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Influence of Academic, Lifestyle and Social Factors on the Levels of Stress, Anxiety and Depression among Undergraduate Students of Maldives National University

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ABSTRACT *Mental health concerns have been on the rise among students across the globe as well as among the student population of the Maldives. Therefore, this study aims to identify the factors associated with stress, anxiety and depression among the students of the Maldives National University. A cross-sectional study was employed among undergraduates at the Maldives National University. After data cleaning, 445 participants were included. A self-administered questionnaire assessed academic, demographic, lifestyle, and social factors. Problematic internet use was measured using the 6-item Problematic Internet Use Questionnaire - Short Form (PIUQ-SF-6), social support using the Multidimensional Scale of Perceived Social Support (MSPSS), and stress, anxiety, and depression using the Depression, Anxiety and Stress Scale-21 (DASS-21). Associations were evaluated using the chi-square test, and significant variables were further analyzed with bivariate logistic regression. A p-value <0.05 was considered statistically significant. Among the 445 participants, 80% showed mild to extremely severe depression, 81% reported mild to extremely severe anxiety, and 71% experienced mild to extremely severe stress. Gender was significantly associated with anxiety and stress, marital status with depression, and mode of study with stress. Academic dissatisfaction, academic pressure, and problematic internet use were strongly associated with stress, anxiety and depression, whereas social support was significantly associated with depression and stress. The findings highlight that demographic, lifestyle, social and academic factors play an important role in students' mental wellbeing. Strengthening university mental health services, and promoting healthy coping strategies are essential to reduce mental distress among students.*

Key Words: Depression, Anxiety, Stress, Undergraduates, Academic Factors

Introduction

Health is defined as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (Callahan, 1973). Though this definition encompasses mental health as one of the components of health, it has been consistently overlooked and stigmatized across different borders, countries, cultures, and communities. Before the 1900s, mental health was considered taboo, and individuals suffering from mental health conditions were often blamed for their struggles. These sufferings were treated as personal shortcomings - especially for men, who feared being emasculated and labeled as weak, and for women, who were frequently dismissed as hysterical and confined to institutions where they faced mistreatment, including shock therapy and imprisonment (Frank & Glied, 2006).

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Unfortunately, despite progress in mental health advocacy, these outdated beliefs and stigmas still persist in some parts of the world today.

Mental health is a critical aspect of overall well-being, yet it remains a significant challenge among university students. Studies indicate increasing rates of psychological distress in higher education settings worldwide. According to the World Health Organization (WHO), anxiety and depression are among the most common mental health disorders affecting students. In the Maldives, mental health concerns among university students have been understudied.

According to 2019 statistics published by the World Health Organization, approximately 970 million people globally were living with a mental disorder, with anxiety and depressive disorders being the most prevalent (WHO, 2022). The increasing prevalence of mental health issues makes it crucial to explore the factors influencing stress, anxiety, and depression among university students. The National College Health Assessment III, published by the American College Health Association in 2022, reported that more than 77% of surveyed students experienced moderate to severe psychological distress. Additionally, 35% of students were diagnosed with anxiety, while 27% reported experiencing depression (Acha-ncha III, 2022). A study conducted in the Maldives National University also indicated rising levels of anxiety among undergraduate students (Shanoora & Nawaza, 2018).

Given the high global and local burden of student mental health issues, it is essential to understand the factors contributing to stress, anxiety and depression among students of the Maldives National University. This study aims to determine the proportion of students experiencing stress, anxiety, and depression, and identify associated academic, lifestyle and social determinants. This study hypothesizes that there are significant associations between these mental health conditions and various demographic, academic, and behavioral factors.

Literature Review

Stress, anxiety and depression are frequently reported among undergraduate students worldwide (Mofatteh, 2021). This in turn may have a negative impact on future generations. Studies consistently show that anxiety tends to occur more often than depression (Shawahna et al., 2020). In a study conducted among undergraduate students of the Maldives National University, it was found that a total of 58.9% students had moderate to severe and above levels of anxiety, 28.3% had moderate to severe levels of stress & 28.9% had moderate to severe levels of depression (Shanoora & Nawaza, 2018).

Numerous determinants contribute to the levels of stress, anxiety and depression, including demographic factors such as age and gender (Mofatteh, 2021; Ramón-Arbués et al., 2020). A study conducted at Anhui Medical University of China indicate higher depressive symptoms among females than in males, 19.0% and 15.3% respectively (Xie et.al., 2019). Conversely, a nationwide study carried out among Chinese university students suggested the opposite, showing moderately high levels of Depression among males than female, 16.4% and 11.6%, respectively (Yu et al., 2022).

It is understood that a sudden shift in living conditions, such as moving away from family, presents unforeseen challenges which can ultimately cause a shift in

mentality. Numerous studies have established strong correlations between living situations and levels of stress, anxiety and depression. Mental distress was more prevalent among students living away from their families or students living in hostels (Amir Hamzah et al., 2019;Yu et al., 2022). Moreover, financial factors and employment status also contributed to the development of mental distress (Awan, 2019; Mohamad et al., 2021).

Throughout the transition period from high school to university life, students experience numerous challenges. Considering the academic factors, the year of study may be the strongest predictor of anxiety among university students (Amir Hamzah et al., 2019). Lucas Goodgame et al. (2022) states that first year students were more at risk for depression.

In addition to this, academic satisfaction is a contributing factor to stress, anxiety and depression (Lucas Goodgame et al., 2022). The field of study may also be an influential factor in the development of mental illnesses. Numerous studies have provided evidence that medical and health-related fields are more prone to stress, anxiety and depression (Lucas Goodgame et al., 2022; Shawahna et al., 2020). Furthermore, a cumulative literature review showed mental distress is less common among part time students (Limone & Toto, 2022).

The current advancements in modern technology have led to the identification of problematic internet use and physical inactivity as major health concerns and the symptoms of depression can be reduced by limiting the use of mobile phones and increasing physical activity (Xie et al., 2019). Unsatisfactory sleep quality is another factor observed among respondents experiencing depression (Islam et al., 2021; Wang et al., 2022). Mental distress was associated with sleep disturbance, including both excessive and insufficient sleep (Mamun et al., 2022).

As evident from the literature, having good social support decreases the likelihood of mental distress. Social support refers to the assistance provided by individuals within a person's social network, with the individual (the ego) at the center of this network. The quality of social support may vary depending on the source, intensity, and frequency of social interactions (Wang et al., 2022). As most of the college students are just entering adulthood, they might face emotional adjustments in the new environment, in addition to the academic challenges. Therefore, support from family, friends, and significant others enhances students' adjustment to university life and reduces psychological distress. Strong social networks help mitigate the pressures associated with academic and personal challenges (Lei et al., 2021).

College students represent a population at significantly higher risk of psychological distress compared to other social or age groups (Mofatteh, 2021). To address this, it is crucial not only to identify the factors affecting stress, anxiety and depression but also to offer feasible solutions that academic institutions could use to lessen its detrimental effects. Psychological distress may seriously jeopardize students' academic success and have an impact on their future job paths at the same time (Yu et al., 2022).

Methods

Research design

A quantitative, cross-sectional descriptive-analytical study was conducted to determine the proportion of depression, anxiety, and stress among undergraduate students at Maldives National University (MNU) and to identify the associated contributing factors. The study was conducted among students enrolled across different faculties and campuses of MNU. The university›s primary campus is situated in the capital city, Male›, with additional campuses in Kulhudhuffushi, Gan, Hithadhoo, and Thinadhoo.

A self-administered questionnaire was used to collect data on demographic, academic, lifestyle, and social factors. Depression, anxiety, and stress were measured using the DASS-21 scale. Chi-square tests were conducted to assess associations between categorical variables, and logistic regression was used to determine significant predictors of mental distress. Ethical approval was obtained, and informed consent was secured from all participants before data collection.

Sample and Methods

The study population comprised of undergraduate students enrolled at different faculties at the Maldives National University. A list of undergraduates with their respective emails was obtained from the Student Support Services for recruitment.

Using a single population proportion formula with a %95 confidence level, a %5 margin of error, and a prevalence rate of anxiety (%58.9) based on a previous study at MNU (Shanoora & Nawaza, 2018), the minimum required sample size was 465, including a %25 non-response rate. The final sample comprised of 445 participants after data cleaning.

To achieve the required sample size, a quota sampling method was used. The sampling process involved:

1. **Stratification by Region** – Participants were first categorized based on the campuses they were enrolled in.
2. **Stratification by Faculty** – Students were further stratified based on their faculty of study within each region.
3. **Proportional Selection** – The final selection of participants was proportionally allocated from each faculty.

The questionnaire was emailed to students, and researchers were positioned at various faculties to recruit participants in person. Data collection continued until the target sample size was reached. A total of 499 responses were received, and 445 valid responses were analyzed after data cleaning.

$$n = \left(\frac{z_2^{9^2} \times p(1-p)}{d^2}\right)$$

$$n = \left(\frac{1.96^2 \times 0.589(1-0.589)}{0.05^2}\right)$$

$$n = 371.998$$

Add 25% non-response rate = 464.98 = 465

Where:

n - Minimum sample size

p - Estimated proportion of evidence-based practice (58.9%)

d - Margin of sampling error tolerated (5%)

Inclusion and Exclusion Criteria

Inclusion Criteria:

1. Individuals aged 18 and above.
2. Students enrolled in undergraduate programs at Maldives National University.
3. Individuals willing and able to complete the questionnaire.

Exclusion Criteria:

1. Individuals below 18 years.
2. Courses less than one year in duration.
3. Individuals unwilling or unable to complete the form.

Study Tool

The study used a self-administered questionnaire (Appendix 2), which included the following sections:

- **Demographic Factors:** Age, gender, marital status, living arrangements, employment status, and source of funding for education.
- **Academic Factors:** Faculty, year of study, mode of study, satisfaction with academic performance, and academic pressure.
- **Lifestyle Factors:** Sleep patterns, physical activity, smoking habits, personal time, fruit and vegetable consumption, and Problematic Internet Use. Problematic Internet Use was measured using the 6-item Problematic Internet Use Questionnaire Short-Form (PIUQ-SF-6) (Demetrovics et al., 2016), a 5-point Likert scale assessing internet usage habits (Cronbach's alpha = 0.70, indicating acceptable reliability) (Chemnad et al., 2023).
- **Social Factors:** Social support was assessed using the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet et al., 1988). This 12-item scale evaluates perceived support from family, friends, and significant others, using a 7-point Likert scale. It has demonstrated high reliability in college students (Cronbach's alpha values: 0.91 for significant others, 0.87 for family, 0.85 for friends).
- **Mental Health Factors:** Depression, anxiety, and stress were measured using the Depression, Anxiety, and Stress Scale-21 (DASS-21) (Lovibond & Lovibond, 1995). The 21-item scale uses a 4-point Likert scale (0 = Did not apply at all, 3 = Applied most of the time) to assess emotional distress. DASS-21 has high reliability (Cronbach's alpha: 0.94 for Depression, 0.87 for Anxiety, 0.91 for Stress) (Antony et al., 1998). It is a screening tool, not a

diagnostic instrumen

Data Analysis

Following data collection, responses were exported to an Excel sheet for preprocessing. The data was cleaned and coded before analysis. The final dataset comprised 445 responses.

Data was analyzed using SPSS Version 23, applying the following statistical techniques:

- **Descriptive Statistics:** Used to calculate frequencies and percentages for categorical variables.

  Chi-Square Tests: Used to identify associations between categorical variables (e.g., gender and stress).

  Logistic Regression: Conducted to assess significant predictors among variables that showed statistical significance in the Chi-square tests.

To conduct Chi-square tests, depression, anxiety, and stress scores were dichotomized as follows:

"No Depression, Anxiety, or Stress" = Participants scoring **normal** on the DASS-21.

"Depression, Anxiety, or Stress" = Participants scoring **mild or higher** on the DASS-21.

A p-value of <0.05 was considered as statistically significant.

Results

Descriptive

A total of 445 undergraduate students from Maldives National University participated in this study. Of all the participants, 76.18% were females and 23.82% were males. The ages ranged from 18 to 45 years, and the majority of the students were single (83.15%), living with family (76.40%), and not working (71.69%).

Academically, the majority of the students were studying full-time (90%), with 63% being moderately satisfied with their academic performance. Additionally, 33% of the participants felt somewhat pressured about their academic performance.

Among lifestyle factors, the majority of the participants (75%) were at risk of problematic internet use. Approximately 47.4% of participants had high social support, while the rest had moderate or low support.

A summary of descriptive statistics is shown in Tables 1, 2, and 3.

Proportion of depression, anxiety and stress among participants

The study found that:

- 80% of participants exhibited mild to extremely severe levels of depression.
- 81% experienced mild to extremely severe levels of anxiety.
- 71% reported mild to extremely severe levels of stress.

These results indicate a high prevalence of mental distress among undergraduate students at the Maldives National University. Figure 1 presents the severity levels of stress, anxiety, and depression among participants.3.3 Factors influenced the level of depression, anxiety and stress

Chi-square tests were performed to identify associations between demographic, academic, lifestyle, and social factors with depression, anxiety, and stress (Tables 1, 2, and 3). The Pearson Chi-square asymptotic significance (2-sided) value was taken as the p-value for statistical significance.

The results showed the following significant associations:

Gender was significantly associated with anxiety ($p < 0.001$) and stress ($p = 0.007$). Female students reported higher anxiety and stress levels than males.

Marital status was significantly associated with depression ($p = 0.031$). Unmarried students showed higher depression levels compared to married students.

Mode of study was significantly associated with stress levels ($p = 0.001$). Students enrolled in full-time programs reported higher stress levels than those in blended or part-time programs.

Academic dissatisfaction and academic pressure were significantly associated with depression, anxiety, and stress ($p < 0.001$). Students who were dissatisfied with their academic performance or felt overwhelmed by academic pressure exhibited higher mental distress.

Problematic Internet Use was significantly associated with depression ($p = 0.020$), anxiety ($p < 0.001$), and stress ($p < 0.001$). Students at risk of excessive internet use had significantly higher mental distress.

Social support was significantly associated with depression ($p < 0.001$) and stress ($p < 0.001$). Students with high social support reported lower depression and stress levels compared to those with low or moderate social support.

The Chi-square values for these key associations are included in Tables 1, 2, and 3.

Table 1. Factors associated with Depression

			Levels of Depression				
			No Depression		**Depression**		
	Total (N)	**%**	**Total (N)**	**%**	**Total (N)**	**%**	**p value**
Demographic Characteristics							
Age							0.230
20 years and below	218	48.99%	39	17.89%	179	82.11%	
21 years and above	227	51.01%	51	22.47%	176	77.53%	
Gender							0.206
Male	106	23.82%	26	24.53%	80	75.47%	

Female	339	76.18%	64	18.88%	275	81.12%	
Marital Status							0.031
Unmarried	370	83.15%	68	18.38%	302	81.62%	
Married	75	16.85%	22	29.33%	53	70.67%	
Living arrangement							0.442
Lives alone or with friends	105	23.60%	24	22.86%	81	77.14%	
Lives with his/her family	340	76.40%	66	19.41%	274	80.59%	
Employment Status							0.357
Yes	126	28.31%	29	23.02%	97	76.98%	
No	319	71.69%	61	19.12%	258	80.88%	
Financial Support							0.245
Scholarship	204	45.84%	42	20.59%	162	79.41%	
Self-Funding	58	13.03%	16	27.59%	42	72.41%	
Family Support	183	41.12%	32	17.49%	151	82.51%	
Lifestyle Factors							
Sleep Time							0.709
Less than 7 hours	341	76.63%	66	19.35%	275	80.65%	
7-9 hours	95	21.35%	22	23.16%	73	76.84%	
More than 9 hours	9	2.02%	2	22.22%	7	77.78%	
Physical activities							0.908
Not Adequate	374	84.04%	76	20.32%	298	79.68%	
Adequate	71	15.96%	14	19.72%	57	80.28%	
Smoking							0.149
Yes	30	6.74%	3	10.00%	27	90.00%	
No	415	93.26%	87	20.96%	328	79.04%	
Personal Time							0.438
Less than 1 hour	100	22.47%	16	16.00%	84	84.00%	
1 - 2 hours	155	34.83%	35	22.58%	120	77.42%	
More than 2 hours	190	42.70%	39	20.53%	151	79.47%	
Fruits consumption							0.829
None	241	54.16%	49	20.33%	192	79.67%	
1-2 servings	193	43.37%	38	19.69%	155	80.31%	
3-5 servings	11	2.47%	3	27.27%	8	72.73%	

Vegetable consumption							0.089
None	173	38.88%	40	23.12%	133	76.88%	
1-2 servings	249	55.96%	43	17.27%	206	82.73%	
3-5 servings	19	4.27%	7	36.84%	12	63.16%	
More than 5 servings	4	0.90%	0	0.00%	4	100.00%	
PIUQ-SF-6							0.020
No risk	111	24.94%	31	27.93%	80	72.07%	
Risk of problematic internet use	334	75.06%	59	17.66%	275	82.34%	
Social Factors							
Social Support							<0.001
Low Support	41	9.21%	2	4.88%	39	95.12%	
Moderate Support	193	43.37%	24	12.44%	169	87.56%	
High Support	211	47.42%	64	30.33%	147	69.67%	

Table 2. Factors associated with Anxiety

			Levels of Anxiety				
			No Anxiety		Anxiety		
	Total (N)	%	Total (N)	%	Total (N)	%	p value
Demographic Characteristics							
Age							0.109
20 years and below	218	48.99%	35	16.06%	183	83.94%	
21 years and above	227	51.01%	50	22.03%	177	77.97%	
Gender							<0.001
Male	106	23.82%	34	32.08%	72	67.92%	
Female	339	76.18%	51	15.04%	288	84.96%	
Marital Status							0.237
Unmarried	370	83.15%	67	18.11%	303	81.89%	
Married	75	16.85%	18	24.00%	57	76.00%	
Living arrangement							0.559
Lives alone or with friends	105	23.60%	18	17.14%	87	82.86%	
Lives with his/her family	340	76.40%	67	19.71%	273	80.29%	
Employment Status							0.187
Yes	126	28.31%	29	23.02%	97	76.98%	
No	319	71.69%	56	17.55%	263	82.45%	

Financial Support							0.107
Scholarship	204	45.84%	43	21.08%	161	78.92%	
Self-Funding	58	13.03%	15	25.86%	43	74.14%	
Family Support	183	41.12%	27	14.75%	156	85.25%	
Academic Factors							
MNQF level							0.470
Level 4	144	32.36%	25	17.36%	119	82.64%	
Level 5	42	9.44%	9	21.43%	33	78.57%	
Level 6	60	13.48%	8	13.33%	52	86.67%	
Level 7	199	44.72%	43	21.61%	156	78.39%	
Campus							0.676
Male' campus	392	88.09%	76	19.39%	316	80.61%	
Other campuses	53	11.91%	9	16.98%	44	83.02%	
Faculty							0.601
Health related	219	49.21%	44	20.09%	175	79.91%	
Non-health related	226	50.79%	41	18.14%	185	81.86%	
Year of study							0.437
Year 1	195	43.82%	36	18.46%	159	81.54%	
Year 2	113	25.39%	23	20.35%	90	79.65%	
Year 3	96	21.57%	22	22.92%	74	77.08%	
Year 4	36	8.09%	3	8.33%	33	91.67%	
Year 5	5	1.12%	1	20.00%	4	80.00%	
Mode of study							0.105
Full time	402	90.34%	75	18.66%	327	81.34%	
Full time / Blended	34	7.64%	10	29.41%	24	70.59%	
Part time / Blended	9	2.02%	0	0.00%	9	100.00%	
Level of satisfaction with academic performance							<0.001
Very satisfied	43	9.66%	18	41.86%	25	58.14%	
Moderately satisfied	282	63.37%	54	19.15%	228	80.85%	
Poorly satisfied	120	26.97%	13	10.83%	107	89.17%	
Concerns regarding academic performance							<0.001
Overwhelmingly pressured	135	30.34%	8	5.93%	127	94.07%	
Somewhat pressured	145	32.58%	26	17.93%	119	82.07%	
I feel pressured but I am doing okay	116	26.07%	33	28.45%	83	71.55%	
Not so pressured	35	7.87%	10	28.57%	25	71.43%	

I feel no pressure at all	14	3.15%	8	57.14%	6	42.86%	
Lifestyle Factors							
Sleep Time							0.106
Less than 7 hours	341	76.63%	58	17.01%	283	82.99%	
7-9 hours	95	21.35%	24	25.26%	71	74.74%	
More than 9 hours	9	2.02%	3	33.33%	6	66.67%	
Physical activities							0.422
Not Adequate	374	84.04%	69	18.45%	305	81.55%	
Adequate	71	15.96%	16	22.54%	55	77.46%	
Smoking							0.897
Yes	30	93.26%	6	20.00%	24	80.00%	
No	415	6.74%	79	19.04%	336	80.96%	
Personal Time							0.172
Less than 1 hour	100	22.47%	13	13.00%	87	87.00%	
1 - 2 hours	155	34.83%	30	19.35%	125	80.65%	
More than 2 hours	190	42.70%	42	22.11%	148	77.89%	
Fruits consumption							0.602
None	241	54.16%	42	17.43%	199	82.57%	
1-2 servings	193	43.37%	41	21.24%	152	78.76%	
3-5 servings	11	2.47%	2	18.18%	9	81.82%	
Vegetable consumption							0.114
None	173	38.88%	36	20.81%	137	79.19%	
1-2 servings	249	55.96%	42	16.87%	207	83.13%	
3-5 servings	19	4.27%	7	36.84%	12	63.16%	
More than 5 servings	4	0.90%	0	0.00%	4	100.00%	
PIUQ-SF-6							<0.001
No risk	111	24.94%	41	36.94%	70	63.06%	
Risk of problematic internet use	334	75.06%	44	13.17%	290	86.83%	
Social Factors							
Social Support							0.630
Low Support	41	9.21%	8	19.51%	33	80.49%	
Moderate Support	193	43.37%	33	17.10%	160	82.90%	
High Support	211	47.42%	44	20.85%	167	79.15%	

Table 3. Factors associated with Stress

	Total (N)	%	Levels of Stress				p value
			No Stress		Stress		
			Total (N)	%	Total (N)	%	
Demographic Characteristics							
Age							0.442
20 years and below	218	48.99%	60	27.52%	158	72.48%	
21 years and above	227	51.01%	70	30.84%	157	69.16%	
Gender							0.007
Male	106	23.82%	42	39.62%	64	60.38%	
Female	339	76.18%	88	25.96%	251	74.04%	
Marital Status							0.390
Unmarried	370	83.15%	105	28.38%	265	71.62%	
Married	75	16.85%	25	33.33%	50	66.67%	
Living arrangement							0.936
Lives alone or with friends	105	23.60%	31	29.52%	74	70.48%	
Lives with his/her family	340	76.40%	99	29.12%	241	70.88%	
Employment Status							0.332
Yes	126	28.31%	41	32.54%	85	67.46%	
No	319	71.69%	89	27.90%	230	72.10%	
Financial Support							0.258
Scholarship	204	45.84%	64	31.37%	140	68.63%	
Self-Funding	58	13.03%	20	34.48%	38	65.52%	
Family Support	183	41.12%	46	25.14%	137	74.86%	
Academic Factors							
MNQF level							0.518
Level 4	144	32.36%	37	25.69%	107	74.31%	
Level 5	42	9.44%	15	35.71%	27	64.29%	
Level 6	60	13.48%	16	26.67%	44	73.33%	
Level 7	199	44.72%	62	31.16%	137	68.84%	
Campus							0.876
Male' campus	392	88.09%	115	29.34%	277	70.66%	
Other campuses	53	11.91%	15	28.30%	38	71.70%	
Faculty							0.838
Health related	219	49.21%	63	28.77%	156	71.23%	
Non-health related	226	50.79%	67	29.65%	159	70.35%	

Year of study							0.471
Year 1	195	43.82%	56	28.72%	139	71.28%	
Year 2	113	25.39%	35	30.97%	78	69.03%	
Year 3	96	21.57%	31	32.29%	65	67.71%	
Year 4	36	8.09%	8	22.22%	28	77.78%	
Year 5	5	1.12%	0	0.00%	5	100.00%	
Mode of study							0.001
Full time	402	90.34%	112	27.86%	290	72.14%	
Full time / Blended	34	7.64%	18	52.94%	16	47.06%	
Part time / Blended	9	2.02%	0	0.00%	9	100.00%	
Level of satisfaction with academic performance							<0.001
Very satisfied	43	9.66%	20	46.51%	23	53.49%	
Moderately satisfied	282	63.37%	91	32.27%	191	67.73%	
Poorly satisfied	120	26.97%	19	15.83%	101	84.17%	
Concerns regarding academic performance							<0.001
Overwhelmingly pressured	135	30.34%	11	8.15%	124	91.85%	
Somewhat pressured	145	32.58%	40	27.59%	105	72.41%	
I feel pressured but I am doing okay	116	26.07%	48	41.38%	68	58.62%	
Not so pressured	35	7.87%	21	60.00%	14	40.00%	
I feel no pressure at all	14	3.15%	10	71.43%	4	28.57%	
Lifestyle Factors							
Sleep Time							0.382
Less than 7 hours	341	76.63%	94	27.57%	247	72.43%	
7-9 hours	95	21.35%	33	34.74%	62	65.26%	
More than 9 hours	9	2.02%	3	33.33%	6	66.67%	
Physical activities							0.720
Not Adequate	374	84.04%	108	28.88%	266	71.12%	
Adequate	71	15.96%	22	30.99%	49	69.01%	
Smoking							0.463
Yes	30	93.26%	7	23.33%	23	76.67%	
No	415	6.74%	123	29.64%	292	70.36%	
Personal Time							0.270
Less than 1 hour	100	22.47%	23	23.00%	77	77.00%	
1 - 2 hours	155	34.83%	50	32.26%	105	67.74%	
More than 2 hours	190	42.70%	57	30.00%	133	70.00%	

Fruits consumption							0.312
None	241	54.16%	65	26.97%	176	73.03%	
1-2 servings	193	43.37%	63	32.64%	130	67.36%	
3-5 servings	11	2.47%	2	18.18%	9	81.82%	
Vegetable consumption							0.355
None	173	38.88%	49	28.32%	124	71.68%	
1-2 servings	249	55.96%	73	29.32%	176	70.68%	
3-5 servings	19	4.27%	8	42.11%	11	57.89%	
More than 5 servings	4	0.90%	0	0.00%	4	100.00%	
PIUQ-SF-6							<0.001
No risk	111	24.94%	51	45.95%	60	54.05%	
Risk of problematic internet use	334	75.06$	79	23.65%	255	76.35%	
Social Factors							
Social Support							<0.001
Low Support	41	9.21%	6	14.63%	35	85.37%	
Moderate Support	193	43.37%	42	21.76%	151	78.24%	
High Support	211	47.42%	82	38.86%	129	61.14%	

Bivariate logistic regression

For further analysis, bivariate logistic regressions were carried out for the factors that showed a significant association with Chi-squared test (Table 4). Females were more likely to have features of anxiety (OR=2.67 95% CI 1.61-1.41) and stress (OR=1.87 95%CI 1.18-2.96), compared to males. Being unmarried (OR=1.84 95% CI 1.05-3.24) increases the odds of depressive features. On the other hand, mode of study was not significant in the bivariate analysis. Participants who were poorly satisfied with their academic performance had higher odds for depression (OR=7.309 95% CI 2.92-18.31), anxiety (OR=5.93 95% CI 2.57-13.67) and stress (OR=4.62 95% CI 2.13-10.02). Moreover, participants who were overwhelmingly pressured regarding their academic performance were more likely to experience features of depression (OR=8.46 95% CI 2.48-28.78), anxiety (OR=21.17 95% CI 5.90-75.91) and stress (OR=28.18 95% CI 7.58-104.79). Participants with risk of problematic internet use had higher odds for depression (OR=2.74 95% CI 1.75-4.31), anxiety (OR=3.86 95% CI 2.34-6.36) and stress (OR=2.67 95% CI 1.61-4.42) compared to those who had no risk of problematic internet use. Furthermore, odds for depression (OR=0.12 95% CI 0.03-0.50) and stress (OR=0.27 95% CI 0.11-0.67) were reduced for participants having moderate social support than those having low social support.

Table 4. Crude odds ratio for factors associated with depression, anxiety and stress

Variables	Odds ratio (OR)	95% CI		P
		Lower limit	Upper limit	
Depression				
Marital Status				
Unmarried	1.844	1.050	3.235	0.033
Married	Reference	-	-	
Satisfaction with academic performance				
Very satisfied	Reference	-	-	
Moderately satisfied	1.978	1.005	3.896	0.048
Poorly satisfied	7.309	2.917	18.314	<0.001
Concerns regarding academic performance				
Overwhelmingly pressured	8.455	2.484	28.781	0.001
Somewhat pressured	3.433	1.10	10.737	0.034
I feel pressured but I am doing okay	1.969	0.63	6.12	0.242
Not so pressured	1	0.286	3.499	1
I feel no pressure at all	Reference	-	-	
PIUQ-SF-6				
No risk	Reference	-	-	
Risk of problematic internet use	2.581	1.09	2.981	0.021
Social Support				
Low Support	Reference	-	-	
Moderate Support	0.118	0.028	0.503	0.004
High Support	0.361	0.082	1.593	0.179
Anxiety				
Gender				
Male	Reference	-	-	
Female	2.667	1.609	4.419	<0.001
Satisfaction with academic performance				
Very satisfied	Reference	-	-	
Moderately satisfied	3.04	1.548	5.968	0.001
Poorly satisfied	5.926	2.569	13.669	<0.001
Concerns regarding academic performance				
Overwhelmingly pressured	21.167	5.90	75.905	<0.001
Somewhat pressured	6.103	19.088	19.088	0.002
I feel pressured but I am doing okay	3.354	10.41	10.41	0.036
Not so pressured	3.333	12.08	12.082	0.067
I feel no pressure at all	Reference	-	-	

PIUQ-SF-6				
No risk	Reference	-	-	
Risk of problematic internet use	3.86	2.34	6.359	<0.001
Stress				
Gender				
Male	Reference	-	-	
Female	1.872	1.183	2.961	0.007
Satisfaction with academic performance				
Very satisfied	Reference	-	-	
Moderately satisfied	1.825	0.954	3.493	0.069
Poorly satisfied	4.622	2.131	10.025	<0.001
Concerns regarding academic performance				
Overwhelmingly pressured	28.182	7.579	104.79	<0.001
Somewhat pressured	6.563	1.95	22.126	0.002
I feel pressured but I am doing okay	3.542	1.05	11.69	0.042
Not so pressured	1.667	0.435	6.38	0.456
I feel no pressure at all	Reference	-	-	
PIUQ-SF-6				
No risk	Reference	-	-	
Risk of problematic internet use	2.744	1.75	4.306	<0.001
Social Support				
Low Support	Reference	-	-	
Moderate Support	0.270	0.109	0.669	0.005
High Support	0.616	0.243	1.564	0.308

Discussion

Mental health problems in the undergraduate population have been on the rise due to various factors and challenges. Thus, the aim of this study is to explore the various factors that contribute to stress, anxiety, and depression among undergraduate students. Even though DASS-21 is not a diagnostic tool, it can be used as a screening tool to measure the prevalence or the proportion of depression, anxiety and stress. In this study, 71% had mild to moderate levels of stress, 81% had mild to extreme levels of anxiety and 80% of the participants had mild to extreme levels of depression (Shawahna et al., 2020; Mamun et al., 2022).

To our knowledge, there is only one study done to identify the prevalence of stress, anxiety and depression among undergraduate students in the Maldives National University. Compared to this study, the proportion of students with stress, anxiety and depression had increased substantially. However, this study was conducted in 2018 before the COVID-19 pandemic which had a significant impact on mental health among both the general population and the student population (WHO, 2022). Furthermore, psychological distress and prevalence of stress, anxiety and depression among the student population has increased followed by

the COVID-19 pandemic (Kavvadas et al., 2023). This can explain the increase in proportion of stress, anxiety and depression over the years.

Among the demographic factors, gender was significantly associated with anxiety and stress, where females are more likely to have both anxiety and stress. Similarly, previous studies have shown that females report higher levels of anxiety and stress compared to males (Shanoora & Nawaza, 2018; Xie et al., 2019). Furthermore, this study revealed that unmarried students were more likely to have depression. Similar findings were reported in a study done among university students of Greece, which revealed that unmarried students were at a higher risk of psychological distress in comparison to married students (Kavvadas et al., 2023). Contrary to these findings, some studies have shown that being engaged in a relationship was a contributing factor for mental distress and this was attributed to failure in spending time with their partners, financial distress and increased academic workload (Mamun et al., 2022).

Mode of study was found to be significant for stress in this research. Participants enrolled in full time courses were more likely to be stressed in comparison to part time students. This is in accordance with other studies which revealed that part time students were less likely to experience mental stress (Limone & Toto, 2022). It was reported in the study that these results may be explained by the fact that part-time students have more adjustability with their course (Limone & Toto, 2022).

Undergraduate students face numerous challenges in their endeavor to achieve academic excellence. Students are forced to navigate an unfamiliar environment; the shift from a high school setting to a university setting is a major change which comes with multiple stressors, leading to an increasing level of mental distress (Zada et al., 2021). In this study, there was a significant association between the academic pressure and academic performance and the increasing levels of anxiety, depression and stress among the study population. These findings are consistent with the other studies done in Italy, Emirates and Pakistan (Awadalla et al., 2020; Limone & Toto, 2022; Zada et al., 2021).

Considering lifestyle factors, most of the participants were getting less sleep than the recommended amount of time (Hirshkowitz et al., 2015). Even though sleep was not associated with stress, anxiety and depression in this study, getting adequate sleep can significantly reduce the risk of mental health problems (Wang et al., 2022).

One's dietary factors plays a role in the development of mental health problems (Głąbska et al., 2020). In this study most of the participants consumed no or less than 2 servings of fruits and vegetables and it was not associated with stress, anxiety and depression. Similarly, a STEP survey showed that people aged 15-44 years consumed less amounts of fruits and vegetables (Raheema Abdul Raheem, 2022). Even though this was not associated with stress, anxiety and depression, studies have shown that it is associated with mental health (Głąbska et al., 2020). Hence further studies are needed to identify the association and more importantly, the benefits of taking the recommended amounts of fruits and vegetables on mental health.

Majority of the study participants had a risk of problematic internet use which

is generally associated with depression, anxiety and stress (Mengistu et al, 2021). The bivariate regression analysis showed that compared to participants with no risk, the participants at risk were more likely to have depression, anxiety and stress. The relationship between depression and problematic internet use can be both ways as people with depression may use the internet as a coping mechanism and eventually become addicted to the internet (Mengistu et al., 2021).

In this study social support was associated with both depression and stress. Additionally, this study showed that having high social support decreases the likelihood of having depression and stress. A study done in Northern Tanzania showed that having social support reduces the odds of having mental distress (Mboya et.al). It has been established that high social support can benefit college students to secure their mental health and out of various sources of support family plays a key role (Mboya et.al). Furthermore, it has been reported that experiencing mental distress can come with prejudice and to overcome this family support plays an important role (Wang et al., 2020). Majority of the study participants were living with their family and had high social support, which could have played a role in the protective effect of high social support.

The findings correspond with global literature indicating substantial mental health challenges within university populations. Academic demands, problematic internet use, and insufficient social support were identified as significant determinants of stress, anxiety and depression. These findings underscore the necessity for comprehensive institutional mental health initiatives. Future research should explore longitudinal assessments of these factors.

Strengths and Limitations

The scope of the study has been restricted to undergraduate students currently undertaking courses at the Maldives National University, and therefore, the data may not reflect undergraduate students from other universities. Furthermore, it is possible for a student's situation to evolve throughout their university journey, however, this research solely focuses on the present status. As the questionnaire provided is through online methods, there is a possibility that the acquired data may be biased, in accordance with social acceptance (Mamun et al., 2022). However, as the questionnaire is self-administered, respondents can answer at their own convenience, reducing such bias. To the best of our understanding, this study is currently the only study conducted in the Maldives which explored the various factors affecting the mental health of undergraduate students.

Conclusion

It has been demonstrated through the study, that demographic, lifestyle, academic and social factors have an influence on the levels of depression, anxiety and stress among undergraduate students. This highlights the importance of prioritizing the students' mental health, which can ultimately lead to better outcomes with regard to academics as well as in all avenues of life. It is imperative that these associating factors are taken into consideration by universities to strengthen the student support services, including counseling services. This can be beneficial as social support was found to be a protective factor for depression and stress in this study. Furthermore, the awareness regarding coping strategies can be assessed

among first year students, which can strengthen the strategies to guide students through their university life and cope with the stressors in an efficient manner. It is recommended that further studies are conducted in a wider scope, including students from across other universities of the Maldives. Studies may also be conducted to enhance the understanding on how these factors influence students in the long term.

Declarations

Ethical Considerations

Prior to the conduction of the study, ethical approval from the National Health Research Council and Maldives National University was obtained to ensure adherence and compliance to ethical standards. Confidentiality was strictly maintained and the participation was entirely voluntary with informed consent obtained from all respondents. The data was gathered through an online survey, and the participants were provided with an information sheet, which consisted of information regarding the study purpose and confidentiality, along with a list of available mental health services with the contact details. Participants retained the right to withdraw from the survey at any point without facing any consequences. To ensure confidentiality, no information that identified the individual was collected. In order to implement data security measures, the data was stored on safe servers with access restricted to authorized researchers only. Moreover, data collected from this study will not be used in any further research and acquired data would be discarded within six months after publishing.

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Conflict of interests

The authors declare that they have no conflict of interest.

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