PSYCHOLOGY AND EDUCATION (2021) 58(4): 23-30
Article Received: 08th October, 2020; Article Revised: 15th February, 2021; Article Accepted: 20th March, 2021

Development of New Tool to Measure Depression among Professional Undergraduate University Students

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Abstract:
Aim: The present study focused on determining the prevalence of depression among undergraduate university students. It also compared the level of depression in first and graduating year students.
Methods: A validated questionnaire MBS was developed which includes the demographic characteristics and depression scale. This questionnaire was distributed to 1638 students of five departments- Allied health science, Nursing, Pharmacy, Hospitality and Architecture of two universities. Analysis was done using SPSS software.
Results: The present study showed that 81.7% students were identified having depression with different levels. Females were found more depressed with 46.05% in comparison with male students 29.18%. The level of depression was more severe in females (3.6%) than males (1.8%). The significant difference was observed in levels of depression among different academic level of students (fresher, juniors, senior and graduating). The graduating students were identified for having severe depression in comparison with freshers.
Conclusion: The present study showed that the students identified as severe depressed were also clinically verified by the psychiatrists to be depressed hence validating the results. Female students were more depressed than males. The developed MBS questionnaire can be very handy in determining the severe depression cases in educational institutes as a pre- clinical tool.

Key Words: Depression; Professional undergraduate; University students; Tool development; Prevalence

Introduction:

The prevalence of depression and mental health conditions are expanding exponentially day by day at global level. Depression is one of the most common illnesses worldwide. According to WHO fact sheet 2020 there are more than 300 million people affected with depression worldwide [1]. Depression can be differentiated from mood swings or short termed emotional acts by being long lived responses with high severity. Depression may lead to poor functioning at work, school and family resulting in great sufferings. Most extreme effect of depression could be suicide. In the age group of 15-29, depression is a leading reason for suicide [2]. Keeping this in mind, effective treatments for depression are made

available for the concerned person, however the treatment could reach to actual affected population. Several reasons such as limited resources, proper-trained health professional and stigma associated with mental disorders lead to this limited access to the treatment to affected ones and imprecise measurement of depression [3].

The incorrect measurement of depression, most of the affected persons could not be diagnosed accurately and on time. Sometimes this inaccurate assessment can also lead to wrong diagnosis and medication to the people who are not depressed, thus lead to situations, which are much more serious.

Literature Review

Numerous assessment studies suggest the accurate assessment of the people suffering from depression. The most common assessment methods include telephonic and in-person communication with the patient using *Beck Depression Inventory Questionnaire and PHQ-9 Questionnaire* for assessment of depression worldwide. García-Batista *et al.* [4] conducted a study on general and hospital population of Dominican Republic to test the internal consistency of the Beck Depression Inventory (BDI-II), however this study could not differentiate between depressed and non-depressed subjects. This study may suffer from social and personal biasness and suggested that revised BDI-II could mislead the purpose and involved the factors that unable to identify the symptoms of depression. Similarly, Lee *et al.* [5] and Gary *et al*. [6] used BD I-II as screening measure among African women and Korean adolescents respectively and reported much-unexpected finding of having lowest depression in females. However, no clinical trials were measured or treated after identification of depressed population, whereas Korean Adolescents results were required to be compared with that of clinical adolescents for better results. Similar studies were performed on general population of Finland by Nuevo *et al*. [7], medical students in India by Kumar *et al*. [8], High school students in US by Linda *et al*. [9] college students in Brazil by Andrade *et al*. [10], Chronic back pain patients from a tertiary rehabilitation centre by Wesley *et al*. [11] and observed that present results can't be utilized for population under clinical or institutional settings or age groups which were studied in this study.

Likely, BDI-II the Patient Health Questionnaire (PHQ-9) is globally accepted and used measurement tool for depression testing in clinical setting. PHQ-9 is also self-administered questionnaire having 9 items and patient is required to tick the most suitable option. Based on overall score, the clinician diagnoses the depression; however, physical factors and history are also needed for making final decision by clinicians. Several studies were conducted to identify the classification of depression using PHQ-9. Most of the studies include public as well as the patients suffering from various diseases as the target respondents to assess the depression with PHQ-9. Hinz *et al*. [12] performed psychometric study with PHQ-9 on public and patients having cancer. The results showed that the PHQ-9 lacks in one-dimensional confirmatory factor analysis (CFA) in patient's sample. Udedi *et al*. [13] focused on determining the understanding and specificity of the PHQ-9 in the type-2 diabetes mellitus patients in Malawi. The study concluded that PHQ-9 has accuracy of 81% in determining the depression among the patients and requires the additional diagnostic assessment for confirmation. Forkmann *et al*. [14] performed CFA and Rasch analysis using PHQ-9 on elder German population for assessment of depression severity. This concluded the limited use of PHQ-9 as diagnostic algorithm rather than a scale. Numerous studies have used PHQ-9 for assessment of depression severity worldwide. Few of the benchmark studies e.g. Adewuya *et al.* [15]

on Nigerian University Students, Pence *et al*. [16] on HIV-infected patients in Cameroon, Munoz-Navarro *et al.* [17] on adult patients in Spanish primary care centres, Pinto-Meza *et al.* [18] on respondents from two primary care centre in Barcelona, Carey *et al.* [19] on adult patients attending 12 urban general practices in Australia and Malpass *et al.* [20] on general practice patients in Bristol shows the widespread use of PHQ-9 as the diagnosis tool for depression severity. As it is evident from the review conducted in the existing studies, none of the them guarantees the inclusion of all the problems related to depression severity. In addition, PHQ-9 suffers with identification of the size or extent of a problem with particular items on the questionnaire due to cognitive interviewing as a methodological approach. In addition, the studies suggest that the factors for assessing the depression severity may be affected by the socio-economic and demographic variables of the respondents hence they need to be considered before the administration of PHQ-9 as an instrument for the assessment of depression severity. Therefore, there is a need to identify and overcome the shortcoming of the existing studies related to BDI-II and PHQ-9 in detection and treatment of depression patients worldwide.

MBS Questionnaire for identification of depression patients

The following shortcomings of BDI-II and PHQ-9 were identified by conducting an extensive literature review

1. Both BDI-II and PHQ-9 suffer from self-bias problem as they are to be filled by the patient itself.
2. They only produce a binary outcome based on patient's score of questionnaires.
3. PHQ-9 can only be used to detect the major depressive syndrome and needs additional clinical information to detect major depressive disorder leading to suicidal complications in the patients.

To overcome the above shortcomings, MBS questionnaire was developed for detection of depression patients. Over 700 clinicians, academicians and researchers working in the field of depression detection and management were identified and interviewed for checking the implication and importance of MBS questionnaire. The study was conducted at two of the prominent private university in Northern India for higher education having professional courses in 11 faculties including Engineering, Management, Healthcare, Pharmacy and Education.

Methodology

The present study was conducted at two private universities, Punjab, India. The respondents of the study were undergraduate students of five different programs namely Allied Health Sciences, Nursing, Pharmacy, Hospitality and Architecture. All students participating in study were regular students. Students already diagnosed with any mental ailment or seeking professional help were excluded from the study.

The MBS questionnaire was developed using Beck Depression Inventory and PHQ-9 questionnaire as baseline and broadening it based on literature review. MBS questionnaire was validated after extensive literature review and in-depth interviews of researchers, academicians and clinicians to check its implications and importance in India. The questionnaire was pilot tested for reliability and validity was done on 140 (10% of total sample) participants. The responses were measured on a Likert scale of 1-5, 1 being least important and 5 being the most important. The total score was calculated and categorised into following 4 categories as shown in table 1.

The Cronbach's alpha for pilot study was found to be 0.754 and face validity was good. All the respondents perceived the questionnaire well and

instructions were clear. The respondents were able to complete the questionnaire in 2-3 minutes. The questionnaire was distributed to all the students of above programs using online mode. The questionnaire was filled by 1638 students of five branches from both universities. Only email id was collected as the unique identification of the respondent. The students were asked to fill the questionnaire on will and no restrictions were imposed to fill up the questionnaire. These were the special precautions taken so that the problem of bias answering is minimised. The coding of responses was done for carrying out the analysis. Data pre-processing was done to filter the invalid responses. After pre-processing, 1410 responses were found complete and correct rest 228 were rejected and not considered for further analysis. The data was analysed using Rapid Miner and SPSS software. The respondents who scored more than or equal to 25 were recommended to visit the specially appointed qualified psychologist present within university for validation using clinical trials. Respondents were provided with the clinical assistance sponsored by the universities and were not charged for any consultation fee.

Results

Total 1638 respondents from both the universities participated in the present study. Out of 1638 responses, recorded 1410 were found complete and included in the study. The mean age of participants was 17.54±1.02 years with maximum number of students varied from 16 to 18. Out of total 1410 students, 64.9% (916) were female and 35.1% (494) male. The various demographic features are shown in tabular form in table 2.

The respondents of the study were classified based on departments viz. Allied Health Sciences, Nursing, Pharmacy, Hospitality and Architecture. Respondents from Allied health department were maximum (451, 31.99%) followed by Nursing (349, 24.75%), Pharmacy (330, 23.4%), Hospitality (169, 11.99%) and Architecture (111, 7.87%) undergrad students. For checking reliability of scale, Cronbach's alpha was used, which was 0.72 and considered as satisfactory internal consistency [21].

Depression was measured using 21 items of new validated scale. The combined score of less than or equal to 8 was considered as normal (no depression), 9-16 score as mild depression, 17-24 as moderate score and more than 25 score as severe depression. The mean for depression in present study was 10.24 ± 4.10 with values of skewness and kurtosis close to 1, which represents that current data can be analysed using parametric tests. Out of all participants, 47.8% students were in mild depression, 22.1% in moderate range, 24.7% in no depression range and 5.4% in severe depression range.

To formulate the hypothesis of our study few benchmark studies in the relevant field were reviewed. The studies conducted by [22, 23] showed that the prevalence and level of depression was more in female than male students. Yet, in literature, there are few studies where males were found to be more depressed than female as identified by Khan *et al*. [24]. In addition, the depression was found more prevalent in graduating batch when compared with fresher batch [25]. In accordance to the relevant literature review the hypothesis of our study were as follows

Hypothesis 1: Female will have more depression than male

Hypothesis 2: Graduating Batch will have more depression than fresher batch

The hypothesis -1 testing, was found statistically significant (X2 = 1.64, F = 3.12, p = 0.028) with the frequency of depression in females were 46.05% in comparison with 29.18% in males. Further, the severity of depression was also significantly high in females (3.6% in females vs 1.8% in males; p=0.015). Hence, the female students are more depressed than male students.

The hypothesis-2 was found statistically significant (X2 = 8.77, DF = 2.7, *P* = 0.03) with the frequency of depression in graduating students

(92.46%) vs fresher students (65.6%). Further, the seniors (96.81%) have significantly more depression than juniors85.92%), (Figure 1). This result depicts that all the groups behave differently for depression and levels of depression is different among all. With the academic progression, the stress also enhanced in graduating as compared to fresher and senior batch in comparison to junior batch. Hence, the hypothesis 2 is accepted. From the results of some previous cases happened in numerous academic setups, there's some indirect evidence that may be prove the requirement and importance of the findings of present study for today's generation and professionals. The tendency of suicide is more in students with depression.

It was also observed that severe cases of depression are more in 20 age group (P=0.0315) which represents the severity of depression enhanced with age (Figure 2).

Students of departments Allied health sciences, pharmacy and nursing were found more depressed than students of hospitality and architecture departments (P=0.003) (Figure 3).

Conclusion:

The results of the MBS Questionnaire are encouraging and in accordance to the previous benchmark studies. The MBS questionnaire is validated and as the study concludes, it can be used as depression identification and screening tool in clinical settings. The students identified as severe depressed were also clinically verified by the psychiatrists to be depressed hence validating the results. The MBS questionnaire is easy to administer and can be used in educational settings to identify the severe depression cases. The MBS Questionnaire can be handy in such scenarios and educational institutions, mentors and parents can be benefitted using this as pre-clinical screening tool.

Acknowledgements

The authors acknowledge Rajlaxmi Swain, Tamana, Zarka Wani, Yehya Yaqoob, Basharat Mir, Nazira Navi Bhat who were the students of Chitkara School of Health Sciences, Chitkara University, Punjab for helping in data collection.

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Article Received: 08th October, 2020; Article Revised: 15th February, 2021; Article Accepted: 20th March, 2021

Table 1 Depression category on basis of scores in Questionnaire

Respondent Score in MBS Questionnaire	Depression Level of the respondent
0-8	No Depression
9-16	Mild Depression
17-24	Moderate Depression
>= 25	Severe Depression

Table 2 Demographic characteristics of the respondents

Age		
Age (year)	N	Frequency
16	289	20.50
17	518	36.74
18	476	33.76
19	127	9.00
Gender		
Female	916	64.9
Male	494	35.1
Department(s)		
Allied health	451	31.99
Pharmacy	330	23.40
Nursing	349	24.75
Hospitality	169	11.99
Architecture	111	7.87

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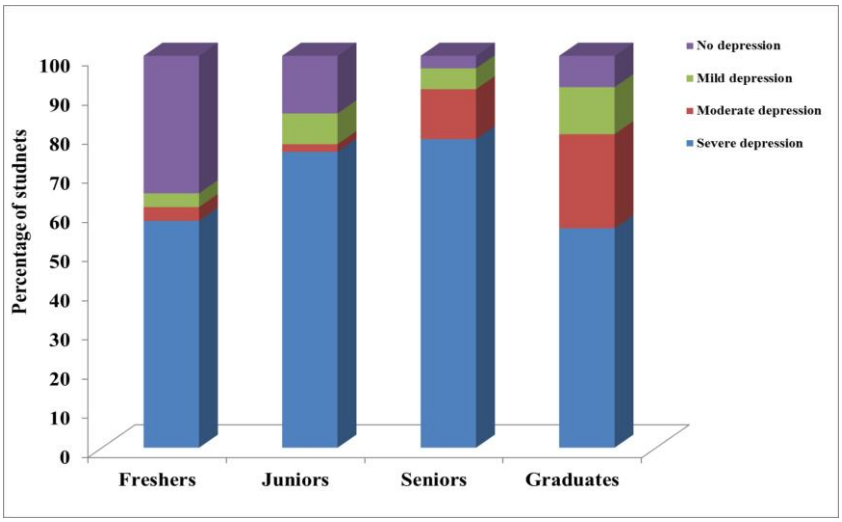

Figure 1 Severity of depression among different groups of students

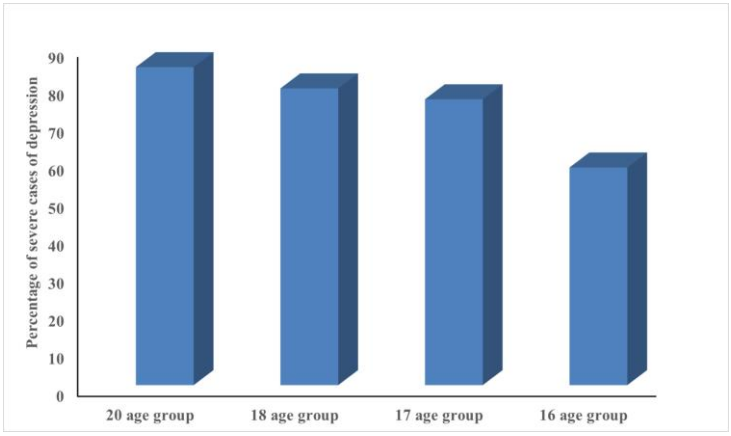

Figure 2 Percentage of severe depression among different age groups

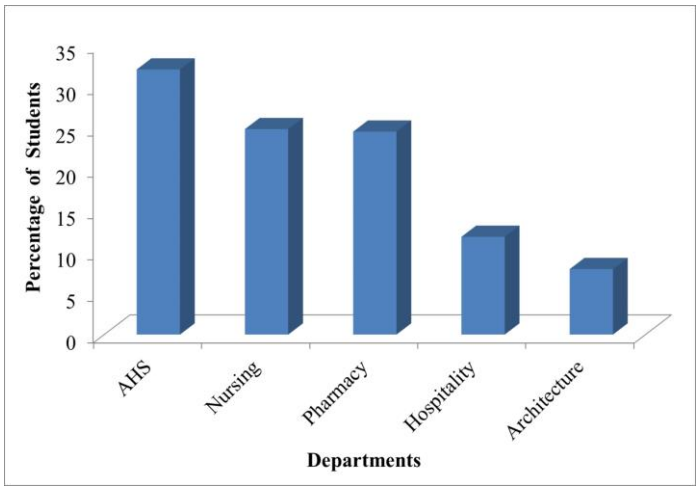

Figure 3 Percentage of students of different departments under severe depression