

Medical student mental health and the role of rumination

Juliette A Ward, Bess M Kew, Jennifer Jordan, Richard J Porter, Katie M Douglas

ABSTRACT

INTRODUCTION: Mental illness is the second-leading reason for tertiary students in Aotearoa New Zealand to consider dropping out of studies. Meta-analyses report moderate or greater symptoms of depression in 27% and anxiety in 34% of medical students. Rumination has been identified as a transdiagnostic risk factor for anxiety and depression symptoms in medical student populations, but no studies in New Zealand thus far have studied rumination alongside mental health symptoms in tertiary students.

METHODS: We conducted an online survey in 2023 to examine the rate of depression and anxiety symptoms, as well as rumination, in a Christchurch-based medical student sample. The survey included demographic questions (gender, ethnicity), the Depression Anxiety Stress Scale 21 (DASS-21) and the Ruminative Responses Scale (RRS), which includes questions on brooding, reflection and depression-related rumination symptoms.

RESULTS: One hundred out of a possible 335 (29.9%) medical students completed the survey. Seventy-six were female. Thirty-six percent reported moderate or greater symptom levels of depression, 45% of anxiety and 42% of stress. All RRS subscales were significantly positively correlated with depression, anxiety and stress symptoms. Female students reported significantly more symptoms of anxiety than male students. Asian students reported significantly higher levels of brooding and total rumination than Pākehā students.

CONCLUSION: This medical student cohort had concerning high levels of depression, anxiety and stress symptoms. Rumination is likely an important contributor to negative mental health outcomes. Further research is required to tailor accessible interventions for students with high levels of rumination.

Mental illness is the second leading reason for tertiary students in Aotearoa New Zealand to consider dropping out of studies.¹ Twelve percent and 10% of New Zealanders aged 15–24 report moderate or greater symptoms of depression and anxiety, respectively (according to General Anxiety Score-7 [GAD-7] and Patient Health Questionnaire-9 [PHQ-9]), and rates have increased over time.² These symptoms appear to be more prevalent among the New Zealand tertiary student population,³ including medical students.⁴ Globally, meta-analyses report moderate or greater symptoms of depression in 27%⁵ and anxiety in 34%⁶ of medical students; however, these estimates are based on studies that use a range of different measures, making direct comparison with the former studies challenging. What is clear is that medical students face many risk factors contributing to poor mental health, including academic pressure, social isolation due to study location or hours, fear of impact of help-seeking on career progression/fitness to practice, perfectionistic personality traits and mental health stigma in medicine.^{7,8}

Rumination has been identified as a transdiagnostic risk factor for anxiety and depression symptoms in medical student populations.^{9,10}

Rumination is characterised by repetitive thoughts focussing on one's negative emotions, and is categorised into two components: brooding and reflection.¹¹ Brooding has been linked to the development of depressive symptoms over time and maladaptive coping, whereas preliminary evidence suggests reflective rumination is associated with concurrent, but not longitudinal, depressive symptoms and more adaptive coping strategies.^{11,12} Although rumination is an important treatment target, no studies in New Zealand thus far have examined rumination alongside mental health symptoms in tertiary students. We conducted a survey to examine the rate of depression and anxiety symptoms, as well as rumination, in a Christchurch-based medical student sample.

Methods

Ethics approval for the survey was granted by the University of Otago Human Ethics Committee (23/044). Survey distribution occurred between 9 June 2023 and 31 August 2023. Survey promotion occurred through email, social media, in-person promotion at large group teaching and word-of-mouth. All participants provided written informed consent.

The online Qualtrics survey collected the following data:

- Demographic details: gender (female, male, other) and ethnicity.
- Depression, anxiety and stress symptoms: the Depression Anxiety Stress Scale 21 (DASS-21) was used to identify mild, moderate, severe and extremely severe levels of depression, anxiety and stress symptoms, based on established cutoffs on the DASS-42.¹³ DASS-21 is widely utilised as a measure of mental health symptoms in international student studies^{5,6} and was used in the most recent comparable New Zealand study.⁴
- Rumination: the Ruminative Responses Scale (RRS) included 22 questions on reflection, brooding and depression-related rumination symptoms.

In this paper, data were analysed using SPSS (version 31). Comparisons of mean scores of male and female genders used independent sample *t*-tests. A one-way ANOVA was used to explore the effect of ethnicity on survey outcomes. Games–Howell testing was used for *post hoc* comparisons. Pearson correlation analyses were used to investigate associations between rumination and depression and anxiety symptoms.

Results

One hundred out of a possible 335 (29.9%) medical students completed the survey. Seven students did not complete the RRS. Seventy-six students were female, 23 were male and one was non-binary. Respondents included 15 Māori, 57 Pākehā/NZ European, 25 Asian, one Pacific and two Other ethnicities.

Fifty-three percent of students reported above normal depression symptom levels: 17% mild, 16% moderate, 8% severe and 12% extremely severe. Fifty-five percent of students reported above normal anxiety symptom levels: 10% mild, 16% moderate, 13% severe and 16% extremely severe. Fifty-four percent of students reported above normal stress levels: 12% mild, 21% moderate, 15% severe and 6% extremely severe.

Mean DASS and RRS subscale scores for the total sample, as well as by gender and ethnicity, are presented in Appendix Table 1.

The mean DASS anxiety score was significantly higher in female students than male students (mean difference=4.37, $t=2.27$, $p<0.05$). Although female mean scores were higher in every other measure, the differences were not statistically significant.

Survey findings by ethnicity are displayed in Figure 1. One-way ANOVA, comparing Pākehā, Māori and Asian groups, found significant

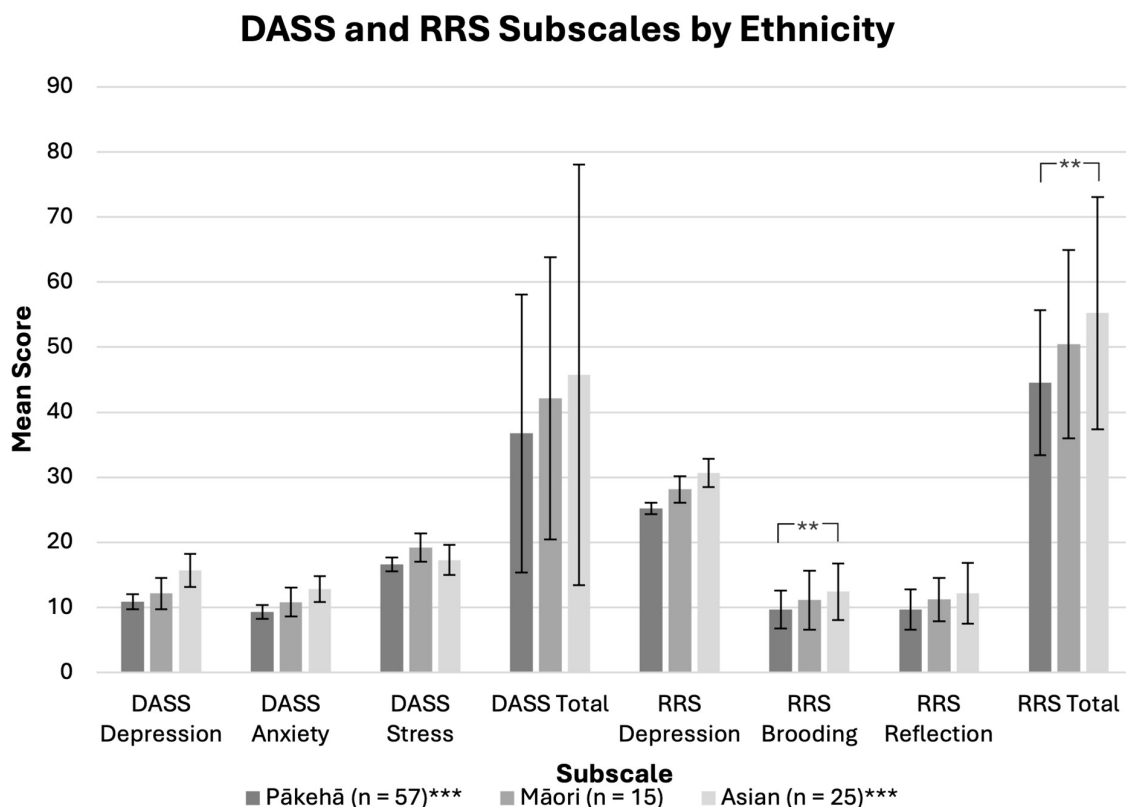
Table 1: Percentages of students meeting Depression Anxiety Stress Scale cutoff for moderate or greater levels of depression, anxiety and stress symptoms.

		Moderate or greater		
		Depression (>14)	Anxiety (>10)	Stress (>19)
Total (n=100)		36 (36%)	45 (45%)	42 (42%)
Gender	Female (n=76)	27 (36%)	40 (53%)	35 (46%)
	Male (n=23)	8 (35%)	4 (17%)	6 (26%)
Ethnicity	Māori (n=15)	5 (33%)	6 (40%)	7 (47%)
	Pākehā (n=57)	16 (28%)	24 (42%)	23 (40%)
	Asian (n=25)	14 (56%)	14 (56%)	11 (44%)
	Pacific (n=1)	1 (100%)	1 (100%)	1 (100%)
	Other (n=2)	0 (0%)	0 (0%)	0 (0%)

Table 2: Percentages of students meeting Depression Anxiety Stress Scale cutoffs for severe to extremely severe levels of depression, anxiety and stress symptoms.

		Severe to extremely severe		
		Depression (>21)	Anxiety (>15)	Stress (>26)
Total (n=100)		20 (20%)	29 (29%)	21 (21%)
Gender	Female (n=76)	17 (22%)	25 (33%)	15 (20%)
	Male (n=23)	3 (13%)	3 (13%)	5 (22%)
Ethnicity	Māori (n=15)	2 (13%)	4 (27%)	5 (33%)
	Pākehā (n=57)	8 (14%)	13 (23%)	9 (16%)
	Asian (n=25)	10 (40%)	11 (44%)	6 (24%)
	Pacific (n=1)	0 (0%)	1 (100%)	1 (100%)
	Other (n=2)	0 (0%)	0 (0%)	0 (0%)

Figure 1: Mean scores of the DASS and RRS subscales in Pākehā, Māori and Asian students.*



*Error bars represent +1 standard error of the mean.

**Significant differences found on ANOVA *post hoc* analysis.

***n=54 Pākehā and n=21 Asian for RRS mean scores.

DASS = Depression Anxiety Stress Scale; RRS = Ruminative Responses Scale.

Minimum and maximum possible scores: DASS depression, anxiety and stress subscales: 0–42; DASS total: 0–126; RRS brooding and reflection: 5–20; RRS depression: 12–48; RRS total: 22–88.

Table 3: Pearson correlations between subscales of DASS and RRS.

	DASS depression	DASS anxiety	DASS stress	DASS total
RRS depression	.87***	.64***	.65***	.83***
RRS brooding	.71***	.65***	.68***	.78***
RRS reflection	.67***	.46***	.48***	.62***
RRS total	.85***	.65***	.67***	.83***

***Correlation at 0.001 (two-tailed).

n=93.

DASS = Depression Anxiety Stress Scale; RRS = Ruminative Responses Scale.

between-group differences across all RRS subscales ($p < 0.02$). *Post hoc* analysis revealed that Asian students had significantly higher mean scores than Pākehā students in RRS brooding ($F=4.80$, $p=0.03$) and RRS total ($F=5.06$, $p=0.04$).

Exploratory analysis revealed significant, positive correlations among all DASS and RRS subscales, including their total scores (see Table 3).

Discussion

This survey shows concerning high levels of depression, anxiety and stress symptoms in medical students, with clear links to rumination. A substantial proportion of this Christchurch-based medical student cohort had moderate or greater levels of depression symptoms (36%), anxiety symptoms (45%) and stress (42%). Female students reported significantly more symptoms of anxiety than male students. Asian students reported significantly higher levels of brooding and total rumination than Pākehā students. While not statistically significant, Māori students reported higher levels of depression and anxiety symptoms, stress and rumination than Pākehā students. This is in keeping with the higher prevalence of mental illness symptoms reported in Māori adults compared to all other ethnicities in the New Zealand Health Survey.² These findings likely reflect broader social and structural determinants of mental health. Further research is required to explore the experience of Māori medical students, ideally within a larger sample size for increased power.

This sample reported greater levels of depression and anxiety symptoms than the Tōku Oranga study, which found moderate or greater symptom

levels of 32% depression and 34% anxiety using the DASS-21 on a Christchurch-based medical student sample in 2019–2020.⁴ Compared with this study, the Tōku Oranga study has very similar demographics and response rate (28%). The increase in depression and anxiety symptoms in a similar cohort may be partly explained by lasting effects of the COVID-19 pandemic, or may simply reflect worsening mental health in the broader population as reported in the 2024 New Zealand Health Survey.²

This is the first study to examine rumination in New Zealand medical students. We found strong positive correlations between rumination, particularly the brooding component, and depression, anxiety and stress symptoms in our study cohort. This is consistent with existing research, highlighting rumination as a transdiagnostic risk factor and potential treatment target.^{9,10} We are now, therefore, developing and testing brief interventions targeting rumination, with the potential for use across New Zealand tertiary student samples in treating and preventing depression and anxiety disorders (trial registration number: ACTRN12624000758505p).

This study has several limitations. Response bias is likely, with a response rate of 30%. Male students were under-represented at 23%. Self-selection may have attracted individuals with experience of mental illness, while excluding individuals with mental illness severe enough to prevent participation. DASS-21 and RRS are self-reported symptom questionnaires, not formal diagnostic measures. Finally, the cross-sectional study design prevents any understanding of causality.

Medical student mental health in New

Zealand is a major concern. The medical profession ultimately relies on the wellbeing of its future practitioners, underscoring the need for focussed attention in this area. Although systemic and institutional approaches are needed to

address the stressors students face, rumination is likely an important contributor to negative mental health outcomes. Further research is required to tailor accessible interventions for students with high levels of rumination.

COMPETING INTERESTS

KMD and RJP use software provided free-of-charge by Scientific Brain Training Pro for Cognitive Remediation trials. KMD is an independent clinical investigator on DSMC and co-chair of the Australasian Society of Bipolar and Depressive Disorders. RJP has received support for travel to educational meetings from Servier and Lundbeck.

ACKNOWLEDGEMENTS

The research presented in this paper was funded by the Health Research Council of New Zealand (HRC NZ; grant number: 22/848). HRC NZ had no further role in any aspect of the paper. JAW would like to acknowledge funding from the Canterbury Medical Research Foundation during preparation of this manuscript.

AUTHOR INFORMATION

Juliette A Ward: Medical Student, Otago Medical School, University of Otago, Christchurch, Aotearoa New Zealand.

Bess M Kew, MSc, BSc(Hons): Department of Psychological Medicine, University of Otago, Christchurch, Aotearoa New Zealand.

Jennifer Jordan, PhD, Dip Clin Psych: Associate Professor, Department of Psychological Medicine, University of Otago, Christchurch, Aotearoa New Zealand.

Richard J Porter: Distinguished Professor, Department of Psychological Medicine, University of Otago, Christchurch, Aotearoa New Zealand; Specialist Mental Health Services, Health New Zealand – Te Whatu Ora, Canterbury, Aotearoa New Zealand.

Katie M Douglas: Research Associate Professor and Clinical Psychologist, Department of Psychological Medicine, University of Otago Christchurch, Aotearoa New Zealand.

CORRESPONDING AUTHOR

Katie M Douglas: Research Associate Professor and Clinical Psychologist, Department of Psychological Medicine, University of Otago Christchurch, PO Box 4345, Christchurch 8140, Aotearoa New Zealand.
E: katie.douglas@otago.ac.nz

URL

<https://nzmj.org.nz/journal/vol-139-no-1635/medical-student-mental-health-and-the-role-of-rumination>

CITATION

Ward JA, Kew BM, Jordan J, et al. Medical student mental health and the role of rumination. *N Z Med J.* 2026 May 29;139(1635):125-132. doi: 10.26635/6965.7338.

REFERENCES

- Gharibi K. Kei Te Pai? Report on Student Mental Health in Aotearoa. New Zealand Union of Students' Association; 2018.
- Ministry of Health. *Mental Health and Problematic Substance Use: New Zealand Health Survey: 2016/17 and 2021-23 [Internet]*. Wellington: Ministry of Health; 2024 [cited 2025 Dec 9]. Available from: https://www.health.govt.nz/system/files/2024-06/mental_health_and_problematic_substance_use_report_-_final.pdf
- Samaranayake CB, Fernando AT. Satisfaction with life and depression among medical students in Auckland, New Zealand. *N Z Med J.* 2011;124(1341):12-17.
- Donovan KA, Beaglehole B, Frampton CM, et al. Tōku Oranga: the subjective wellbeing and psychological functioning of postgraduate and medical students in Ōtautahi Christchurch. *N Z Med J.* 2023;136(1586):51-62. doi: 10.26635/6965.6243.
- Rotenstein LS, Ramos MA, Torre M, et al. Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation Among Medical Students: A Systematic Review and Meta-Analysis. *JAMA.* 2016;316(21):2214–2236. doi: 10.1001/jama.2016.17324.
- Quek TT, Tam WW, Tran BX, et al. The Global Prevalence of Anxiety Among Medical Students: A Meta-Analysis. *Int J Environ Res Public Health.* 2019;16(15):2735. doi: 10.3390/ijerph16152735.
- Beautrais A. Stress and suicide in medical students and physicians. *New Zealand Medical Student Journal.* 2020;30:11-14. doi: 10.57129/EQAM7870
- Sayburn A. Why medical students' mental health is a taboo subject. *BMJ.* 2015;350:h722. Available from: <https://www.jstor.org/stable/26973355?seq=1>
- Li GX, Liu L, Wang MQ, et al. The longitudinal mediating effect of rumination on the relationship between depressive symptoms and problematic smartphone use in Chinese university students: A three-wave cross-lagged panel analysis. *Addict Behav.* 2024;150:107907. doi: 10.1016/j.addbeh.2023.107907.
- Varma P, Boomika J. Rumination, anxiety & sleep quality among medical professionals. *International Journal of Interdisciplinary Approaches in Psychology.* 2025;3(8):132. doi: 10.61113/ijiap.v3i8.1132
- Treynor W, Gonzalez R, Nolen-Hoeksema S. Rumination Reconsidered: A Psychometric Analysis. *Cogn Ther Res.* 2003;27(3):247-259. doi: 10.1023/A:1023910315561.

12. Burwell RA, Shirk SR. Subtypes of rumination in adolescence: associations between brooding, reflection, depressive symptoms, and coping. *J Clin Child Adolesc Psychol.* 2007;36(1):56-65. doi:10.1080/15374410709336568.
13. Lovibond SH, Lovibond PF. *Depression Anxiety & Stress Scales.* 2nd ed. Sydney: Psychology Foundation; 1995. doi: 10.1037/t01004-000.

Appendix

Appendix Table 1: Mean scores of the DASS and RRS by gender and ethnicity.

	Total	Gender			Ethnicity				
		Female	Male	Non-binary	Māori	Pākehā	Asian	Pacific	Other
DASS depression	12.8 [SD 10.035]	13.0 [SD 10.124]	10.0 [SD 9.742]	20.0 [SD 0.000]	12.0 [SD 9.273]	11.0 [SD 8.676]	16.0 [SD 12.867]	16.0 [SD 0.000]	5.0 [SD 7.071]
DASS anxiety	10.3 [SD 8.576]	11.0 [SD 8.705]	6.0 [SD 5.336]	30.0 [SD 0.000]	11.0 [SD 8.678]	9.0 [SD 7.842]	13.0 [SD 10.017]	16.0 [SD 0.000]	3.0 [SD 4.243]
DASS stress	17.2 [SD 9.211]	17.0 [SD 8.583]	18.0 [SD 8.915]	32.0 [SD 0.000]	19.0 [SD 8.274]	17.0 [SD 8.211]	17.0 [SD 11.617]	32.0 [SD 0.000]	11.0 [SD 7.071]
DASS total	39.7 [SD 24.718]	41.0 [SD 24.337]	34.0 [SD 23.148]	82.0 [SD 0.000]	42.0 [SD 21.666]	37.0 [SD 21.353]	46.0 [SD 32.333]	64.0 [SD 0.000]	19.0 [SD 18.385]
RRS depression	27.0 [SD 7.842]	27.0 [SD 7.870]	25.0 [SD 7.810]	35.0 [SD 0.000]	28.0 [SD 7.873]	25.0 [SD 6.631]	31.0 [SD 9.795]	32.0 [SD 0.000]	25.0 [SD 5.657]
RRS brooding	10.6 [SD 3.664]	11.0 [SD 3.742]	9.0 [SD 2.915]	16.0 [SD 0.000]	11.0 [SD 4.518]	10.0 [SD 2.875]	12.0 [SD 4.342]	13.0 [SD 0.000]	9.0 [SD 1.414]
RRS reflection	10.6 [SD 3.655]	11.0 [SD 3.522]	9.0 [SD 3.830]	15.0 [SD 0.000]	11.0 [SD 3.364]	10.0 [SD 3.072]	12.0 [SD 4.651]	15.0 [SD 0.000]	12.0 [SD 3.536]
RRS total	48.1 [SD 13.979]	49.0 [SD 13.916]	43.0 [SD 13.500]	66.0 [SD 0.000]	49.0 [SD 14.461]	45.0 [SD 11.142]	55.0 [SD 17.827]	60.0 [SD 0.000]	46.0 [SD 10.607]

DASS: total n=100, female n=76, male n=23, non-binary n=1, Māori n=15, Pākehā n=57, Asian n=25, Pacific n=1, Other n=2.

RRS: total n=93, female n=72, male n=20, non-binary n=1, Māori n=15, Pākehā n=54, Asian n=21, Pacific n=1, Other n=2.

DASS = Depression Anxiety Stress Scale; RRS = Ruminative Responses Scale; SD = standard deviation.

Minimum and maximum possible scores: DASS depression, anxiety and stress: 0–42; DASS total: 0–126, RRS brooding and reflection: 5–20; RRS depression: 12–48; RRS total: 22–88.

The one student identifying as non-binary was included in all analyses except for the gender-specific analyses.