Depression Among Medical Students of Karachi A Cross Sectional Study [version 1]

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Abstract
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Introduction: Depression is a mood disorder characterized by loss of interest in daily activity, feeling of hopelessness and helplessness, decreased appetite, anger and irritability. The risk factors which leads to depression include academic demands, daily habits, sleeping hours, sedentary lifestyle, inability to cope, helplessness, increased psychological pressure, mental tension and increased work load etc. The objective of current study is to find out the prevalence of depression among students of different medical colleges of Karachi and its association with life style, habits and coping mechanisms.

Methods: A descriptive cross-sectional study was conducted in 6 months i.e. April 2018 to September 2018, using a self-designed, self-explanatory questionnaire which also included Public Health Questionnaire (PHQ-9) for identification of depression. The coefficient of reliability including Cronbach alpha was 0.839 for the questionnaire. The data was analyzed by using mean with standard deviation and frequency with percentages while association was calculated by using Chi-square test.

Results: The mean age of participants was 21.43 ±1.803. About 2/3 of the participants were female with marital status of 3/4th of participants being single. 92% of the medical students were found to be depressed while 26% of them have suicidal thoughts. Symptoms of depression were compared with depression score, which showed strong positive correlation. Depression scores were also compared with lifestyle habits of participants, including sleeping hours, exercise,
recent trauma and multiple coping mechanisms, presented significant association with depression scores (p-value ≤ 0.01).

Conclusions: It is concluded that depression is highly prevalent amongst medical student populations while the lifestyle habits, sleeping hours, physical activities, recent trauma and coping mechanism showed significant positive association with depression.

**Keywords**
Depression, Depression score, Medical students, coping mechanism.
Introduction

Depression is a mood disorder characterized by loss of interest in daily activity, feeling of hopelessness and helplessness, decreased appetite, anger and irritability (Marcus, 2012). Depressive symptoms are extremely prevalent in students nowadays which are typically characterized by sadness, loss of interest, hopelessness, nervousness or anxious feelings and even suicidal thoughts (Kessler et al., 2003). According to the results of different meta-analyses, the prevalence of depressive symptoms are higher among college students compared to the general population or non-college students (Mikolajczyk et al., 2008).

Depression is a major correspondent to the global burden of diseases and affects people all over the world with the global prevalence of 3.2% (Moussavi et al., 2007). The prevalence of depressive symptoms among college students were estimated to be 33% (Sarokhani et al., 2013) and 27-50% of medical students were found to be depressed (Sherina, Rampal and Kaneson, 2004; Koochaki et al., 2011; Rotenstein et al., 2016). Looking over Pakistan, prevalence of depression and anxiety is 34% (Mirza and Jenkins, 2004). A high prevalence of anxiety and depression 43.89% was found amongst medical students of Pakistan (Jadoon et al., 2010). The prevalence rate of depression across Karachi is 60-70% respectively (Inam, Saqib and Alam, 2003; Khan et al., 2006a). It was found that approximately 70% of the medical students suffered from anxiety and depression in Karachi (Khan et al., 2006b).

A number of studies have reported a high prevalence of depression and anxiety among medical students, both internationally and in Pakistan. And risk factors which lead to depression; such as academic demands, exams, inability to cope, helplessness, increased psychological pressure, mental tension and high work load etc. (Shaikh et al., 2004; Khan et al., 2006a). It is estimated that by the year 2020, anxiety and depression will be the second most common cause of disability worldwide (Lopez and Murray, 1998). Stress during education can lead to mental distress and have a negative impact on cognitive functioning and learning. Hence, there is a need to quantify the anxiety, depression and its associated factors among medical students for their counselling and rehabilitation (Khan et al., 2006a; Qureshi et al., 2019).

The objective of current study is to find out the prevalence of depression among students of different medical colleges of Karachi and its association with symptoms, life style habits and coping mechanisms.

Methods

A descriptive cross-sectional study was conducted using a self-designed, self-explanatory questionnaire Public Health Questionnaire (PHQ-9) of Pfizer (Zhang et al., 2013) for identification of depression. Questionnaire includes questions related to demographics i.e. age, gender, ethnicity, year of study, lifestyle, coping mechanisms for depression. The questionnaire was validated by pilot testing on a sample of 20 students. The coefficient of reliability including Cronbach alpha was 0.839 for the questionnaire. The questionnaire was disseminated personally; names of students were not recorded. Ethical approval certificate was obtained by Ziauddin University which was submitted and accepted by all the institutions participating in research. Sample Size was calculated using Openepi and was found to be 200.

Study was conducted in 6 months i.e. April 2018 to September 2018. Multistage sampling technique was done, in first stage three private medical colleges (Ziauddin University, Bahira University, Jinnah Medical and Dental College) and three government medical Colleges (DOW University, Jinnah Sindh Medical University, Karachi Medical and Dental College) were selected, while in the second stage students from those universities/colleges were randomly selected for the study. Students from all years like first, second, third, fourth and fifth year of MBBS were included. Students of BDS, Pharmacy, and Physiotherapy etc. were excluded to avoid bias.

The data was analyzed by using Statistical Package for Social Sciences (SPSS-22). The mean with standard deviation were calculated for quantitative variables while frequency and percentages for qualitative variables. The association of depression with appeared symptoms, life style habits and coping mechanisms were calculated by using Chi-square test.

Results/Analysis

About 230 questionnaires were distributed in different public and private sector medical universities of Karachi among MBBS students in different years of study, out of which 200 were fully filled. Data was collected from 3 government and 3 private sector universities of Karachi. Depression was identified using Public Health Questionnaire 9 (PHQ-9). Majority of the participants were suffering from mild depression, 92% of the population was suffering from some degree. 41% of population was suffering from mild depression, 27% from minimal depression, 14% from moderate depression, 7% from moderately severe depression and 3% from severe depression. 8% population was not suffering from depression at all. While 26% of them also had suicidal intentions. The mean age of participants was 21.43 with standard deviation of 1.803. About 2/3 participants were female with marital status of 3/4th of participants being single. Considering ethnicity majority of study participants were Panjabi speaking. Students from each year were equally included in the study. The basic demographic characteristics of participant are shown in Table 1.
Symptoms of depression like hopelessness, helplessness, loss of interest in daily activities, appetite or weight changes, sleep changes, anger or irritability, loss of energy, self-loathing, reckless behaviour, concentration problems and unexplained aches and pains were compared with depression score, including minimal, mild, moderate, moderately severe and severe depression, which showed strong positive correlation as p-values were highly significant (p-value ≤ 0.01), mentioned in Table 2.

Depression scores were compared with lifestyle habits of participants and some of the habits, including sleeping hours, exercise, and recent trauma showed significant relation with depression scores (p-value ≤ 0.01). Looking over the multiple coping mechanisms, significant association was noted in minimizing the symptoms as either talking to a friend or family member, sleeping or meditation. On the other hand, ignoring the issues or optimism didn’t show any significant association as shown in Table 3.

### Discussion

Depression is a significant problem in medical schools. The overall depression rate in medical students of Karachi is found to be 92%, whereas it was previously recorded at 70% in a study (Khan et al., 2006a). The result shows 41% of students are mildly depressed and 10 percent severely or close to severely depressed. Similarly, in a meta-analysis for depression, about 27% of medical students suffered from depression (Rotenstein et al., 2016). In addition, 11.1% of students suffered from suicidal ideation. This statistic is very close to the 10% of individuals in the data presented. A study on medical students in Egypt also pointed out that 65% of students were depressed (Fawzy and Hamed, 2017). This shows that there is a repeated trend of depression in many medical schools. An article from Cameroon shows that 30.6% of their medical students had major depressive disorder (Ngasa et al., 2017). This again shows a repeated trend of depression. An article by Lane et al., 2016 states that Pakistani American ethnicity has a non-significant trend in depression (Lane, Cheref and Miranda, 2016). However, the results stated earlier do not correlate with the population in Pakistan medical schools. Therefore, depression is an issue.

### Table 1. Characteristics of study Participants

| Characteristics          | n  | %  |
|--------------------------|----|----|
| Gender                   |    |    |
| Male                     | 67 | 35.5|
| Female                   | 133| 65.5|
| Marital Status           |    |    |
| Single                   | 170| 85  |
| Committed                | 22 | 11  |
| Married                  | 5  | 2.5 |
| Divorced                 | 3  | 1.5 |
| Ethnicity                |    |    |
| Sindhi                   | 29 | 14.5|
| Punjabi                  | 54 | 25  |
| Pathan                   | 22 | 11  |
| Baloch                   | 4  | 2   |
| Urdu Speaking            | 73 | 36.5|
| Others                   | 18 | 9   |
| Year of Study            |    |    |
| First Year               | 40 | 20  |
| Second Year              | 40 | 20  |
| Third Year               | 40 | 20  |
| Fourth Year              | 40 | 20  |
| Fifth Year               | 40 | 20  |
| Symptoms                                                                 | Minimal Depression | Mild Depression | Moderate Depression | Moderately Severe Depression | Severe Depression | No Depression | P Value |
|-------------------------------------------------------------------------|--------------------|----------------|--------------------|-----------------------------|------------------|--------------|---------|
| Hopelessness                                                            | 11 5.5             | 36 18          | 13 6.5             | 10 5                        | 4 2              | 1 0.5        | 0.000   |
| Helplessness                                                            | 19 9.5             | 39 19.5        | 16 8               | 12 6                        | 6 3              | 3 1.5        | 0.000   |
| Loss of interest in daily activities                                    | 12 6               | 50 25          | 16 8               | 13 6.5                      | 4 2              | 3 1.5        | 0.000   |
| Appetite or weight changes                                              | 17 8.5             | 32 16          | 14 7               | 9 4.5                       | 4 2              | 3 1.5        | 0.038   |
| Sleep changes, Anger or irritability, Loss of energy, Self-loathing, Reckless behaviour, Concentration problems | 30 15              | 54 27          | 21 10.5            | 14 7                        | 5 2.5            | 5 2.5        | 0.001   |
| Unexplained aches and pains                                             | 13 6.5             | 24 12          | 10 5               | 10 5                        | 4 2              | 1 0.5        | 0.001   |
| None of the Symptoms                                                    | 8 4                | 5 2.5          | 1 0.5              | 0 0                         | 0 0              | 4 2          | 0.055   |
Our study suggests that certain lifestyle practices, coping mechanisms, and life events can have an effect on depression. Specifically, sleep is a highly significant factor towards depression. Likewise, in one study on undergraduates in Nepal, 35.4% of students were sleep deprived (Bhandari et al., 2017). Out of that percentage of students 21.2% of students were depressed. Sleep deprivation is a common correlate towards depression. Another study amongst adolescents stated that sleep deprivation increased the risks of depression between 25-38% (Roberts and Duong, 2014). Therefore, this minor finding may signify that students are depressed due to sleep deprivation.

Another finding statistically significant was spending time with friends and family. It seems that social isolation is a keen risk factor towards depression. However, our statistics for being alone did not specify any significance. This may be because according to Matthews et al, socially isolated young adults are not necessarily lonely. It is the feeling of loneliness which is a risk factor for depression (Matthews et al., 2016). While coping with family and friends can reduce the risk of depression.

| Variable                      | Minimal Depression | Mild Depression | Moderate Depression | Moderately Severe Depression | Severe Depression | No Depression | P Value |
|-------------------------------|--------------------|-----------------|--------------------|-----------------------------|-------------------|---------------|---------|
|                               | n %                | n %             | n %                | n %                         | n %               | n %           |         |
| Sleeping Hours                |                    |                 |                    |                             |                   |               |         |
| 2-4 Hours                     | 0 0               | 7 3.5           | 2 1                | 3 1.5                       | 0 0               | 1 0.5         | 0.000   |
| 4-6 Hours                     | 25 12.5           | 37 18.5         | 18 9               | 6 3                         | 0 0               | 5 2.5         |         |
| 6-8 Hours                     | 27 13.5           | 32 16           | 4 2                | 1 0.5                       | 3 1.5             | 9 4.5         |         |
| >8 Hours                      | 3 1.5             | 6 3             | 3 1.5              | 4 2                         | 3 1.5             | 1 0.5         |         |
| Exercise                      |                    |                 |                    |                             |                   |               |         |
| Daily                         | 15 7.5            | 8 4             | 3 1.5              | 1 0.5                       | 1 0.5             | 3 1.5         | 0.328   |
| Alternative Days              | 9 4.5             | 21 10.5         | 5 2.5              | 2 1                         | 1 0.5             | 5 2.5         |         |
| Weekly                        | 15 7.5            | 24 12           | 9 4.5              | 3 1.5                       | 1 0.5             | 6 3           |         |
| Never                         | 16 8              | 29 14.5         | 10 5               | 8 4                         | 3 1.5             | 2 1           |         |
| Free Time                     |                    |                 |                    |                             |                   |               |         |
| Sleeping                      | 9 4.5             | 28 14           | 11 5.5             | 8 4                         | 2 1               | 3 1.5         | 0.025   |
| With Friends and Family       | 36 18             | 32 16           | 15 7.5             | 2 1                         | 1 0.5             | 12 6          | 0.000   |
| Alone                         | 7 3.5             | 18 9            | 7 3.5              | 5 2.5                       | 3 1.5             | 1 0.5         | 0.081   |
| Watching TV or Using computer | 23 11.5           | 41 20.5         | 12 6               | 7 3.5                       | 4 2               | 4 2           | 0.429   |
| Sports                        | 6 3               | 9 4.5           | 3 1.5              | 1 0.5                       | 0 0               | 3 1.5         | 0.858   |
| Reading                       | 11 5.5            | 10 5            | 2 1                | 1 0.5                       | 0 0               | 3 1.5         | 0.445   |
| Coping Mechanisms             |                    |                 |                    |                             |                   |               |         |
| Talking to a friend or family | 30 15             | 34 17           | 13 6.5             | 3 1.5                       | 0 0               | 8 4           | 0.047   |
| Sleeping                      | 14 7              | 39 19.5         | 14 7               | 10 5                        | 2 1               | 2 1           | 0.002   |
| Ignoring                      | 11 5.5            | 20 10           | 1 0.5              | 1 0.5                       | 0 0               | 3 1.5         | 0.543   |
| Optimism                      | 10 5              | 19 9.5          | 8 4                | 3 1.5                       | 3 1.5             | 3 1.5         | 0.126   |
| Meditation                    | 6 3               | 6 3             | 2 1                | 0 0                         | 1 0.5             | 5 2.5         | 0.026   |
| Recent Trauma                 |                    |                 |                    |                             |                   |               |         |
| Death Of a family member      | 13 6.5            | 19 9.5          | 10 5               | 5 5                         | 2.5               | 1 0.5         | 4 2      | 0.673   |
| Death of a friend or pet      | 5 2.5             | 9 4.5           | 6 3                | 3 1.5                       | 1 0.5             | 0 0           | 0.246   |
| Harassment                    | 2 1               | 7 3.5           | 5 2.5              | 5 2.5                       | 3 1.5             | 0 0           | 0.000   |
| Social Embarrassment          | 5 2.5             | 14 7            | 8 4                | 5 2.5                       | 2 1               | 1 0.5         | 0.049   |
| Failure to solve problem      | 11 5.5            | 25 12.5         | 9 4.5              | 10 5                        | 4 2               | 2 1           | 0.001   |
Another variable that has a great significance is, any recent trauma. Specifically, the study suggests harassment, social embarrassment, and failure to solve problems as the main links. It seems that in the case of harassment, workplace bullying and sexual harassment are further correlates of stress (Taniguchi et al., 2016) and the current study shows significant association with some of the factors of recent trauma.

Depression is highly prevalent amongst medical student populations. Therefore, actions must be taken to figure out the causes and solutions to these problems. If harassment is the cause of depression then in the future we must further investigate what kind of harassment is going on, and then the actions to prevent it. We cannot pinpoint what failures to problems causes’ depression. One article suggests that board examination failure can play a role (Bhandari et al., 2017). Moreover Silva et al., 2017 state that higher academic correlate with improvement of depression (Silva et al., 2017). If that is the cause then certain programs need to come up with facilities to help students cope with these initial stressors as is mentioned by one of the study which highlighted the medical student syndrome (MSS) as one of the major stressor (Sadiq, Majeed and Khawar, 2018).

Current study specifically tried to take out the prevalence of depression amongst medical students. The study did its best to figure out daily symptoms and coping mechanisms, however, these specific coping mechanisms could not be further investigated. Future recommendation is to conduct a larger scale study across Pakistan to highlight the prevalence and cause of depression among medical students.

Conclusion
It is concluded that depression is highly prevalent amongst medical student populations while the lifestyle habits, total sleeping hours, physical activities, recent trauma and coping mechanism showed significant positive association with depression. As the medical students are highly vulnerable to depression, actions must be taken to figure out the causes and solutions to their problems.

Take Home Messages
- It is concluded that depression is highly prevalent amongst medical student.
- Lifestyle habits, total sleeping hours, physical activities, recent trauma and coping mechanism showed significant positive association with depression.
- As the medical students are highly vulnerable to depression, actions must be taken to figure out the causes and solutions to their problems.

Notes On Contributors
Miss Ujalla Kumari: Conceptualized and designed this study, both the intervention described and the rigorous measurement and analysis; spearheaded the acquisition of data and helped in the analysis and interpretation of the collected data; revised the drafted article critically for important intellectual content; provided final approval of the version to be published. She is currently a third year Medical Student doing MBBS from Ziauddin University.

Miss Nakeeta Dawani: Conceptualized and designed this study, both the intervention described and the rigorous measurement and analysis; spearheaded the acquisition of data and helped in the analysis and interpretation of the collected data; revised the drafted article critically for important intellectual content; provided final approval of the version to be published. She is currently a third year Medical Student doing MBBS from Ziauddin University.

Miss Joti Devnani: Conceptualized and designed this study, both the intervention described and the rigorous measurement and analysis; spearheaded the acquisition of data and helped in the analysis and interpretation of the collected data; revised the drafted article critically for important intellectual content; provided final approval of the version to be published. She is currently a third year Medical Student doing MBBS from Ziauddin University.

Mr Muhammad Fazal Hussain Qureshi: Conceptualized and designed this study, both the intervention described and the rigorous measurement and analysis; spearheaded the acquisition of data and helped in the analysis and interpretation of the collected data; revised the drafted article critically for important intellectual content; provided final approval of the version to be published. I am currently a third year Medical Student doing MBBS from Ziauddin University.

Mr Fahad Khalid Soleja: Conceptualized and designed this study, both the intervention described and the rigorous measurement and analysis; spearheaded the acquisition of data and helped in the analysis and interpretation of the
collected data; revised the drafted article critically for important intellectual content; provided final approval of the version to be published. He is currently a third year Medical Student doing MBBS from Ziauddin University.

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Miss Ayesha Haroon: Conceptualized and designed this study, both the intervention described and the rigorous measurement and analysis; spearheaded the acquisition of data and helped in the analysis and interpretation of the collected data; revised the drafted article critically for important intellectual content; provided final approval of the version to be published. She is currently a third year Medical Student doing MBBS from Ziauddin University.

Dr Sara Sadiq: Conceptualized and designed this study, both the intervention described and the rigorous measurement and analysis; spearheaded the acquisition of data and helped in the analysis and interpretation of the collected data; revised the drafted article critically for important intellectual content; provided final approval of the version to be published. She is Assistant Professor working in Department of Physiology.

Declarations
The author has declared that there are no conflicts of interest.

Ethics Statement
This project was submitted to the ethical review committee of Ziauddin University (Approval number: 0331529MFDS) and after its approval a certificate was issued, was presented to different universities mentioned in the study and accepted by them before collecting data from their respective institution.

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Lubna Jahanzeb
Baqai Medical University

This review has been migrated. The reviewer awarded 5 stars out of 5

It is very overwhelming to see this student based research on such an important topic. Being a teacher in Pakistani educational setup for more than ten years help me understand this paper in detail. Introduction is very well written with adequate references to support study. Methodology is explained in a very simple yet interesting manner and can help other researcher's to replicate this study easily. The most interesting part of paper is results and discussion which make the argument more interesting and gives the reader perfect picture of the current scenario and reasons behind this issue. I highly recommend this paper.

Competing Interests: No conflicts of interest were disclosed.

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Stijntje Dijk
Erasmus Medical Center

This review has been migrated. The reviewer awarded 2 stars out of 5

The topic of this paper, mental wellbeing among medical students, is very relevant. The study seeks to identify the prevalence of depression among students in a local setting, which provides valuable
information to a field in which cited prevalence vary strongly across literature, and could provide an incentive and starting point for interventions in Karachi. The fact that the paper is written mainly by medical students themselves is commendable. We, however, do have several reservations regarding this paper that we would encourage the authors to consider if submitting a revised paper.- Comparability: Seeing as the main focus of the paper is investigating and comparing the prevalence of depression, it is crucial that the cited literature in both the discussion and introduction is comparable. A number of prevalence papers are cited, however, without the context of which instruments and cutoff values were used, and who these groups were, the reader may be led to draw incorrect conclusions. For example, the authors compare the 92% prevalence of depression among medical students in Karachi to the previously recorded 70% in the study by Khan et al, however do not describe that Khan et al. used a different instrument (AKUADS) with a much higher cutoff value (19) compared to PHQ-9 with a cutoff value of 1, which states that students have a minimal depression even if they feel tired several days a week alone. One should also note the limitation that the PHQ-9 is a self-report tool that should be verified by a clinician prior to a definitive diagnosis being made. Several other citations on current prevalence rates are from 15 years ago, whereas we’d be curious to hear about more recent developments. The paper could benefit from providing more detailed information on the comparability across studies.- Reproducibility of methods: The authors stated they used a self-designed, self-explanatory questionnaire that contains the PHQ-9, however, have not explained in what ways they have modified the existing and validated instrument. The authors used the tool Openepi to conduct statistical calculations however have not provided the reader with a level of detail that would allow us to replicate their results and calculations, which we encourage the authors to add in any revisions.- Results: We found it difficult to interpret tables 2 and 3 and wondered whether there might be alternative formats that could demonstrate the point the authors wish to make. We additionally caution that the discussion then makes causal assumptions based on correlation, whereas for example, the correlation found between lack of sleep leading to depression may also have been depression leading to lack of sleep, as is also the case for the conclusions drawn on isolation and physical activity. The results on suicidal ideation are expressed differently in the abstract (26% of students with depression) and the conclusion (10% of all participants). We believe that the paper would benefit from aligning abstract and body, and should provide the reader with an explanation on what cutoff value is used for suicidal ideation. We thank the authors for their valuable work and interesting paper and hope they would be able to address some of our reservations in any revised versions.

**Competing Interests:** No conflicts of interest were disclosed.
This review has been migrated. The reviewer awarded 4 stars out of 5

This study is the need of the hour among medical students. As a medical teacher for the past 15 years, I have come across many students having suicidal tenancies and I have sent them for psychiatric counselling. And this year world mental health day them is on suicide prevention, to focus more on 40 seconds action. After completing a debate and a panel discussion in CME programme yesterday in our institution, reading this article and getting to know that the 26% had suicidal thoughts is really worrying and alarming. This descriptive study was conducted nicely and the results are projected clearly. Please kindly consider the depressed students to have some continuous counseling sessions and the treatment and follow up.

**Competing Interests:** No conflicts of interest were disclosed.

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Rehana Faryal Mehdi
Ziauddin University

This review has been migrated. The reviewer awarded 5 stars out of 5

Indeed a very insightful analysis of one of the major condition encountered by students, reading this paper gives me a complete picture of the situation and measures taken. It is interesting to see that this study was conducted and led by students. I will recommend this study to every researcher working in this area.

**Competing Interests:** No conflicts of interest were disclosed.

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Trevor Gibbs
AMEE

This review has been migrated. The reviewer awarded 3 stars out of 5

Wellness and illness in medical students is a very important topic, which many medical schools, despite their best efforts, are not really coping with. This makes this paper an interesting one to read, covering such an important area. I was pleased to see that it was the students who had developed and written this paper. I am not sure that many of the papers findings are new to the readers with interest in this area, but basing their research in Pakistan does give it a different perspective. The authors have researched their paper well as seen by the large number of relevant references, and I believe have taken a logical and appropriate approach to their research. I personally would have liked to see more description of activities than the papers concentration on statistics and I was left wanting in knowing more about the second half of the study looking at coping mechanisms, particularly given that most of the authors were students. With the results showing as they are, then clearly one must look at how we manage this problem, specifically as it seems that approximately a quarter of the students had suicidal ideas. I do not think that the authors need to make this a national study, I hope that they now have enough material to extend this study into the areas of prevention and management. I would recommend this paper to those involved in student support and curriculum planning.

**Competing Interests:** No conflicts of interest were disclosed.