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**Graduate-entry medical students: older and wiser but not less distressed**

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**Abstract**

**Objectives:** Australia has a growing number of graduate-entry medical courses. It is known that undergraduate medical students have high levels of psychological distress; however, little is known about graduate-entry medical students. We examined whether graduate-entry medical students had higher levels of psychological distress than the same-age general population.

**Method:** Psychological distress was assessed in 122 graduate-entry medical students in an Australian graduate-entry medical school using the 21-item Depression Anxiety and Stress Scale. Mean scores and the proportion of students with scores in the highly distressed range were compared with non-clinical population norms. Scores were also compared across demographic characteristics.

**Results:** Medical students reported higher mean depression, anxiety and stress scores than the general population and were more likely to score in the moderate to extremely high range for anxiety (45% *vs*. 13%; $p<0.001$) and stress (17% *vs*. 13%; $p=0.003$). Anxiety and stress were higher in students aged ≥30 years than in younger students.

**Conclusions:** Despite their maturity, graduate-entry students experienced high psychological distress. Anxiety and stress were higher, not lower, with increasing age. Our results suggest that graduate-entry medical students warrant the same level of concern as their school-leaving counterparts. Further interventions to support these students during medical school are warranted.

**Keywords:** psychological distress, medical students, graduate-entry, DASS-21, Australia

**Introduction**

There is growing concern about the mental health of medical students, doctors-in-training and practicing health care professionals,[1,2] further high- lighted by the deaths of three psychiatry registrars and one intern in Australia this year.[1] It is well established that undergraduate medical students have high levels of psychological distress.[3,4] The prevalence of distress in undergraduate medical students has been estimated at 12%–29% for depression[4] and 34%–43% for anxiety,[5,6] exceeding those values found in the general same-aged population.[3,4] This issue is of widespread importance to medical educators because depression, anxiety and stress may affect clinical decision making,[7] negatively impact on patient care[8,9] and erode professionalism.[10]

Australia has an increasing number of graduate-entry, shorter-duration courses which, by definition, accept students who are older and have more previous life and study experience than school-leaving undergraduates. It is generally assumed that these mature graduate-entry students are better able to cope with the demands of medicine than their school-leaving counterparts;11–13 however, there are few available data to support this, and they are conflicting.12,14 There has been little examination of distress in graduate-entry medical students in contemporary Australian medical schools. It is unclear whether graduate-entry medical students resemble the general population in their distress profiles or whether, like undergraduate students, they have elevated levels of depression, anxiety and stress. This study aimed to deter- mine whether medical students in an Australian graduate- entry course had higher levels of depression, anxiety and stress than in the same-age general population, and the most common sources of their distress.

## Method

### Participants

Participants were recruited from the first three years of a four-year graduate entry course at the University of Wollongong, Graduate School of Medicine. First- and second-year medical students were recruited through announcements made after lectures, with questionnaires returned anonymously to a secure box. Third-year medical students were on local placements during data collection and were invited to complete the survey online via the students' website. Fourth-year students were excluded from the study due to being on external placements, many of which were in remote locations and/or developing countries with unreliable internet access. All participation was voluntary and the response rate was 49%. Ethics approval for this project was obtained from the University of Wollongong Human Research Ethics Committee (project HE09/244/11/003).

### Measures

All participants completed demographic information and the 21-item Depression Anxiety and Stress Scale (DASS-21),[15] a valid and reliable measure of depression, anxiety and stress in clinical and non-clinical populations.[15,16] Participants also completed a specially designed survey, consisting of 16 Likert-type questions and one open question regarding sources of distress, drawn from previous studies[10,17] and the authors' experience.

### Statistical analysis

Subscale scores for depression, anxiety and stress were summed as per the DASS manual,[15] with a possible score range of 0–42. Single sample *z*-tests were used to com- pare participants' mean DASS subscale scores with exist- ing population norms for 1002

non-clinical individuals aged 17–39 years.[17] DASS scores were then categorized as: 'normal', 'mild', 'moderate', 'severe' and 'extremely severe',[15] as per the DASS manual. The proportion of medical students and the general population with scores in the moderate to extremely severe range were considered 'psychologically distressed' and were compared using Chi-square tests.[15] Although DASS scores alone do not constitute clinical diagnoses, scores in this range have high sensitivity and moderate specificity for clinical anxiety and depression.[16]

Medical students' subscale scores were also compared by sex, age group and year of study using *t*-tests and one- way analyses of variance followed by Tukey's post-hoc tests to examine pairwise differences. Mean scores (0–3) were calculated for the 16 sources of distress items. Some of these items related to time spent on placement in hospital and were only applicable to second- and third-year students.

**Results**

Of the 122 medical students participating 51% were female and the majority (60%) were aged 25 years or over (Table 1). The proportion of participants drawn from the first, second and third years of study were similar (30%–35%).

**Psychological distress in medical students compared with the general population**

Medical students had significantly higher mean scores than the general population for depression (7.6 *vs*. 6.1; $p<0.001$), anxiety (9.4 *vs*. 4.5; $p<0.001$) and stress (12.6 *vs*. 10.4; $p=0.002$) (Table 2). When comparing the pro- portion of medical students with the population scoring in the psychologically distressed range, the difference for depression was no longer significant (17.2% *vs*. 13.0%; $p=0.166$). However, medical students were more likely to be psychologically distressed than the population in terms of anxiety (45.1% *vs*. 13.0%; $p<0.001$) and stress (22.1% *vs*. 13.0%; $p=0.003$).

**Psychological distress by demographic characteristics**

Medical students' anxiety and stress increased with age, but no age differences in depression were observed (Figure 1). Students ≥30 years had significantly higher anxiety scores than the 21–24 years age group ($p=0.003$) and marginally higher scores than the 25–29 year olds ($p=0.058$). Students aged ≥30 years also reported significantly higher stress than 21–24 and 25–29 year olds ($p=0.043$ and $p=0.019$, respectively). Depression and anxiety scores did not differ by year of medical school; however, stress was significantly higher in first year compared with third-year students ($\bar{x}$ =15.4 *vs*. 9.9, $p=0.006$). No sex differences were observed for depression, anxiety or stress.

**Sources of distress**

The aspects of studying rated as most distressing to medical students were 'learning a large volume of material in a limited time' ($\bar{x}$ =2.2), 'unsure of what to study and in what degree of detail' ($\bar{x}$ =1.9), and 'having less time for family and friends' ($\bar{x}$ =1.6) (Table 3).

**Discussion**

The graduate-entry medical students in our study reported significantly higher levels of depression, anxiety and stress than the general population. Nearly half (45%) of the graduate-entry medical students in our study had anxiety scores in the distressed range, matching levels previously reported for undergraduate students.[5,6,8,10] These high levels of anxiety are particularly concerning given they often precede depression[18] thus potentially jeopardizing the wellbeing of future doctors. Contrary to the general assumption that age and experience would allow older students to cope better with medical school than younger students, we found that anxiety and stress were significantly higher for older students. This finding is of note given that anxiety and stress decrease with age in the general population.[19]

The changing nature of medical degrees in Australia, including shorter, four-year degrees, may contribute to distress. The top sources of distress reported were 'learning a large volume of material in a short time' and 'uncertainty about what to study', indicating that the self-directed nature of problem-based learning courses may heighten anxiety because students are unsure of expectations. Clearer learning objectives could potentially help students. Sources of distress varied significantly between years, with first-year students having higher concerns about assessment tasks and more advanced students having greater concerns about presenting cases to doctors, performing clinical procedures and interactions with senior clinicians. This suggests the need to tailor support to stages of training.

To our knowledge, this is the first study examining levels of depression, anxiety and stress in Australian graduate-entry medical students. We used a validated and reliable assessment tool for psychological distress and compared students' results with those in the same-age non-

clinical populations. However, there are limitations affecting the interpretation of our findings. Given the cross-sectional study design we cannot make conclusions about individual students' changes over time. We sampled graduate-entry medical students from the University of Wollongong only, and it is difficult to assess the representativeness of these students with those in other graduate-entry programmes without detailed student profile information (e.g. GAMSAT entry scores, undergraduate grades). In addition, the study response rate was moderate and it is possible that highly distressed students participated at higher rates than their less-distressed counterparts, introducing a response bias. We did not collect information regarding participants' undergraduate degree (e.g. science versus non-science) or family situation (e.g. responsibility for dependents/children) and these may be important factors in contributing to stress and anxiety in this older cohort which could be further explored in future research. Finally, coping skills and personality are important dimensions in psychological distress but were beyond the scope of this study. Despite these limitations, the findings cast doubt on the assumption that graduate-entry medical students are necessarily resistant to psychological distress. Further research, utilizing participant follow-up for initial non-response, is needed to better understand the extent and correlates of psychological distress in this population.

**Conclusions**

Despite being more experienced and mature than school-leavers, Australian graduate-entry medical students were highly distressed. Contrary to previous assumptions, anxiety and stress were highest for older students. Our results suggest that graduate-entry medical students warrant the same level of concern as their school-leaving counterparts. Further preventative and intervention strategies aimed at reducing stigma and equipping future doctors to help protect their own well- being are warranted.[20]

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## Disclosure

The authors report no conflict of interest. The authors alone are responsible for the content and writing of the paper.

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**Table 1. Demographic characteristics of participants (*N* =122)**

| *Characteristic* | N *(percentage)* |
|---|---|
| Age group: | |
| 21-24 years | 49 (40) |
| 25-29 years | 43 (35) |
| ≥30 years | 30 (25) |
| Sex: | |
| Male | 60 (49) |
| Female | 62 (51) |
| Year of study: | |
| First | 36 (30) |
| Second | 43 (35) |
| Third | 43 (35) |

**Table 2. DASS subscale results for medical students and the general population, expressed as means and proportion with psychological distress[a]**

| *Subscale and group* | *Raw scores* | | | *Proportion psychologically distressed* | | |
|---|---|---|---|---|---|---|
| | ***Mean (SD)*** | ***z-score*** | **p-*value*** | **N *(%)*** | ***Chi-square*** | **p-*value*** |
| **Depression** | | | | | | |
| Medical students | 7.6 (7.7) | 2.45 | <0.001 | 21 (17.2) | 1.9 | 0.166 |
| Population | 6.1 (6.9) | | | 130 (13.0) | | |
| **Anxiety** | | | | | | |
| Medical students | 9.4 (8.4) | 11.23 | <0.001 | 55 (45.1) | 111.0 | <0.001 |
| Population | 4.5 (4.9) | | | 130 (13.0) | | |
| **Stress** | | | | | | |
| Medical students | 12.6 (7.9) | 2.85 | 0.002 | 27 (22.1) | 9.0 | 0.003 |
| Population | 10.4 (8.3) | | | 130 (13.0) | | |

[a]Participants with subscale scores in the moderate to extremely severe range according to DASS manual.[15]

**Table 3. Sources of distress experienced by medical students, means and standard deviations[a]**

| *Source of distress* | *Mean (SD)* |
|---|---|
| Learning a large volume of material in a limited time | 2.16 (0.74) |
| Unsure of what to study and in what degree of detail | 1.86 (0.92) |
| Having less time for family and friends | 1.63 (0.88) |
| Assessment tasks | 1.50 (0.77) |
| Financial concerns | 1.48 (0.94) |
| Reduced physical exercise | 1.45 (0.98) |
| Having less time for hobbies or personal care | 1.42 (0.90) |
| Unsure of what depth to study learning objectives | 1.30 (1.03) |
| Presenting cases to doctors[b] | 1.29 (0.86) |
| Sleep deprivation | 1.22 (0.92) |
| Pressure from consultants[b] | 1.17 (0.90) |
| Performing clinical procedures[b] | 1.14 (0.87) |
| Interactions with senior doctors[b] | 1.11 (0.88) |
| Finding it harder to do well than in your previous degree | 0.98 (1.03) |
| Interactions with junior doctors[b] | 0.50 (0.65) |
| Talking with terminally ill patients[b] | 0.45 (0.61) |

[a]Score range: 0 'not a source of stress', 1 'mild', 2 'moderate', 3 'extreme source of stress'.

[b]Only second and third year were included for these analyses as first-year students had not yet been on clinical placement.

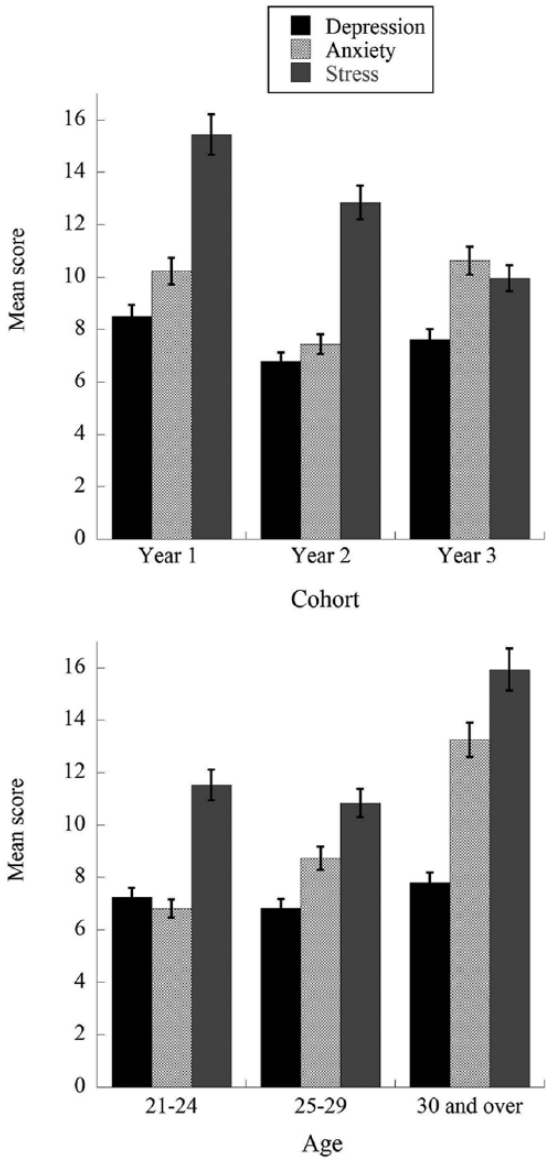



**Figure 1. Mean DASS subscale scores for medical students, by year of medical school and age.**
Error bars indicate standard deviations.