


Adult first-year students' reports of depressive symptoms at a rural South African university

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Abstract

Depression is a significant mental health issue affecting university students, especially those in their first year of study. Unfortunately, much of the research has focused on students in the adolescent stage of development. This study, which is part of a larger project, sought to explore depressive symptoms in older students. We administered the University Student Depression Inventory (USDI) to a sample of 318 undergraduate first-year students between 22 and 54 years at a rural-based university in the KwaZulu-Natal province of South Africa. The sample comprised mainly women (64.2%). We examined depressive symptom prevalence, gender, rural/urban background, and age effects. The results showed that men and rural students reported significantly more depressive symptoms, with 7.9% of the sample reporting thoughts of suicide and 16.7% questioning whether life is worth living, most or all of the time. Almost one-quarter (24.5%) of the participants stated that they spend more time alone than they did previously, and 17.9% reported loss of interest in previously enjoyed activities. Although the participants reported fewer depressive symptoms overall, compared to an earlier study of adolescent university students, the present findings raise concern. Considering that almost one-quarter of the participants reported a loss of interest (which is a critical symptom of depressive illness) and one in six questioning whether life is worth living, the need for active interventions, support and prevention programmes for students at universities is an urgent matter.

Keywords

Depression, mental health, rural, student, suicidal, urban

Depression in university students is a matter of great concern and one that has significant consequences, especially considering the associated suicide ideation, academic decline, and even drop-out from higher education studies. To date, much of the research in this area has been conducted on undergraduate students, mostly in the adolescent stage, who are faced with new developmental challenges, very different academic environments, increased work load, self-study expectations, and often very significant financial pressures (Pillay et al., 2020; Shamsuddin et al., 2013). These stresses have been associated with the onset of mental health problems, including depression, suicide ideation, feelings of hopelessness, helplessness, sleep deprivation, and other signs such as low self-esteem (Bouteyre et al., 2007; Pillay et al., 2020; Richardson et al., 2017).

In recent years, our universities have become increasingly aware of the mental health challenges facing students, and this is an issue that we must take seriously. At one university, for instance, more than 20 students attempted suicide during the exam period in 2018 (Kgosana, 2020). The interplay between poor emotional health and academic failure is a significant one, suggesting a two-way relationship (Ibrahim et al., 2013). Negative emotion and the inability to cope often lead to thoughts of suicide and even substance abuse, with men showing higher rates of substance dependence (Garlow et al., 2008; Richardson et al., 2017). A recent South African study of students (mean age 18.9 years) at two universities in large metropolitan areas noted a 12-month prevalence for suicide ideation of 40.9%, with women and Black students at increased risk (Bantjes et al., 2021). Another South African investigation found that 'severe' depressive symptoms using the Beck Depression Inventory increased from 3.81% in 2016 to 12.63% in 2019 (Rousseau et al., 2021).

The National Survey on Drug Use and Health in the United States showed that individuals in the 18- to 25-year age-band had a higher prevalence of Major Depressive Episodes across the life span (Center for Behavioral Health Statistics and Quality, 2018). Similarly, the American Psychiatric Association (2013) noted that the incidence of Major Depressive Disorder (MDD) peaks during the early 20s. This may suggest that being an older student could be a protective factor against depressive symptoms to some degree.

However, not much research has focused on depressive symptoms in more mature students, that is, adults. This is unfortunate because adults have more life responsibilities than adolescents do, and the expectations of adults are considerably greater given the broader level of responsibility that they generally carry. Like earlier stages of development, the emergence of adulthood brings its own challenges and developmental stage-specific demands that adults have to successfully navigate. Ordinarily this includes work, providing for families and associated responsibilities. Wood et al. (2018) describe this period as one in which there is decreasing support from family and others that the individual has been accustomed to in earlier years. They add that, excluding infancy, no other life stage involves such complex and dynamic changes on multiple levels of engagement with the world. The decision to further their education, therefore, may bring additional strain, that the individual has not anticipated. Attempting to juggle various competing demands including personal, financial, familial, and time constraints, while maintaining emotional and mental stability throughout their study period, can be taxing (Dawborn-Gundlach & Margetts, 2018).

Older students may have greater financial responsibilities, including financing their own education. According to Richardson et al. (2017), financial trouble is a predictor of depression in university students. Taking care of a family or contributing to family expenses can be an additional burden for students in the older age group. This poses added pressure for students to complete their courses in the minimum time, amid familial responsibilities, and some may be holding jobs simultaneously. Khawaja and Duncanson (2008) noted that, despite the expected developmental stress-level peak in the middle age group 30–56 years, their study did not find significant differences.

Depression and other mental health problems are more prevalent and challenging in the first year of university study (Islam et al., 2022; Pillay et al., 2020), which is understandable, given the sudden changes in academic demands, learning environments and the inherent pressures. Older students entering a first-year class are more likely to have had a study discontinuation period between school and university, and are very likely to find themselves surrounded by much younger students. They may feel a sense of social dislocation and loneliness in the context of the majority student body which is usually in a different life stage and social position (Dawborn-Gundlach & Margetts, 2018). This situation may pose adjustment difficulties and carry the added pressure to succeed and prove their worth within classes of younger (mainly adolescent) students.

With this context of student mental health in mind, we were interested in understanding the extent and pattern of depressive symptom presentation in adult university students. Since this study is part of a larger project that also investigated depressive symptoms in adolescent students up to 21 years of age (Pillay et al., 2020), this study sought to report on data that were collected on depressive symptoms in students aged 22 years and older, and specifically students attending a rural-based university in South Africa. Considering the challenges facing tertiary education in

rural-based institutions, the general disadvantage experienced by students, and the value of such learning environments in contributing to the country's development especially in rural communities (Edwards, 2015), we believed that such a research context would contribute very meaningful data. Also, in a country like South Africa, with the hardships faced by rural communities as a result of apartheid and the lack of development in those areas, it is important to recognise that education is vital for people to get out of poverty. At the same time, the challenges of daily life in rural communities pose many barriers to education, health, and social development, and we see the value of this study in that context.

Method

Participants

The present investigation is part of a larger project on depressive symptoms in university students. The sample for this study comprised participants in an undergraduate first-year psychology class at a rural-based university in KwaZulu-Natal, South Africa, who were 22 years or older. We enrolled a total of 318 participants who met these inclusion criteria, and the sample included 204 (64.2%) women and 114 (35.8%) men. The mean age was 25.3 years ($SD=4.59$) with a range between 22 and 54 years.

Instrument

We used the 30-item University Student Depression Inventory (USDI) to assess students' reports of depressive symptoms. The instrument, developed by Khawaja and Bryden (2006), is a self-report inventory that requires participants to respond to items assessing the presence of depressive symptoms experienced over the preceding 2 weeks. The USDI uses a 5-point Likert-type scale that ranges from 1 (*not at all*) to 5 (*all of the time*), and includes items such as 'The activities I used to enjoy no longer interest me'; 'I have thought about killing myself'; and 'My mood affects my ability to carry out assigned tasks'. The total score could range between 30 and 150 with higher scores indicating the presence of more depressive symptoms. The USDI has been used successfully in various parts of the world (Khawaja & Duncanson, 2008; Lee et al., 2013; Pillay & Bundhoo, 2015), and permission to use this instrument has been granted to the project leader of our larger study on university student depression. A Cronbach Alpha of $\alpha=0.88$ was achieved in this study, suggesting good internal consistency. The USDI was used in its original English text, and earlier use of the instrument in the same institutional context confirmed that students were able to comprehend the items (Pillay et al., 2020).

In addition to using the total USDI score as an indication of overall depressive symptoms, earlier studies, from which the present data are drawn, also found individual items (e.g., suicidal ideation; loss of interest; feelings of worthlessness) helpful in identifying the proportion of the sample reporting specific depressive symptoms (Pillay & Bundhoo, 2015; Pillay et al., 2020). Many of these symptoms are also regarded as critical symptoms of depression, including for the diagnosis of conditions such as MDD (American Psychiatric Association, 2013). It was, therefore, decided to follow that approach and examine specifically items scored 4 or 5 (i.e., 'symptoms present most of the time' or 'symptoms present all of the time'), namely responses reflecting more severe depressive symptoms.

Procedure

Students in an undergraduate first-year psychology programme were informed of the study, and offered the opportunity to participate. Only students aged 22 years and older were included in this data set, given our specific interest in the reporting of depressive symptoms in older students. The

instrument was administered with minimal interference on academic time. Following the preliminary information briefing and explanations about the study, students were given an information sheet specifying the study's nature and purpose. Thereafter, consent forms and questionnaires were provided to those who agreed to participate, with the instruction that the questionnaires should be completed without names or other identifying details being included. Participants were then requested to fold the questionnaires and deposit them into a box that we had placed in a common area. This approach was used as further reassurance that the process guaranteed anonymity for participants.

Ethical considerations

Ethics clearance for the investigation was obtained from the University of KwaZulu-Natal Human and Social Sciences Research Ethics Committee as part of our larger project on student depression (Pillay et al., 2020). Participants were initially informed about the study and that it was voluntary in nature, noting that they should respond in an anonymous manner. They were advised that they could withdraw from the study at any time without consequence and that psychological intervention opportunities would be made available to them should they need it. Since participation was anonymous, it was not possible to identify those participants with high depression scores. However, both before and after the questionnaire administration, the researchers advised participants of the opportunity for psychological assistance should they feel the need.

Data analysis

The data were analysed using SPSS v27 (IBM Corp., 2020). Descriptive statistics were computed. To explore any possible interaction effects as well as to examine significant differences across the independent variables, we used chi-square tests and *t*-tests. In addition to analysing the present adult student data, we compared these data with earlier published adolescent university student data from the same university (Pillay et al., 2020) to examine the possible effects of age and developmental status. Significance level was set at $p < .05$.

Results

Table 1 shows the mean USDI scores for the total sample, as well as for the gender, geographic background, and age group breakdowns (i.e., participants less than 25 years of age versus those equal to or over 25 years). The decision to divide the group into those over and under 25 years was based on the resulting mean age of 25.3 years, which made this a convenient and meaningful cut-point. Also, the authors were interested in examining possible developmental variations that may manifest in the depressive symptoms, and dividing into two age groups facilitated that process. Participants self-described, through a check box, whether they were from rural or urban home environments, as described in the earlier part of this project (Pillay et al., 2020).

No significant gender, geographic background, or age group effects were found. Table 2 reflects the frequencies and percentage of participants reporting depressive symptoms as present 'most of the time' or 'all of the time'. Several interaction effects were also noted for specific reported depressive symptoms by gender, geographic background, and age group, which are shown in Table 3.

In our comparison of the present data with earlier adolescent university student data (mean age 19.8 years) collected from the same university (Pillay et al., 2020), we found some statistically significant findings. Significantly more adolescents than adults reported not attending lectures as much as they used to ($\chi^2=4.23, p=.038$, Cramer's $V=0.073$), being overwhelmed by the challenges encountered in their studies ($\chi^2=4.95, p=.026$, Cramer's $V=0.079$), feeling disappointed in themselves ($\chi^2=7.42, p=.006$, Cramer's $V=0.096$), not coping well ($\chi^2=4.64, p=.031$, Cramer's

$V=0.076$), and thinking that most people are better than them ($\chi^2=5.80$, $p=.016$, Cramer's $V=0.085$). No other significant differences were noted between the depressive symptoms reported by these two developmental groups.

Table 1. Mean USDI scores.

	N	Mean	Standard deviation	t	p
Total sample	318	60.28	21.60		
Women	204	58.79	20.92	1.64	0.10
Men	114	62.03	22.63		
Rural students	198	60.97	22.56	0.73	0.46
Urban students	120	59.13	19.96		
<25 years old	193	59.16	20.49	0.74	0.46
≥25 years old	125	61.00	22.32		

USDI: University Student Depression Inventory.

Table 2. Depressive symptoms reported as present 'most of the time' or 'all of the time'.

Item	n	%
I spend more time alone than I used to	78	24.5
My study is disrupted by distracting thoughts	72	22.6
I do not feel rested even after sleeping	72	22.6
I have trouble starting assignments	65	20.4
I do not have the energy to study at my usual level	64	20.1
I have trouble completing study tasks	61	19.2
My energy is low	60	18.9
Daily tasks take me longer than they used to	58	18.2
The activities I used to enjoy no longer interest me	57	17.9
Challenges I encounter in my studies overwhelm me	56	17.6
I do not find study as interesting as I used to	55	17.3
My mood affects my ability to carry out assigned tasks	55	17.3
I feel like I cannot control my emotions	55	17.3
I wonder whether life is worth living	53	16.7
I find it hard to concentrate	53	16.7
I feel emotionally empty	49	15.4
I think most people are better than me	49	15.4
I do not feel motivated to study	48	15.1
I feel withdrawn when I am around others	47	14.8
I worry I will not amount to anything	47	14.8
I feel disappointed in myself	44	13.8
I am more tired than I used to be	43	13.5
I do not cope well	40	12.6
I feel sad	37	11.6
I do not attend lectures as much as I used to	34	10.7
I do not have any desire to go to lectures	37	11.6
I feel worthless	29	9.1
No one cares about me	28	8.8
I have thought about killing myself	25	7.9
Going to university is pointless	14	4.4

Table 3. Interaction effects of depressive symptoms with gender, geographic background, and age.

Interaction effect	USDI item	Chi-square, χ^2	<i>p</i>	Cramer's <i>V</i>
More men than women reported	Not attending lectures as much as they used to	4.84	0.028	0.123
	Feeling emotionally empty	4.34	0.037	0.117
	Finding it hard to concentrate	6.49	0.011	0.143
	Having trouble starting assignments	3.77	0.052	0.109
	Daily tasks take longer than they used to	16.33	0.000	0.227
	Do not cope well	3.98	0.046	0.112
	Do not find study as interesting as they used to	3.77	0.052	0.109
	Think most people are better than them	4.34	0.037	0.117
	Having trouble completing study tasks	5.83	0.016	0.135
More rural than urban students reported	Do not have any desire to go to lectures	8.52	0.004	0.161
	Thought about killing themselves	3.63	0.057	0.107
	Daily tasks take longer than they used to	4.34	0.037	0.117
	Do not cope well	7.97	0.005	0.158
More younger (<25 years) than older (\geq 25 years) students reported	Feeling more tired than they used to be	4.04	0.044	0.113
	Do not feel motivated to study	4.32	0.038	0.117

USDI: University Student Depression Inventory.

Discussion

The mean USDI scores in the present sample are lower than those reported in earlier Australian, Philippine, and Mauritian studies (Khawaja & Duncanson, 2008; Lee et al., 2013; Pillay & Bundhoo, 2015). Interestingly, the mean USDI score for women (58.79) in the present investigation of adult students is lower than for females in the earlier South African adolescent study (63.09), while the means for men were similar (62.03 and 61.55) across both studies (Pillay et al., 2020). This suggests that adult women students reported fewer depressive symptoms and may be coping better than their adolescent counterparts, whereas men in the present adult sample report similar symptom levels to male adolescent students. This finding has multiple implications, first the surprising finding that women reported fewer depressive symptoms (albeit not significantly so) than men did. This is in contrast to the American Psychiatric Association's (2013) report that females are at higher risk than males for MDD by as much as three times. The present finding could be due to (a) the fact that our study did not examine MDD, but instead looked at some symptoms of depression and (b) the instrument that we used (the USDI) also looked at academic-related stressors and individual responses to academic demands. Second, the extent to which the finding may be reflecting on the possibility of better adaptation and coping with academic-related stress among women than men is an issue that needs to be investigated further. An interesting concept that has been previously reported is women's greater use of coping methods aimed at changing their affective responses to stressful situations, whereas men's coping adopts more problem-oriented methods (Kelly et al., 2008).

The findings that 7.9% of the participants reported feeling suicidal most or all of the time and about twice that proportion wondered whether life is worth living are of great concern. In addition to the seriousness of this emotional disturbance, the risk to life and the need for mental health care, there are also implications for the affected individuals' in terms of their academic studies. The finding raises concern about their ability to cope with their studies while under these emotional strains. Depressive symptoms in students can have significant impact on their ability to

respond to the various academic demands, the tertiary education environment, and to complete their education successfully (Bouteyre et al., 2007; Richardson et al., 2017). Furthermore, the relatively high frequencies of cognitive, affective, behavioural, and physiological symptoms (as shown in the symptom frequencies in Table 2) are indications of motivational, concentration, and related difficulties that are known to impact on academic progress.

One in six participants (17.3%) admitted that their mood affected their ability to do their work, and a similar proportion (17.9%) reported a loss of interest in activities they previously enjoyed. These symptoms are noted as critical in the diagnosis of an MDD. In the Diagnostic and Statistical Manual of Mental Disorders (Fifth edition) (*DSM 5*), the American Psychiatric Association (2013) specifies that at least one of two these symptoms (low mood and loss of interest) must be present for the diagnosis to be made. Although this study was not designed to diagnose depressive disorder, the prevalence of the *DSM 5* Criterion A (1) and (2) symptoms in over 17% of the sample raises concern about the likelihood of an MDD in a notable proportion of the students.

The comparison with the earlier adolescent student data (Pillay et al., 2020) highlights interesting findings, especially relating to the possible protective effects of maturation. Even though only on five of the USDI scores, it is noteworthy that adult students (compared to adolescent counterparts) appeared to show significantly lower susceptibility to depressive symptoms affecting motivation to attend lectures, feeling overwhelmed by their studies, not coping well, feeling disappointed in themselves, and having a low self-esteem. This is consistent with a US study that found higher susceptibility to depressive illness in the younger age group (Center for Behavioral Health Statistics and Quality, 2018), as well as the American Psychiatric Association (2013) report of a depressive illness peak during the early 20s.

This study has provided useful results, but we are also aware that it has some limitations. These include the cross-sectional approach to identifying symptoms of depression, since depression as an illness manifests over a period of time and can vary in intensity and number of symptoms. Also, the fact that the depressive symptoms were self-reported, must be noted as a limitation. Although this investigation also looked at depressive symptoms in one specific tertiary institution, and may not reflect the situation nationally, our aim was to explore the prevalence of depressive symptoms among students attending a rural-based university, given the widespread deprivation in South Africa's rural communities, and the fairly large portion of the population that live in rural communities.

Conclusion

In this study of older university students, our findings revealed fewer self-reported symptoms of depression than earlier research on adolescent students sampled from the same rural-based tertiary institution. Women reported significantly fewer symptoms and rural students reported more symptoms. The findings suggest that being older students at university may offer some protection compared to younger counterparts. However, self-reports suggest that there are still areas of concern in terms of depressive symptoms and their associated effects on students' ability to concentrate on their work and study successfully. This is an unfortunate situation in a country like South Africa and especially poor communities in rural areas where the costs of education (relative to income) and the sacrifices that have to be made to study are very significant. If we consider also the high unemployment rate and job scarcity in our country, it is important that students entering tertiary education are able to complete their studies as quickly as possible in order that they can become financially independent. In the case of older students, this issue is even more of a priority because many are self-supporting and may even have dependants.

There is a great need for psychosocial support services within university contexts to assist students who have emotional or other mental health problems and are in need of professional help. Although all universities have student counselling services, the number of students needing services may make the demand quite difficult for the small staff numbers to assist. As a country, we need to also have more focus on increasing resources at rural-based institutions of higher learning. As Edwards (2015) noted, despite the post-apartheid developments in South Africa, many old struggles remain and rural universities must be supported in their efforts to overcome the unique challenges that they face to ultimately uplift those communities that have been marginalised and insufficiently resourced.

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References

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.).
- Bantjes, J., Breet, E., Lochner, C., Roos, J., Kessler, R. C., & Stein, D. J. (2021). Reducing nonfatal suicidal behaviour among university students: Actuarial analysis of potential effects of treating common mental disorders. *South African Journal of Psychology, 51*(1), 21–34. <https://doi.org/10.1177/0081246320973838>
- Bouteyre, E., Maurel, M., & Bernaud, J. L. (2007). Daily hassles and depressive symptoms among first year psychology students in France: The role of coping and social support. *Stress and Health, 23*, 93–99.
- Center for Behavioral Health Statistics and Quality. (2018). *2017 national survey on drug use and health*. <https://www.samhsa.gov/data/sites/default/files/cbhsq-reports/NSDUHDetailedTabs2017/NSDUHDetailedTabs2017.htm#tab8-56A>
- Dawborn-Gundlach, M., & Margetts, K. (2018). Measures of the adjustment of mature-age, undergraduate students to university. *Journal of Global Education and Research, 2*(1), 17–32. <https://doi.org/10.5038/2577-509X.2.1.1014>
- Edwards, S. D. (2015). The role of rural universities in developing psychology in South Africa. *South African Journal of Psychology, 45*(1), 50–59.
- Garlow, S. J., Rosenberg, J., Moore, J., Haas, A. P., Koestner, B., Hendin, H., & Nemeroff, C. B. (2008). Depression, desperation, and suicidal ideation in college students. *Depression and Anxiety, 25*, 482–488.
- IBM Corp. (2020). *IBM SPSS statistics for windows* (Version 27.0).
- Ibrahim, A. K., Kelly, S. J., Adams, C. E., & Glazebrook, C. (2013). A systematic review of studies of depression prevalence in university students. *Journal of Psychiatric Research, 47*(3), 391–400.
- Islam, S., Akter, R., Sikder, T., & Griffiths, M. D. (2022). Prevalence and factors associated with depression and anxiety among first-year university students in Bangladesh: A cross-sectional study. *International Journal of Mental Health Addiction, 20*, 1289–1302. <https://doi.org/10.1007/s11469-020-00242-y>
- Kelly, M. M., Tyrka, A. R., Price, L. H., & Carpenter, L. L. (2008). Sex differences in the use of coping strategies: Predictors of anxiety and depressive symptoms. *Depression and Anxiety, 25*(10), 839–846. <https://doi.org/10.1002/da.20341>
- Kgosana, R. (2020, November 06). *UP students' march shines light on depression, suicides*. <https://citizen.co.za/news/south-africa/2024995/pics-up-students-march-shines-light-on-depression-suicides/>
- Khawaja, N. G., & Bryden, K. J. (2006). The development and psychometric investigation of the university student depression inventory. *Journal of Affective Disorders, 96*, 21–29.
- Khawaja, N. G., & Duncanson, K. (2008). Using the university student depression inventory to investigate the effect of demographic variables on students' depression. *Journal of Psychologists and Counsellors in Schools, 18*(2), 195–209. <https://doi.org/10.1375/ajgc.18.2.195>

- Lee, R. B., Maria, M. S., Estanislao, S., & Rodriguez, C. (2013). Factors associated with depressive symptoms among Filipino university students. *PLOS ONE*, 8(11), Article e79825. <https://doi.org/10.1371/journal.pone.0079825>
- Pillay, A. L., & Bundhoo, H. Y. (2015). Depressive, suicidal and related symptoms in university students in Mauritius. *African Journal of Physical, Health, Education, Recreation and Dance*, 21, 253–260.
- Pillay, A. L., Thwala, J. D., & Pillay, I. (2020). Depressive symptoms in first year students at a rural South African University. *Journal of Affective Disorders*, 265, 579–582. <https://doi.org/10.1016/j.jad.2019.11.094>
- Richardson, T., Elliot, P., Roberts, R., & Jansen, M. (2017). A longitudinal study of financial difficulties and mental health in a national sample of British undergraduate students. *Community Mental Health Journal*, 53(3), 344–352.
- Rousseau, K., Thompson, S., Pileggi, L., Henry, M., & Thomas, K. G. F. (2021). Trends in the prevalence and severity of depressive symptoms among undergraduate students at a South African University, 2016–2019. *South African Journal of Psychology*, 51(1), 67–80. <https://doi.org/10.1177/0081246320977759>
- Shamsuddin, K., Fadzil, F., Ismail, W. S., Shah, S. A., Omar, K., Muhammad, N. A., . . . Mahadevan, R. (2013). Correlates of depression, anxiety and stress among Malaysian university students. *Asian Journal of Psychiatry*, 6(4), 318–323. <https://doi.org/10.1016/j.ajp.2013.01.014>
- Wood, D., Crapnell, T., Lau, L., Bennett, A., Lotstein, D., Ferris, M., & Kuo, A. (2018). Emerging adulthood as a critical stage in the life course. In N. Halfon, C. Forrest, R. Lerner, & E. Faustman (Eds.), *Handbook of life course health development* (pp. 123–143). Springer. https://doi.org/10.1007/978-3-319-47143-3_7