Depression, Anxiety and Stress Levels Among Allied Health Undergraduates in a Defence University, Sri Lanka

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Abstract

Background

Depression, Anxiety and Stress levels are considered indicators of psychological well-being. These mental disorders conflict with the healthy lives of young adults when entering critical life transitions like university life. Further, Allied Health Sciences undergraduates have been reported as a more vulnerable group in this regard. The main objective of this study was to assess Depression, Anxiety and Stress levels among the undergraduates of a defence university in Sri Lanka.

Methods

The study was conducted as a cross-sectional descriptive study among all the undergraduates (n=640) attached to FAHS, KDU. A general questionnaire was used to collect socio-demographic data, and DASS 21 was used to assess the level of stress, depression, and anxiety. The data analysis was performed using descriptive statistics, Spearman correlation test and Pearson Chi-square test in SPSS 25.0.

Results

The majority were reported, normal level of depression (64.9%), anxiety (59.5%), stress (72.3%). However, 35.1 %, 40.5%, 27.7% were having mild to extremely severe depression, anxiety and stress levels, respectively. A significant strong positive relationship was identified between depression and anxiety (r=0.707, p= 0.000), depression and stress (r=0.722, p= 0.000) and anxiety and stress (r=0.658, p= 0.000). The level of depression was statistically significant only with degree course (p=0.040). However, anxiety and stress levels had no significant associations with gender, academic year, and degree course. The current medical treatments had significant associations with depression (p= 0.002), anxiety (p= 0.000) and stress (p= 0.002). Moreover, history of psychological treatments had associations with anxiety (0.009) and stress (0.040).

Conclusion

The majority of the participants had 'normal' levels of depression, anxiety, and stress among the study population. However, frequent assessment of the undergraduates' psychological profiles is essential to make necessary interventions to enhance their mental health status.

Background

According to the World Health Organization, Health is defined as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity [1]. Most people confide in health as physical well-being and be free from diseases, and they neglect their psychological well-being [2]. Further, World Health Organization defines 'Mental Health' as a state of well-being in which the individual realises his or her abilities, coping with the everyday stresses of life, working productively and fruitfully, and can contribute to his or her community [3].
Mental disorders such as Depression, Anxiety, Stress consist of a wide range of issues with various symptoms. Moreover, they generally indicate conflicting emotions, behaviours, thoughts and relationships with others [3]. According to updated worldwide statistics, at present, 450 million people have a mental disorder [4].

Many mental health problems appear within 18-25 of age, particularly in a vulnerable developmental period in an individual's life. In young adults, mental health problems may conflict with their healthy lives when entering university life, which is considered a critical life transition in their educational life [5]. Therefore, undergraduates are identified as a particular risk group due to unpredictable lifestyle changes associated with new friendships and social norms [6].

Depression, anxiety and stress are common mental disorders among university students [7]. Physical and mental illnesses, absenteeism, substance abuse, diminished work efficiency and burnout may trigger elevated levels of depression, anxiety and stress among undergraduates [8]. According to the statistical studies, up to 60% of university students reported that they left universities without completing their degree programs due to depression, anxiety, and maladjustment [9]. Furthermore, excessive stress results in physical and mental health problems, which affect students' academic achievements, personal and professional development [10].

Allied Health Sciences students had reported as a more vulnerable group for depression, anxiety, and stress due to their learning environment [11]. Except for academic learning, Allied Health Sciences students have to achieve skills in laboratory and clinical settings and undergo both theory and practical or clinical examination, which may lead to a complex learning background [12]. Even though some degree of stress needs to trigger and encourage students to achieve their targets [13], the increased level of depression, anxiety and stress may cause reduced concentration, decreased level of problem-solving and decision making [14].

Even though plenty of research has been conducted on assessing depression, anxiety, and stress among allied health science undergraduates globally, the studies conducted in Sri Lanka are deficient specially, in a defence university. Further, when comparing with other universities in Sri Lanka, General Sir John Kotelawala Defence University (KDU) has a different academic and administrative environment due to different culture with the military setting. Therefore, the main aim of this study was to assess the levels of Depression, Anxiety and Stress among the undergraduates of FAHS, KDU.

**Methods**

**Data Collection**

The current study was carried out as a descriptive cross-sectional study at FAHS, KDU. All the undergraduates (N=679) study in all the degree courses (i.e., Nursing and Midwifery, Physiotherapy, Medical Laboratory Sciences, Pharmacy, Radiotherapy and Radiography) the FAHS, KDU were selected for this study and the undergraduates who have not consented to the study were excluded.
The data was collected in the mid of the semester to maintain the same academic environment for all FAHS undergraduates. The ethical approval for the study was obtained from the Ethics Review Committee (RP/S/2020/15), Faculty of Medicine, KDU, Sri Lanka and all methods were performed in accordance with the relevant guidelines and regulations. Further, the institutional approval was obtained from the Vice-Chancellor, KDU, and the Dean, FAHS, KDU. The study objectives and data collection process were discussed with all the heads of five-degree courses before the data collection. The informed consent was obtained online from the study participants before the data collection. Participation was voluntary, and the participants had the right to withdraw at any time without further explanation.

The data collection was conducted entirely online due to the prevailing COVID-19 pandemic situation of the country. The questionnaire was shared online among all the students in FAHS, KDU, by maintaining and ensuring their privacy and confidentiality. Furthermore, the consent for the study was obtained once the purpose and objectives were explained on the first page of the online questionnaire. Moreover, the participants who were willing to receive mental health support were encouraged to receive mental health services through an online shared leaflet shared during the data collection.

The questionnaires were not consisted any sensitive questions which would create psychological embarrassment/ trauma or to the undergraduates. The undergraduates were informed that they could leave from the study at any time, and departure from the study does not affect academic activities. Moreover, all participants' students were informed that their participation is voluntary, and there are no incentives or rewards for them for their contribution to the study. Furthermore, the participants were encouraged to ask further questions and clarify their concerns by contacting research investigators during the study by providing the contact details. The researchers assured the participants that all gathered data from the participants would be kept confidential and not released in public under any circumstance. The soft copies of all the data were stored and protected with a unique password, and hard copies generated were stored and kept locked in a secure place. After five years, all the data will be deleted to secure the participants' privacy and confidentiality.

**Study Instruments**

The study instrument consisted of two parts. The first part was a general questionnaire that assessed the socio-demographic data. The general questionnaire was translated into Sinhala by professional translators and back-translated to English by two professional translators. Then, a reconsolidated version was developed by the investigators with the discussion with the translators before use. A pre-test was conducted among 25 most recently passed out graduates of the FAHS, KDU, to determine whether it is acceptable, whether it is understood in the way it is supposed to, and whether the language used is appropriate and straightforward.

The second part of the online questionnaire consisted of Sinhalese validated version of Depression, Anxiety and Stress (DASS-21) and permission to use the scale was obtained from its developers [15]. In this Sinhala validation, the internal consistency of the subscales of depression, anxiety and stress in DASS 21 respectively reported as 0.83, 0.76 and 0.80 [15].
The emotional states of Depression, Anxiety and Stress were measured by DASS-21, which was designed with three self-report scales [16]. DASS-21 is the short version of the original DASS (Depression, Anxiety, and Stress Scale), consisting of 42 items. Depression (DASS-D), Anxiety (DASS-A), and Stress (DASS-S) scale consisted of DASS-21 with 21 items questionnaire. Moreover, DASS-21 items scored through a four-point Likert-type scale of 0 to 3, and each scale was multiplied by the sum of 2 to calculate total scores [12]. Once multiply DASS-21 by the sum of 2, check the severity level according to the table below (Table 01) [15].

**Data Analysis**

Data analysis was conducted using the Statistical Software SPSS version 23.0. Descriptive statistics were used to describe socio-demographic characteristics. The Shapiro-Wilk test was used to assess the normality of data distribution, and it was noted that the data was not normally distributed. Therefore, to examine the relationship between Depression, Anxiety and Stress, Spearman's correlation test was used. Further, to identify the associations between independent variables with the levels of Depression, Anxiety and Stress, Pearson's Chi-square test was used. Most of the socio-demographic characteristics were that more than 20% of cells had expected frequencies > 5. Therefore, Fisher's exact test was applied as an approximation method to analyse the small sample sizes. Alpha level of significance was set at < 0.05.

**Results**

**Socio-demographic data**

From the total population of 679 undergraduates, 640 undergraduates responded for the study forming a response rate of 94.25%. Majority of the sample consisted of females (75.8%; n=485). When considering the academic years, 26.6% (n=170) were from fourth year, 25.3% (n=162) were from first year, 24.2% (n=155) were from second year and 23.9% (n=153) were from third year. When considering the degree courses, 24.2% (n=156) were nursing undergraduates, 22.0% (n=141) were physiotherapy undergraduates, 20.0% (n=128) were Medical Laboratory Sciences undergraduates, 17.7% (n=113) were Pharmacy undergraduates, 9.4% (n=60) were Radiography undergraduates and 6.7% (n=43) were Radiotherapy undergraduates (Table 2).

Out of 640 participants, 10.5% had responded that they are currently under medical treatments. From the study participants, about 11.1% of respondents stated that they had undergone psychological treatment during their lifetime.

**Reliability of the Sinhalese version of DASS-21**

Cronbach's alpha reliability test was done to assess the internal consistency of the subscales of DASS-D, DASS-A and DASS-S. The test results showed a coefficient of 0.882, 0.819 and 0.859, for depression, anxiety and stress, respectively, indicating DASS-21 is a reliable measurement.

**Assessment of depression, anxiety and stress levels**
The mean scores of depression, anxiety and stress levels were 8.11 (SD±7.857), 6.93±6.764 and 11.45±8.199, respectively. According to the analysed data, the majority of the undergraduates were identified with 'normal' levels of depression (65.0%; n=416), anxiety (59.5%; n=381) and stress 72.3% (n=463) (Table 3). From the study population, 28.6% nursing, 36.2% physiotherapy, 35.2% Medical Laboratory Sciences, 31.7% Radiography, 37.2% Radiotherapy and 43.4% Pharmacy undergraduates showed mild to extremely severe depressive symptoms within their courses. Further, there were 35.1 % nursing, 41.8 % physiotherapy, 37.5% Medical Laboratory Sciences, 36.7% Radiography, 51.2% Radiotherapy, and 46.9% Pharmacy undergraduates presented with mild to extremely severe anxiety symptoms within their courses. Moreover, 22.7% nursing, 30.5% physiotherapy, 25.8% Medical Laboratory Sciences, 28.3% Radiography, 39.5% Radiotherapy, 28.3% Pharmacy undergraduates presented with mild to extremely severe stress symptoms within their courses.

**Relationship between depression, anxiety and stress**

There was a significant strong positive relationship between depression and anxiety (r = 0.707, p =0.000), depression and stress (r = 0.722, p =0.000) stress and anxiety (r = 0.658, p =0.000) (Table 4).

**Associations of socio-demographic characteristics with depression, anxiety and stress**

The level of depression was only statistically significant with degree course (p=0.040). However, anxiety and stress levels had no significant associations with gender, academic year, and degree course (Table 5). The undergraduates under current medical treatments had significant associations with depression (p= 0.002), anxiety (p= 0.000) and stress (p= 0.002). Moreover, psychological treatment during their lifetime had associations with anxiety (0.009) and stress (0.040) (Table 6 & 7).

**Discussion**

The main aim of the current study was to assess the levels of Depression, Anxiety and Stress among the Allied Health undergraduates in a defence university; therefore, undergraduates of the Faculty Allied Health Sciences, General Sir John Kotelawala Defence University was selected as the study population. Further, the associations between depression, anxiety, and stress with socio-demographic characteristics were assessed.

The majority of the current study respondents reported 'normal' levels of depression, anxiety and stress. Therefore, 35.1%, 40.5%, 27.7% of undergraduates were having mild to extremely severe depression, anxiety and stress levels, respectively. A similar study carried out among nursing undergraduates at the University of Peradeniya, Sri Lanka, have reported that the majority of the respondents reported mild to extremely severe symptoms of depression (51.1%), anxiety (59.8%) and stress (82.6%) [12]. In another Sri Lankan study, there was a high prevalence of stress among nursing undergraduates at the University of Sri Jayewardenepura, Sri Lanka [17]. In the current study, 28.6%, 35%, 22.7% of nursing undergraduates were having mild to extremely severe depression, anxiety, and stress levels. It shows that the depression, anxiety and stress levels are comparatively low among the nursing undergraduates of FAHS, KDU.
compared to the previous studies conducted among nursing undergraduates in Sri Lanka. The new reformations in nursing education in Sri Lanka, a healthy academic environment, high standard student counselling services, high infrastructure facilities, and high job security available for the undergraduates at the KDU might be the significant reasons for this difference. However, student counselling and student services improvements might be needful to increase the undergraduates' mental health.

Furthermore, this study found that strong significant positive Correlation between depression, anxiety and stress and this result is compatible with previous literature carried out in Sri Lanka[12] and other countries[18,19]. This strong Correlation also indicates increased risk for somatic modification in psychological health, increased persistence sensation of fear, apprehension, tension, and discomfort, leading to poor psychological well-being that would interfere and limit academic performance [18].

The degree course has been associated with depression, which could be attributed to the greater fear of not achieving undergraduates’ goals. It could be due to variations in the academic activities, hours of clinical placements, end semester academic-based examinations and laboratory-based and clinical examinations among different degree courses. Moreover, the current study did not find any significant association between gender and academic year with depression, anxiety and stress. Internationally there are numerous studies conducted to assess depression, anxiety and stress among undergraduates. These studies showed that depression, anxiety and stress are associated with gender[20], and in some similar studies compared to males, female undergraduates have a higher prevalence of depression, anxiety and stress [21]. Moreover, there was a significant association between levels of depression, anxiety and stress with the academic year in a study conducted among the nursing undergraduates at the University of Peradeniya, Sri Lanka [12].

The study further found that depression is significantly associated with the participants who were on medical treatments currently. Moreover, a history of psychological treatments is significantly associated with the level of stress and anxiety. Therefore, identifying the undergraduates' physical and psychological status is essential to developing their psychological health [12].

**Conclusions**

The findings conclude that majority of the participants had normal levels of depression, anxiety and stress. Moreover, the finding showed a significant solid positive relationship between depression, anxiety and stress. There was no significant association between depression, anxiety and stress with socio-demographic variables such as gender and academic year. However, it was noted that frequent assessment of depression, anxiety and stress levels is critical in identifying the undergraduates who need support in their academic life.

Poor mental health status has a significant influence on undergraduates' future; therefore, interventions should be developed and prioritised to enhance the mental health among the undergraduates FAHS in several areas; student services and support, academic learning methods, course design, environment, culture and communication and student society activities.
Declarations

Ethics approval and consent to participate

The Ethical approval for the current study was obtained from the Ethic Review Committee, Faculty of Medicine, General Sir John Kotelawala Defence University, Sri Lanka (RP/S/2020/15) and all methods were performed in accordance with the relevant guidelines and regulations. The informed consent was obtained online from the study participants before the data collection. Participation was voluntary, and the participants had the right to withdraw at any time without further explanation.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and analysed on the current study will not be shared public to preserve the privacy and confidentiality of the participants. However, the datasets from this study are available from the corresponding author upon reasonable request.

Abbreviations

FAHS: Faculty of Allied Health Sciences
KDU: General Sir John Kotelawala Defence University

Competing interests

The authors declare that they have no competing interests.

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Authors’ contributions

VBJP, SK, JPDK and HDSD participated in writing the proposal, data collection and writing. WGCK and NFJF participated in analysing data, interpreting data, and writing and submitting the article for publication. All authors read and approved the final manuscript.

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Tables

Table 1 Scoring system of DASS-21

| Severity levels | Depression | Anxiety | Stress |
|-----------------|------------|---------|--------|
| Normal          | 0-9        | 0-7     | 0-14   |
| Mild            | 10-13      | 8-9     | 15-18  |
| Moderate        | 14-20      | 10-14   | 19-25  |
| Severe          | 21-27      | 15-19   | 26-33  |
| Extremely severe| 28+        | 20+     | 34+    |

Table 2 Descriptive statistics for socio-demographic characteristics
| Demographic Characteristics | Number | Percentage% |
|-----------------------------|--------|-------------|
| **Gender**                  |        |             |
| Male                        | 155    | 24.2        |
| Female                      | 485    | 75.8        |
| **Academic Year**           |        |             |
| First –year                 | 162    | 25.3        |
| Second-year                 | 155    | 24.2        |
| Third-year                  | 153    | 23.9        |
| Fourth-year                 | 170    | 26.6        |
| **Degree course**           |        |             |
| Nursing                     | 156    | 24.2        |
| Physiotherapy               | 141    | 22.0        |
| MLS                         | 128    | 20.0        |
| Pharmacy                    | 113    | 17.7        |
| Radiography                 | 60     | 9.4         |
| Radiotherapy                | 43     | 6.7         |

Table 3 Distribution of depression, anxiety and stress levels among the respondents
| Category          | Number | Percentage | Mean ±SD |
|-------------------|--------|------------|----------|
| Depression        |        |            | 8.11±7.857 |
| Normal            | 416    | 65%        |
| Mild              | 105    | 16.4%      |
| Moderate          | 76     | 11.9%      |
| Severe            | 26     | 4.1%       |
| Extremely severe  | 17     | 2.7%       |
| Anxiety           |        |            | 6.93±6.764 |
| Normal            | 381    | 59.5%      |
| Mild              | 58     | 9.1%       |
| Moderate          | 132    | 20.6%      |
| Severe            | 30     | 4.7%       |
| Extremely severe  | 39     | 6.1%       |
| Stress            |        |            | 11.45±8.199 |
| Normal            | 463    | 72.3%      |
| Mild              | 70     | 10.9%      |
| Moderate          | 63     | 9.8%       |
| Severe            | 34     | 5.3%       |
| Extremely severe  | 10     | 1.6%       |

Table 4 Relationship between depression, anxiety and stress among the respondents

| Variables                                | r value | p-value |
|------------------------------------------|---------|---------|
| Correlation between Depression and Anxiety | 0.707   | 0.000   |
| Correlation between Depression and Stress | 0.722   | 0.000   |
| Correlation between Stress and Anxiety   | 0.658   | 0.000   |

** Correlation is significant at the 0.01 level (2-tailed).
Table 5 Associations of socio-demographic characteristics with depression

| Characteristic       | Category     | Frequency | p-value |
|----------------------|--------------|-----------|---------|
| Gender               | Male         | 155       | 0.138   |
|                      | Female       | 485       |         |
| Academic year        | First Year   | 162       | 0.779   |
|                      | Second Year  | 155       |         |
|                      | Third Year   | 153       |         |
|                      | Fourth Year  | 170       |         |
| Degree course        | Nursing      | 156       | 0.040   |
|                      | Physiotherapy| 141       |         |
|                      | MLS          | 128       |         |
|                      | Pharmacy     | 113       |         |
|                      | Radiography  | 60        |         |
|                      | Radiotherapy | 43        |         |
| Medical treatments   | Yes          | 67        | 0.002   |
|                      | No           | 573       |         |
| History of psychological treatments | Yes | 71 | 0.152 |
|                      | No           | 569       |         |

Table 6 Associations of socio-demographic characteristics with anxiety
| Characteristic                  | Category | Frequency | p-value |
|--------------------------------|----------|-----------|---------|
| Gender                         | Male     | 155       | 0.716   |
|                                | Female   | 485       |         |
| Academic year                  | First Year| 162       | 0.077   |
|                                | Second Year| 155       |         |
|                                | Third Year| 153       |         |
|                                | Fourth Year| 170       |         |
| Degree course                  | Nursing  | 156       | 0.367   |
|                                | Physiotherapy| 141       |         |
|                                | MLS      | 128       |         |
|                                | Pharmacy | 113       |         |
|                                | Radiography| 60        |         |
|                                | Radiotherapy| 43        |         |
| Medical treatments             | Yes      | 67        | 0.000   |
|                                | No       | 573       |         |
| History of psychological       | Yes      | 71        | 0.009   |
| treatments                     | No       | 569       |         |

Table 7 Associations of socio-demographic characteristics with stress
| Characteristic                      | Category       | Frequency | p-value |
|------------------------------------|----------------|-----------|---------|
| Gender                             | Male           | 155       | 0.656   |
|                                    | Female         | 485       |         |
| Academic year                      | First Year     | 162       | 0.967   |
|                                    | Second Year    | 155       |         |
|                                    | Third Year     | 153       |         |
|                                    | Fourth Year    | 170       |         |
| Degree course                      | Nursing        | 156       | 0.463   |
|                                    | Physiotherapy  | 141       |         |
|                                    | MLS            | 128       |         |
|                                    | Pharmacy       | 113       |         |
|                                    | Radiography    | 60        |         |
|                                    | Radiotherapy   | 43        |         |
| Medical treatments                 | Yes            | 67        | 0.002   |
|                                    | No             | 573       |         |
| History of psychological treatments| Yes            | 71        | 0.040   |
|                                    | No             | 569       |         |