools) were included in the study. In the survey, the Depression, Anxiety, and Stress Scale - 21 Items (DASS 21) questionnaire was used. The chi-square test was done by using SPSS 21 to test for statistical significance. Cross-sectional quantitative descriptive and inferential statistics were done to analyze bivariate and multivariate logistic regression.

Results: obtained from the study were that the percentage of stress and anxiety among the study population was 51.2% and 55.1% respectively. Multiple logistic regression results reported that residency status [AOR: 0.991, 95% CI 0.677-1.450], enjoying living with parents [AOR: 6.459, 95% CI 0.700-1.413], problems during sleeping [AOR: 0.372, 95% CI 0.257-0.538] and use of electronic gadget during bedtime [AOR: 0.633,95% CI 0.436-0.919] were some associated variables of stress with their AOR at 95% CI. Similarly, Multiple logistic regression results reported that residency status [Adjusted OR=1.055; CI=0.726-1.532], enjoying living with peers [AOR=2.486, 95% CI 1.016-6.082], problems during sleeping [AOR=0.480,95% CI 0.333-0.691], using electronic gadget during bedtime [AOR=0.604,95% CI 0.421-0.866] were associated variables of anxiety. Residency status, enjoying living with parents/peers, sleeping time, problems during sleeping, time spent on the internet, using electronic gadgets during bedtime, and using alcoholic beverages were associated variables with stress and anxiety.

Conclusion: The research study has significantly concluded that anxiety is related to the age of respondents, residency status, enjoyment with peers, sleeping problems, and using electronic devices during bedtime are the major significant factors for anxiety.

Keywords: Adolescent, Associated factors, Stress & Anxiety

Declaration: There is no conflict of interest, and no one financed the research.

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ISSN:2976-1077 (Online)
https//doi.org/10.58196/jhswn/v12.2.2012024.2

Introduction

According to the federal education law of Nepal, grade 12 is the highest qualification at the school level. The school-level education is divided into three phases; Early Child Development (Pre-primary) level, basic level education (1-8), and secondary Level education (9-12)' (Gov.Np, 2018).Therefore, grade 12 students receive a School Leaving Certificate (SLC) after the completion of the grade 12 board examination conducted by the National Examination Board of Nepal. Adolescence is the period ranging from 10 to 19 years of age and is one of the critical transition periods of life. This period occurs after childhood and before adulthood and is characterized by tremendous growth and change and involves physical, emotional, and social transitions and a major part of life to lay down a foundation for good health (WHO, Securing adolescent health and well-being today is vital for the health of future generations - , 2024).

'Stress is a feeling that is initiated when a person perceives demands exceed resources mobilized by and anxiety is a response of the body to a perceived threat which is triggered by an individual's beliefs, feelings, and thoughts and is characterized by worried thoughts, tension, increased blood pressure, respiratory rate, pulse rate, sweating, and difficulty of swallowing dizziness, and chest pain' (APA, 2020) World Health Organization defines mental health as 'A condition of mental health that allows people to manage life's stressors, reach their full potential, learn and work effectively, and give back to their communities in addition it is more than just the absence of mental illness and is a crucial aspect of health and wellbeing' (WHO, 2024).

'Adolescence is a period associated with increased risk for the development of many psychiatric disorders, such as anxiety and depression. It is an important period of peer relationships and a greater dependence on peers. Peer interactions contribute to reducing burden, so it is a crucial interpersonal need' (Benjamin Oosterhoff ,Cara A. Palmer,Jenna Wilson M.S. & Natalie Shook, 2020). Grade 12 is an important turning point in secondary-level education. At this time, the academic performance of the adolescent plays a crucial role in deciding about higher education and career. Parents, teachers, and peer's expectations are important motivators to study hard. According to Kumar Nomesh and et.al (2021) 'If there arises a gap between actual capabilities and expectations of adolescent, then starts to develop stress and anxiety. Different environmental conditions like improper facilities, lack of quality guidance and personal determination, bad economic conditions, and fear of the COVID-19 pandemic have influenced increased stress and anxiety among adolescents. Adolescence is a crucial period of mental development which is associated with higher risks of developing psychiatric disorders and it is one of the most vulnerable groups in mental health during extended periods of COVID-19 due to loss of peer support and academic loss and so on (Nomesh Kumar,Kamleshun Ramphul, & et.al., 2021)

According to MoPE adolescents cover '23.62% of the total population of Nepal (MoPE, 2017)'. "The prevalence of mental health disorders such as anxiety neurosis, depression, and obsessive, compulsive disorders are common in adolescence" (Bishnu P. Choulagai, Sharma P, 2020). Transforming from childhood to adulthood is the period most crucial in human life. It should be handled properly with the guidance of parents, teachers, and the community. 'They have psychological pressure, dealing with emotions, peer pressure and balancing between family and friends, the stress of

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academic competition and others' (Bishnu P. Choulagai, Sharma P, 2020). Identification of the stress of the students becomes important to guide them properly. The main objective of the study is to investigate the factors associated with stress and anxiety among grade twelve science students of Lalitpur district and to assess the level of stress and anxiety among the study population.

Methods

Participants and procedure: The study setting was made on grade 12 science students of Lalitpur district where 4348 science students were enrolled for grade 12 in the academic year 2021/22. Of 43 schools 21 schools were listed as eligible schools and from 21 schools 3937 were a total number of science students for the academic year. Ten schools were selected from PPS then only data were collected from a self-administered questionnaire (demographic, other related factors, and DASS-21) DASS-21 is the set of questions to examine depression. anxiety and stress (arc.psych.wisc.edu, 2024). This set of questions was used to collect data. The scale of answers was designed by Lovibond, S.H. & Lovibond, P.F. (1995), According to them this measure mainly three negative emotions depression, anxiety, and tension/stress (Lovibond, S.H. & Lovibond, P.F., 2017).

Students gave consent before filling in ascent forms from schools and parents. The data were collected on (2022/4/9-2022/6/9). Students had an answer about how much that statement matches their experiences over the past week into one of four responses (i.e. did not apply to me at all=0 score, applied to me to some degree, or some of the time=1 score, applied to me to a considerable degree or a good part of time=2 score and applied to me very much or most of the time=3 score). Therefore, with the final scores multiplied by 2, stress and anxiety level were categorized into 5 different levels.

Data management and analysis

Data was extracted and cleaned by using Microsoft Excel. The final data were analyzed with the help of the SPSS. (Lovibond et.al. 1995) The data was analyzed based on research objectives and research questions. Both descriptive and inferential statistical methods were used to analyze the data. Outliers' management was done by identifying and excluding the mean values if lie beyond three standard errors i.e. Mean± 3S.E. Saphiro-Wilk Test was done to test whether the data was either normally distributed or not. The sample size was calculated by taking "p" and "q" from [27.5% of the students who had stress, 56.9% had anxiety and 41.6% had depression]' (Bishnu P. Choulagai, Sharma P, 2020),

So, $n=Z2(1-p)/d2$ (which is a sample size calculation formula for infinite population)
Where, p=0.569, q=0.431, n=377. Then sample size 377 becomes $n0$ for a finite population, Now, for a finite population (N) =3937; which is the number of science 12-grade students at eligible schools of Lalitpur district for the year 2021/22). multiplying the sample size by 1.5% design effects and adding a 10% nonresponse rate to it, then it became 568. To determine the statistical relationship between the level of stress and anxiety a p-value less than 0.05 was considered statistically significant. Those variables that were significant at 5% during bivariate analysis were included in multivariate analysis.

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Descriptive analysis such as mean, standard deviation, and percentage, frequencies was used for identifying the stress and anxiety-associated factors among grade 12 science students. Dependent variables were categorized into two categories. Multivariate analysis was computed as

Log [p/1-p]
=b0+b1x1+b2x2+b3x3+b4x4+b5x5+b6x6+b7x7
----------bnXn

Where b0 is constant, p= probability of having stress/anxiety, 1-p= probability of not having stress/anxiety

Ethics approval

The study was approved by the Institutional Review Committee of Nobel College; application number (Ref No. MPHIRC 0026/2022). Written consent was obtained from 10 schools and an assent form was obtained from all interested students.

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Results

Table 1: Socio-demographic characteristics

Variables	Numbers(n=568)	Percentage
Age of students (in years)		
≤17	360	63.4
>17	208	36.6
Mean age:17.23(CI:17.5-17.3)		
Sex of students		
Male	324	57
Female	244	43
Marital status of parents		
Divorced	71	12.5
Widowed	16	2.8
Married	481	84.7
Religions of students		
Hindu	452	79.6
Muslim	9	1.6
Buddhist	51	9.0
Christian	51	9.0
Others	5	0.9
Residing with		
Parents	383	67.4
Hostel	48	8.5
Rent	103	18.1
Friends	5	0.9
Others	29	5.1
Educational status of parents	N=562/558	
No formal education	146/262	25.97/46.95
School level education	270/237	48.04/42.47
Higher level education	146/59	25.97/10.57
Occupational status of parents		
Unemployed	36/260	6.41/56.60
Government employed	101/38	17.97/6.81
Private employed	425/260	75.62/46.59
The average income of the family (in NRs)		
≤31,000/month	255	44.9
31,000-70,000/month	256	45.1
≥70,000/month	57	10.0
Types of family	n=568	
Nuclear family	429	75.5
Joint family	139	24.5

Table 2: Stress and Anxiety level category with frequency and percentage: (N=568)

Stress/Anxiety question points	Frequency	Percentage
Normal (0-14)/ (0-7)	283/255	49.8/44.9
Mild (15-18)/ (8-9)	99/49	17.4/8.6
Moderate (19-25)/ (10-14)	93/110	16.4/19.4
Severe (26-33)/ (15-19)	77/58	13.6/10.2
Extremely severe (34+)/ (20+)	16/96	2.8/16.9

Source: Primary data

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Table 3: Association of Socio-demographic variables with stress and anxiety

Variables	Stress		X^2	p-value	Anxiety		X^2	p-value
	Y	N			Y	N		
Sex								
Male	152	172	2.915	0.083	170	154		
Female	133	111			143	101	1.878	0.171
Age in years								
≤17	173	187	1.765	0.184	174	186	4.691	0.030
≥17	112	96			81	127		
Religion								
Hindu	228	224			243	209		
Muslim	4	5	1.979	0.740	3	6	4.668	0.323
Buddhist	26	25			31	20		
Christian	26	25			33	18		
Others	1	4			3	2		
Residing with								
Parents	192	191			170	213		
Hostel	27	21			19	29		
Rent	43	60	9.579	0.048	56	47	9.836	0.043
Friends	2	3			3	2		
Others	21	8			7	22		
Education status of father (562)								
No formal	78	95			95	79		
education	138	127	3.418	0.181	140	123	1.785	0.410
School level education	68	56			75	50		
Higher level education								
Educational status of mother (558)								
No formal education	123	143			141	127		
School level education	124	111	3.560	0.169	131	102	1.443	0.486
Higher level education	33	24			75	34		
Occupation of the father (562)								
Unemployed	17	20			19	19		
Government employed	54	46	1.038	0.595	53	47	0.475	0.789
Private employed	211	214			237	187		
Occupation status of mother (558)								
Unemployed	133	126			140	120		
Government employed	22	19	1.464	0.691	23	18	1.901	0.593
Private employed	126	132			146	111		
Average income (in NRs)								
≤31,000/-	131	124			143	112		
31,000-70,000/-	114	142	1.145	0.285	129	127	0.839	0.360
≥70,000/-	40	17			41	16		

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Table 4: Logistic Regression Variables Contributing to Stress and Anxiety

Variable	Stress		Adjusted OR (95% CI)	p-value	Unadjusted OR (95% CI)	p-value	Variable	Anxiety		Adjusted OR (95% CI)	p-value	Unadjusted OR (95% CI)	p-value
	Y	N						Y	N				
Residing with							Age in yr.						
Parents	192	191	0.991(0.677-1.45)	0.962	0.994(0.70-1.413)	0.97	≥17	173	187	1.354(0.947-1.93)	0.096	0.682(0.48-0.965)	0.03
Others	93	92	Ref.		Ref.		≤17	112	96	Ref.		Ref.	
Enjoying with parents							Residing with						
No	16	2	6.459(1.43-29.00)	0.015	8.357(1.90-36.69)	0.005	Parents	192	191	1.055(0.726-1.532)	0.779	1.005(0.749-1.515)	0.726
Yes	269	281	Ref.		Ref.		Others	93	92	Ref.		Ref.	
Sleeping time							Enjoying with peers						
8 hours	108	120	0.913(0.64-1.302)	0.615	0.829(0.592-1.16)	0.273	No	21	7	02.486(1.016-6.082)	0.046	0.392(0.164-0.939)	0.036
Others	177	163	Ref.		Ref.		Yes	292	278	Ref.		Ref.	
Time spent on the internet							Problem during sleeping						
≥6 hours	252	243	1.256(0.747-2.11)	0.390	1.257(0.76-2.059)	0.364	No	86	118	0.480(0.337-0.691)	0.000	0.584(0.413-0.825)	0.002
≤6 hours	33	40	Ref.		Ref.		Yes	199	165	Ref.		Ref.	
Use of electronic gadgets during bedtime							Use of electronic gadgets during bedtime						
No	165	118	0.633(0.436-0.91)	0.016	0.604(0.427-0.85)	0.004	No	86	118	0.604(0.421-0.866)	0.006	0.584(0.413-0.825)	0.002
Yes	199	86	Ref.		Ref.		Yes	199	165	Ref.		Ref.	
Drinking alcoholism													
No	251	264	0.732(0.39-1.372)	0.330	0.531(0.29-0.956)	0.035							
Yes	34	19	Ref.		Ref.								

Note: OR= Odds Ratio, CI= At 95% Confidence Interval

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Discussion

Several studies have been performed globally pertaining to stress and anxiety among adolescents. But there are a few in Nepal and not anyone in Lalitpur district. There is so much evidence that adolescents experience stress and anxiety in developing countries like Nepal. The current study indicates that more than 50% of the study population was affected by stress in contrast to a cross-sectional study done among junior college students in a rural area of Sangli district of Maharashtra, India, which shows that 44.9% of students had stress' (Waghachavare, V. B. et al , 2013) which is a consistent result of the current study and identified the study have stress. However, research done in Spain in 2020 on college students shows that the prevalence of stress was 34.5%, and anxiety was 23.6%. These dissimilarities may be due to the increased age factors of the respondents of Spain.

'Having problematic Internet use behavior, smoking, presenting insomnia, and having low self-esteem were independently associated with symptoms of stress and anxiety. Being a woman, living with their family, having a stable partner, consuming alcohol frequently, and having poor nutritional habits were significantly associated with stress; and frequent consumption of alcohol was significantly associated with symptoms of anxiety (E. Ramón-Arbués,V. Gea-Caballero, & J. M.Granada-López et al, 2020). The current study revealed that the associated factors for stress were residency status, enjoyment with parents, sleeping time, problems during sleeping, time spent on the internet, using gadgets during bedtime, and drinking alcoholism. Similarly, anxiety-related associated factors were the age of respondents, residing with, enjoying with peers, problems during sleeping, and using gadgets during bedtime.

Chauhan, Reddy, and Goparaju (2020) did a study in Hyderabad, India among intermediate students which revealed that 55.9% of students use the internet abnormally and its consequences were sleep problems, behavior issues, physical health problems, depression, anxiety, and stress. A study conducted in Urban Adolescents of Kamrup District; Assam shows that the prevalence of Internet addiction was 80.7% which was more than the previous study. There was a significant association between Internet addiction and stress (odds ratio=12), and anxiety (odds ratio=3.3) (Saikia, AM. Das J. Barman P. and Bharali MD, 2019).This study was consistent with the present study where the use of electronic gadgets during bedtime is strongly associated with both stress and anxiety (p= 0.006, p=0.003 respectively). Similarly present study on bivariate analysis on stress and problems during sleeping shows a strong significant association (p value 0.000) and bivariate analysis shows a significant association between anxiety and problems during sleeping (p value **0.000**). However, statistical significance doesn't show any association

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between sleeping time and anxiety among the study population in the current study (0.066).

A study was conducted to find out the prevalence and associated factors with anxiety, and stress among high school students in an urban municipality of Kathmandu, Nepal where multivariable logistic regression was carried out to decide statistically significant variables of symptoms of DAS at p-value<0.05 and anxiety was 55.6% and stress was 32.9% respectively. 'The study revealed that the associated factors for stress were female sex, currently living without parents, and presence of perceived academic stress. Associated factors for anxiety were female sex, having a mother with no formal education, students from science or humanities faculty, and the presence of perceived academic stress. (E. Ramón-Arbués,V. Gea-Caballero, & J. M.Granada-López et al, 2020) . However, this study is dissimilar from the current study where being male/female and having a mother with no formal education did not have significant factors of stress and anxiety. But, consistent with the association of stress and anxiety and residency status of the respondents. Our study shows that there is a significant association between anxiety and the residency status of the respondents. (p=0.048).

Our study shows no significant association between stress and the sex of students (p=0.083). But a study done by Waghachavare, V. B. & et al., (2013), among 396 students stress was observed in 69 (38.1%) female students and 49 (23.3%) male students; the association with gender was statistically significant (Waghachavare, V. B. & et al., 2013). 'Likewise, anxiety and stress-related symptoms are more among female respondents found from a study which was conducted in Lalitpur district during COCID-19 pandemic' (Manju Nepal, Parbati Nepal et.al., 2020).

The current study shows that there is a significant association between the stress and residency status of the respondents (p=0.048) and 'anxiety and residency status of the respondents (p=0.043) which is consistent with a study done among high school students in an urban municipality of Kathmandu Nepal' (Anita KarkiI, Bipin ThapaI, et.al., 2022). This study shows that there was a significant association between stress and living with parents in the study population.

A study conducted in Kenya among adolescents in selected secondary schools the percentage of anxiety and the socio-demographic characteristics in terms of respondent's age (p=0.0649) and family set-up (p=0.292) were statistically insignificant' (Adhiambo Nyayieka, M., Kemuma Nyagwencha, S. & Nzyuko, S., 2020). Likewise in contrast the statistical analysis of the present study does not show a significant

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association between stress/anxiety and family type in the study population (p=0.088; p=0.164).

A study conducted in Hyderabad India by Hedaoo, R et al (2017) 'revealed that there was a positive correlation between perceived academic stress and consumption of bakery products, other savory products, and soft drinks ($p<0.05$). The associations among high-stress and high-fat and sugar foods show stress as a conducive factor to upsetting dietary choices (Hedaoo,R. and Gavaravarapu, S.M, 2017). Stress as a cultural factor, which is influencing dietary choices' (Subbarao M Gavaravarapu, 2019,). Our study shows similar results that there is a significant association between stress and alcohol consumption as soft drink consumption which is like a previous study (p=0.046) but not similar with junk food consumption variables. Likewise, anxiety had no significant association with alcohol consumption and junk food consumption which is dissimilar to the previous study.

The study showed the association between time spent on the internet and stress among the study population (p= 0.010) but there is no any significant association between the reason for using the internet and stress (p=0.225) 'similarly a study conducted on internet addiction, it revealed that, the prevalence of internet addiction was 80.7% among the students and conclude that internet addiction and stress and anxiety has significant association' (Saikia, AM. Das J. Barman P. and Bharali MD, 2019) which are consistent with each other.

A study conducted by Choksi et al (2021) among 460 12th-grade stream students concluded that anxiety and stress were more prevalent in students aged 18 years who were in class twelve science students. Three-fourths of 16-year-old students were anxious similarly more than three fourth of 17 years students were anxious. The level of anxiety was found to be decreasing with age' (A. S. Chokshi,P. P. Rangwala, G. H. Dumra et al, 2021)

Likewise, our study shows that there is a significant association between the age of respondents and anxiety in the study population (p=0.030). So, these two studies show similar results that anxiety is directly associated with age factors**.** However, stress and age of students were not significantly associated (p=0.184). In a study conducted in Kenya, up to 26.4% of school-going adolescents have symptoms of anxiety (Adhiambo Nyayieka, M., Kemuma Nyagwencha, S. & Nzyuko, S., 2020) which is dissimilar because a greater percentage of respondents than previous study had developed anxiety in our study.

Parents scolding on poor marks may be a negative support system for respondents to develop stress and anxiety, but the Chi-square association does not show a significant association (p=0.064) between stress/anxiety and scolding on poor

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marks in the study population. The study conducted by Anders, 2011
found significant correlations between family relationships and academic stress among (18-23) college students but the same study showed that there is a negative correlation between stress and family relationships among college freshmen. This was expected because college freshmen have yet to establish college-based support systems that could substitute for family support. Upperclassmen have had more opportunities to build relationships outside of their family with the people that currently surround them. Upperclassmen have had more time to gain relationships with roommates, teammates, club members, classmates, and numerous others they may have bonded with during their academic careers. This idea supports the findings of (Putwain, D. W., Woods, K. A. and Symes, W., 2010) and (Anders, 2011). Chi-square association shows a significant association between using electronic gadgets during bedtime and anxiety (p=0.003) in the study population which is consistent with a cross-sectional study conducted by (Saikia, AM. Das J. Barman P. and Bharali MD, 2019)among higher secondary schools in the urban areas of Kamrup district Assam. 'This study concludes that the prevalence of internet addiction was 80.7% among the students. 71.4% of students used the internet for social networking, and 42.1% used it for study purposes. Similarly, 42.1 % of students spend time on the internet (3-6) hours per day. Thus, this study concluded that internet addiction stress, and anxiety have significant associations among the students (Saikia, AM. Das J. Barman P. and Bharali MD, 2019). The study conducted by Kimball and Mirhosseini (2018) suggests that 'general mood may benefit from improved nutritional status. Nutritional status plays an important role in mental health, and poor nutrition may contribute to the pathogenesis of mental illness. Broad spectrum supplements with a focus on optimizing vitamin D status may provide a new paradigm for the treatment and prevention of mental illness (Kimball, S. M., Mirhosseini, N. ,& J. Rucklidge, 2018).

Conclusion

Stress brings several problems in mental health though people are neglecting it in their daily lives. Social support, personality types coping strategies, etc. can be significant for dealing effectively with stress. The research study has concluded that the day-to-day activities and personal behavior play a significant role in developing stress among people. Residing with whom, enjoying with parents, sleeping duration, sleeping problems, time spent on the internet, use of electronic devices during bedtime, drinking alcoholic beverages

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ISSN:2976-1077 (Online)
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are the major significant factors for stress shown by the research work. The research study has significantly concluded that anxiety is related to the age of respondents residing with whom, enjoying with peers, sleeping problems, and using electronic devices during bedtime.

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