

# A scoping review of mental health status in Australian medical students and doctors-in-training (DiT)

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## Abstract

**Background and Aims:** The study and practice of medicine are known to contribute to burnout in medical students and junior doctors. There is limited data on the degree of mental health burden for Australian medical students and doctors-in-training (DiT). This scoping review aims to explore the impact of medical training on the mental health of Australian medical students and DiT. Exploring the mental health landscape across different stages of training will help to establish putative factors underlying psychiatric comorbidities in this demographic.

**Methods:** The Joanna Briggs Institute (JBI) framework for scoping review was utilized, involving the Population/Concept/Context (PCC) criteria to identify the target population and develop the search strategy. Peer-reviewed articles, published in English from 2012 to 2022 focusing on Australian medical students' and doctors-in-training mental health were considered.

**Results:** Of the 177 articles identified, 24 studies were included in the review. The majority of the studies focused on DiT ( $n = 19$ ) of which interns and residents were most well represented ( $n = 12$ ) followed by surgical training ( $n = 5$ ), with general practice (GP) ( $n = 2$ ) and physician specialties (nil) being poorly represented. Most studies were quantitative ( $n = 18$ ), with qualitative studies ( $n = 6$ ) under represented. Common mental health themes identified were overall psychological distress, burnout, and depression/suicidal ideation with workplace harassment and discrimination being less well represented.

**Conclusions:** Australian DiT are not equally represented in the literature with how different specialty training pathways impact their mental health. Most studies were cross-sectional, preventing a detailed longitudinal assessment of burnout and work-associated psychological distress.

## KEYWORDS

doctors-in-training, interns, junior doctors, mental health, registrars, residents

Disclosures: Anand Ganes and Priya Sunder affirm that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of this study have been omitted; and that any discrepancies from the study as planned have been explained.

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## 1 | BACKGROUND

The study and practice of medicine have recently been identified as contributing to burnout in medical students and junior doctors given the nature and demands of their profession.<sup>1,2</sup> This has been linked to impairments in mental well-being such as depression and suicide.<sup>3</sup> Mental wellbeing can be defined as a “state in which the individual realizes his or her abilities, can cope with the normal stresses of life, can work productively and fruitfully, and can contribute to his or her community.”<sup>4</sup> Compared to the general population, Australian doctors and medical students appear to have higher rates of general stress, with doctors specifically having poorer mental wellbeing and greater suicidal attempts.<sup>5</sup> The training required by Australian doctors is considered to be demanding with long working hours, stressful working environments, and overall challenges in preserving personal commitments. This is in keeping with global data, demonstrating severe rates of psychological distress in junior doctors from countries in Europe and Asia.<sup>6,7</sup> Whilst emerging evidence sheds light on the mental health burden in this demographic, little is known of the factors causing this phenomenon. This scoping review aims to explore the impact of training and workplace factors have on mental health in medical students and DiT in Australia. This will allow us to firstly, identify factors in medical training that can be addressed to improve the mental health of medical students, secondly, prevent further psychiatric burden in the medical profession, and ultimately support the development of evidence-based interventions for junior doctors.

## 2 | METHODS

The scoping review was conducted as per the Joanna Briggs Institute (JBI) Protocol for Scoping Reviews framework described elsewhere.<sup>8</sup> The rationale for conducting a scoping review was to map the landscape of literature surrounding Australian medical students and DiT given the different methodologies of qualitative and quantitative approaches, and the paucity of Australian-specific literature that would not allow for a robust systematic review.

### 2.1 | Review question

The review question was developed using the Population/Concept/Context (PCC) framework.<sup>8</sup> Understanding that medical education in Australia involves medical students (via direct and graduate entry) and junior doctors in various specialty training pathways with variable impacts on mental health. As such, “What is the impact of medical training throughout medical school and post-graduate training on the mental well-being of medical students and junior doctors?” was developed.

### 2.2 | Eligibility criteria

Peer-reviewed qualitative and quantitative studies including observational, quasi-experimental, and randomized control trials were

considered. Medical students who gained entry directly after high school or graduate entry and DiT were included in this review. The DiT for this review included doctors from internship to senior registrars before the attainment of fellowship. Only studies including Australian medical students and/or DiT were included. Studies published after 2012 were included to reflect the contemporary practices in medical schools and training pathways for junior doctors.

### 2.3 | Search strategy

The research question was simplified to five domains including “medical school and training”, “stream of training”, “mental health effects”, “types of studies,” and “country of publication” to derive search terms. Phrase searching, truncation, and wild card symbols with alternate word and spelling strategies were used to maximize the coverage of relevant literature. Exclusion criteria included studies published in languages other than English, before 2012 and outside the area of interest. The databases included in the search were Ovid MedLine, PsycINFO, Cochrane Library, Ovid Embase, and PubMed.

### 2.4 | Data collection and extraction

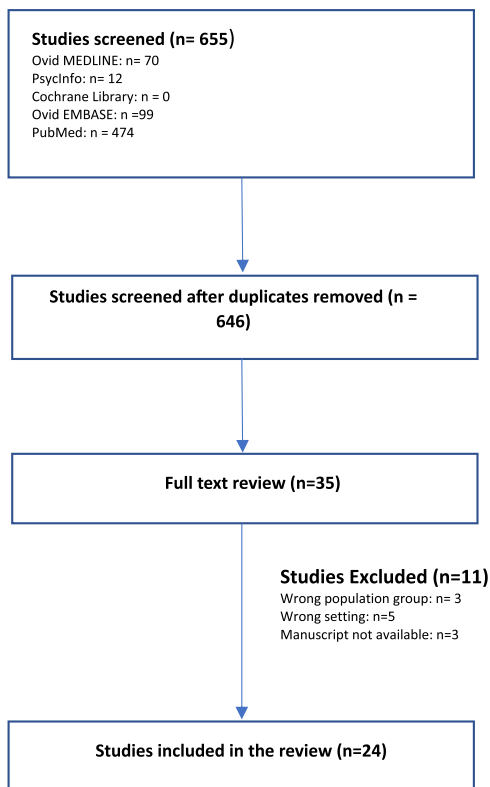
Shortlisted articles from the relevant databases were imported into the Covidence data management tool, with duplicated studies being automatically removed. After excluding the duplicated search, 646 studies were screened based on the title and abstract, with 35 studies being short-listed for full-text review, of which 24 studies were included in the review. Both abstract screening and full-text reviews were conducted independently by the authors (Anand Ganes and Priya Sunder). A summary of the study selection process is detailed in Figure 1. An overview of the included articles is provided in Table 1.

Data from studies included after a full-text review were extracted using a Microsoft Excel template. Author details, study design, sample size, study location, and study findings were documented. The studies were categorized based on the stage of training, specialty of training, and whether they were qualitative or quantitative (Figure 2). Mental health themes (Figure 3) were generated using thematic analysis. This involved each researcher conducting full-text reviews and coding the relevant sub-themes present in each article. These codes were collated using Microsoft Excel with recurrent themes being identified through an iterative process. Each generated theme was cross-analyzed and revised in conjunction with the authors.

## 3 | FINDINGS

### 3.1 | Mental health in medical students

Six studies assessed the impact of medical school on students' psychological state (Figure 2). Entrance into medical school in Australia can be directly after completion of high school or as a graduate entry



**FIGURE 1** Search strategy.

candidate. A cross-sectional analysis of medical students noted no overall difference in burnout between direct and graduate entry medical students.<sup>9</sup> While graduate entry students were more well-prepared for training, they had increased maladaptive coping strategies with significantly higher alcohol consumption compared to direct entry students.<sup>9</sup> Despite no differences in burnout between graduate entry and direct entry cohorts, medical students had significantly higher levels of burnout than the general population.<sup>10</sup> This was further exacerbated by the COVID-19 pandemic as measured in a recent cross-sectional analysis using the Kessler-10 (K10) score in graduate entry students.<sup>11</sup> First-year medical students had the highest mean K10 score compared to the rest of the cohort. In this study, the main concern raised by medical students across all years was the impact of COVID-19 on studies and social isolation secondary to pandemic restrictions. Common coping strategies included connectedness using online social networking and practicing mindfulness, with less frequently documented strategies including support from mental health professional services. This may be due to the stigma associated with having mental health symptoms. Cryer et al demonstrated that medical students, irrespective of direct or graduate entry, were less likely to disclose depression and suicidal ideation to family and friends and even less so to colleagues.<sup>12</sup> This is supported by findings from a large cross-sectional study assessing stigma in medical students where personal views of depression in medical students affected their perceived stigma towards it. Students who believed “I would feel ashamed if I had depression” were statistically more likely to view depression as a measure of weakness, view individuals with depression as “unstable,”

and are less likely to view it as a ‘real medical illness’.<sup>13</sup> History of anxiety, higher K10 scores, and year level of medical school training were independent predictors of mental health stigma in this cohort. Race was also an independent predictor with Caucasian students having a greater degree of perceived stigma than Asian, Middle Eastern, African, and Hispanic students. Practicing mindfulness has been noted to improve psychological well-being.<sup>11</sup> This is supported by a recent quasi-experimental study and observational studies that found mindfulness in medical students had a beneficial role in reducing stress and psychological distress.<sup>14</sup>

## 3.2 | Mental health in doctors in training

The terrain of mental health research in DiT vastly differs for medical students, owing to a range of experience experiences, different specialty program requirements, and varied workplace environments. Overall, nineteen studies assessed the psychological burden of DiT spanning from internship to specialist training; eight studies involved interns and residents, seven involved registrars, and three studies that did not specify the stage of training or included DiT from different stages of training.

### 3.2.1 | Mental health status of interns and residents

Mental health burden throughout internship had interesting patterns; personal and work-related burnout being significantly higher and peaking midway through the internship and patient-related burnout increasing linearly over the year.<sup>15</sup> In another cross-sectional study, interns and residents in 2014 had more favourable scores in psychometric questionnaires compared to 2009.<sup>16</sup> In comparison to the general population, the 2014 cohort had a statistically worse overall mental health state. A cross-sectional survey conducted by Pan et al assessing 1900 interns and residents' mental health state using the K10 survey demonstrated that 50% of doctors were experiencing moderate or higher levels of psychological distress compared to a 30% prevalence noted in the general population.<sup>17</sup> Multivariate analysis in this group highlighted that workplace bullying, dissatisfaction, and poor relationships with other junior doctors were associated with higher rates of psychological burden.

The common themes identified as barriers to psychological well-being include the amount of workload, rostered hours, and bullying by patients and colleagues contributing to poor workplace culture.<sup>18–20</sup> To quantify the impact of workload on mental health outcomes, a subgroup analysis of 2706 junior doctors surveyed as part of the broader Beyond Blue National Mental Health Survey of Doctors and Medical Students in 2013 was conducted.<sup>21</sup> A strong positive correlation was noted between hours worked, psychological distress and suicidal ideation, after adjusting for confounders including age, gender, training stage, specialty of practice, marital status, and history of overseas medical training. Junior doctors working greater than 55 h per week have double the odds of experiencing common mental

TABLE 1 List of included articles for review of state of mental health in Australian medical students and doctors-in-training.

Author/Year	Aim	Study Design	Sample	Cohort	Findings	Survey
Parr et al.	Incidence of burnout in interns	Prospective cohort study	180	Interns	<ul style="list-style-type: none"> <li>Burnout is common during internship in the personal, work and patient related burnout domains.</li> </ul>	Copenhagen Burnout Inventory
Hoffman et al.	Identify causes of stress and burnout in registrars	Qualitative study: Semi-structured interviews	10	G.P and hospital registrars	<ul style="list-style-type: none"> <li>Interaction of dysregulated self-expectations, poor self-care and expectations and responses from others overlapping can result in burnout.</li> </ul>	N/A
Hobi et al.	Identify strategies to preserve mental wellbeing and perceived barriers to above strategies	Qualitative study: Semi-structured interviews	15	Interns and residents	<ul style="list-style-type: none"> <li>Exercise, balanced diet, sleep and workplace wellbeing activities preserve mental health wellbeing</li> <li>Workplace factors – high workload, stigma at workplace, inflexible rostering and workplace discrimination contributed to poor mental health.</li> </ul>	N/A
O'Sullivan et al.	Factors impacting doctors entering speciality training pathways	Qualitative study: Semi-structured interviews	32	Residents	<ul style="list-style-type: none"> <li>DIT applying for non-GP training experience greater barriers</li> <li>Greater barriers to training pathway is associated with greater psychologic distress.</li> </ul>	N/A
Hunter et al.	Investigate mental health effects of junior doctors during the COVID-19 pandemic	Qualitative study: Online survey with thematic analysis	619	Interns, Residents, Registrars	<ul style="list-style-type: none"> <li>COVID-19 pandemic exacerbated pre-existing workplace issues including increased workload, insufficient rest between shifts, career disruption and poor psychologic support.</li> <li>Nonwork-related factors included social isolation and public/political response to COVID-19.</li> </ul>	N/A
Forbes et al.	Identify cases of psychologic distress	Qualitative study: Semi-structured interviews	15	Residents	<ul style="list-style-type: none"> <li>Workplace factors included longstanding culture of increased workload, poor work-life balance.</li> <li>Workplace discrimination included harassment and bullying by colleagues and patients.</li> <li>Lack of support was noted from senior staff/health organisation towards junior doctors</li> <li>Stigma of seeking mental health support by junior doctors worsened psychologic distress.</li> </ul>	N/A
Petrie et al.	Identify factors impacting mental health during medical training	Qualitative study: Semi-structured interviews	12	Interns, Residents, Registrars	<ul style="list-style-type: none"> <li>Factors contributing to poor mental health included professional hierarchies, occupational stress, emotional labour and carrying work stress home.</li> </ul>	N/A

TABLE 1 (Continued)

Author/Year	Aim	Study Design	Sample	Cohort	Findings	Survey
Chanchali et al.	Impact of peer-led mentoring on interns' mental health	Randomised control trial (thematic analysis of results)	53	Interns	<ul style="list-style-type: none"> <li>Peer led mentoring resulted in improved morale, job satisfaction, psychosocial wellbeing and reduced stress levels.</li> </ul>	N/A
Keivic et al.	Identify risk factors contribution to poor mental health in surgical trainees	Cross-sectional study	83	Registrars	<ul style="list-style-type: none"> <li>Mean Mental Component Summary (MCS) significantly lower in male and female trainees compared to population mean.</li> <li>Poor work satisfaction, perceived lack of support, hours of overtime work, unpaid overtime work were strong predictors of poor MCS score.</li> </ul>	36-item Short Form Survey Physical Activity Questionnaire
Gunasingam et al.	Determine prevalence of burnout and the impact of debriefing on burnout	Randomised control study	31	Interns and Residents	<ul style="list-style-type: none"> <li>At baseline, 68% of the cohort met burnout in at least one domain</li> <li>De-briefing alone was not associated with improvement in burnout scores.</li> </ul>	Maslach Burnout Inventory
Cheng et al.	Assessing types of stigma associated with depression, understanding of depression, levels of stress and history of medical illnesses in medical students	Cross-sectional study	1010	Medical Students	<ul style="list-style-type: none"> <li>25% of medical students reported a history of depression</li> <li>Higher stigma against mental health illness was noted in those with a history of anxiety and higher psychological stress (as per the K-10 survey)</li> <li>Students with high levels of stigma towards depression are less likely to disclose own mental health issues to others.</li> </ul>	Kessler Psychological Distress Scale
Petrie et al.	Examines relationship of hours of work to mental health state in junior doctors	Cross-sectional study	2706	Interns, Residents and Registrars	<ul style="list-style-type: none"> <li>Australian junior doctors work an average of 50.1 h per week.</li> <li>Those working greater than 55 h were significantly more likely to report common mental disorders (assessed using General Health Questionnaire-28 survey) to those working 40-44 h per week.</li> </ul>	General Health Questionnaire-28 score
Cryer et al.	Compare stigma associated with suicide and common mental disorders compared to nonpsychiatric co-morbidities in medical students	Cross-sectional study	116	Medical Students	<ul style="list-style-type: none"> <li>Medical students are less likely to disclose suicidal ideation, depression compared to nonpsychiatric co-morbidities.</li> <li>Greater stigma is associated with suicide compared to depression.</li> </ul>	Stigma of Suicide Scale (Short Form-16 item score)
Koppe et al.	Assessing efficacy of Balint groups in improving work related stress in GP and GP registrars.	Quasi-experimental study	21	Registrars	<ul style="list-style-type: none"> <li>Balint group participants' were significant better post intervention compared to the control group</li> </ul>	Psychological Medicine Inventory score

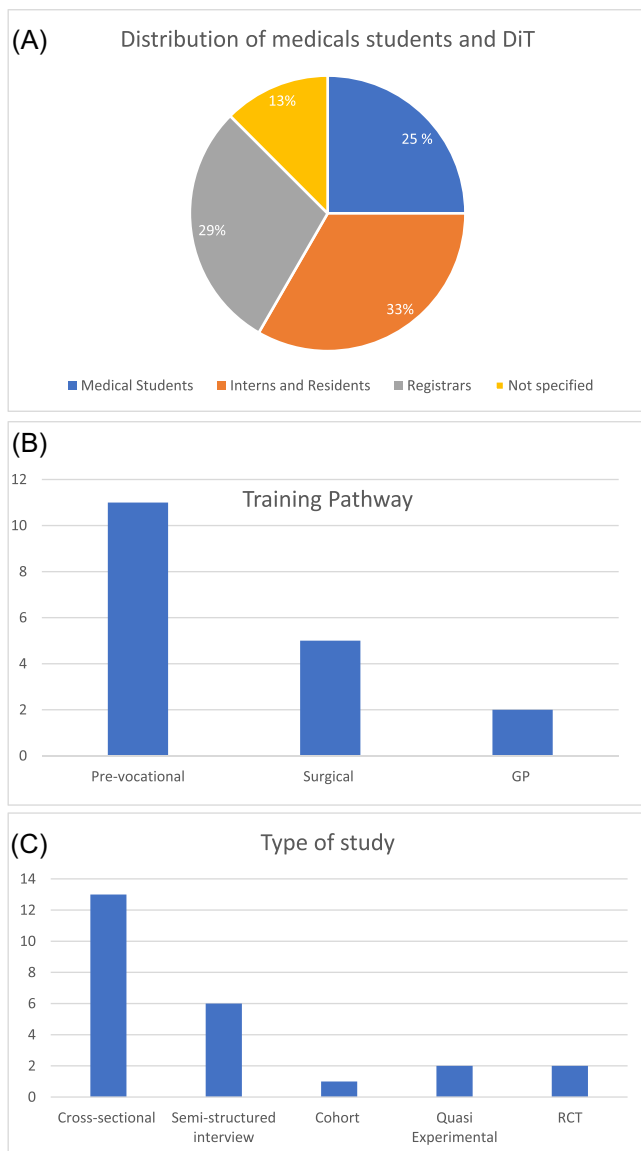
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TABLE 1 (Continued)

Author/Year	Aim	Study Design	Sample	Cohort	Findings	Survey
Kakoschke et al.	Assessing the impact of mindfulness based lifestyle course on medical students' stress	Quasi-experimental study	205	Medical Students	<ul style="list-style-type: none"> <li>A 5-week mindfulness based lifestyle course significantly improves stress</li> </ul>	Perceived Stress scale Mental Health Continuum Short Form Utrecht Work Engagement Scale for Students Freiburg Mindfulness Inventory Mindfulness Adherence Questionnaire
Lyons et al.	Impact of COVID-19 pandemic on medical students' mental wellbeing and strategies to improve mental wellbeing	Cross-sectional study	297	Medical Students	<ul style="list-style-type: none"> <li>Across the cohort of medical students, moderate psychological distress was noted (as per the K-10 survey), with the greatest distress noted in 1st year medical students.</li> <li>Greatest factor during COVID-19 contributing to psychological distress was social isolation.</li> <li>Social networking and mindfulness were most commonly noted to maintain mental wellbeing.</li> </ul>	Kessler Psychological Distress Scale
Soares et al.	Assess stress levels in Australian junior doctors and compare to American junior doctors.	Cross-sectional study	38	Interns and Residents	<ul style="list-style-type: none"> <li>Australian junior doctors have lower stress compared to American junior doctors.</li> <li>Compared to 2009, Australian junior doctors in 2014 had lower mean stress levels.</li> <li>In comparison to the general population scores, the 2014 cohort had a significantly higher stress level.</li> <li>Increased stress was correlated with junior doctors who reported high career anxiety.</li> </ul>	Perceived Stress Scale
Slonim et al.	Determine the impact of self-care behaviours and dispositional mindfulness on psychological distress in medical students	Cross-sectional study	207	Medical Students	<ul style="list-style-type: none"> <li>Greater dispositional mindfulness practice was associated with lower levels of distress.</li> <li>Greater levels of self-care were associated with lower levels of psychological distress.</li> <li>Dispositional mindfulness had a further moderator effect of the relationship between self-care and psychological distress</li> </ul>	Depression, Anxiety and Stress Scales
Kovoor et al.	Identify factors impacting on mental health of surgical trainees	Cross-sectional study	205	Registrars	<ul style="list-style-type: none"> <li>Increased stress was significantly higher in female trainees, those belonging to a minority race, less seniority and greater exposure to COVID-19 patients.</li> </ul>	Perceived Stress Scale

TABLE 1 (Continued)

Author/Year	Aim	Study Design	Sample	Cohort	Findings	Survey
Arora et al.	Assess the prevalence and contributing factors to burnout in orthopaedic trainees	Cross-sectional study	51	Registrars	<ul style="list-style-type: none"> <li>Depression (measured with the Patient Health Questionnaire-2 scale) was strongly associated with increased seniority</li> <li>53% of orthopaedic reported burnout (as per the)</li> <li>Burnout was associated with career dissatisfaction and poor work-life balance.</li> </ul>	Maslach Burnout Inventory
Raftopoulos et al.	Assess prevalence and risk factors of burnout in otolaryngology-head and neck surgery trainees	Cross-sectional study	60	Registrars	<ul style="list-style-type: none"> <li>73% of ENT otolaryngology-head and neck surgery trainees reported burnout in at least one of the 3 burnout domains.</li> <li>Burnout was associated with training location, geographic isolation from social supports, poor work-life balance and negative impacts of training on trainees' partner/family.</li> </ul>	Maslach Burnout Inventory
Ryder et al.	Investigate resilience, stress and burnout and support provided to obstetric and gynaecology trainees	Cross-sectional study	231	Registrars	<ul style="list-style-type: none"> <li>Moderate levels of resilience demonstrated by trainees</li> <li>55% of trainees reported burnout</li> <li>57% of trainees reported low to very low support from the training faculty.</li> </ul>	14-item Resilience Scale
DeWitt et al.	Assessing differences in mental health status for graduate versus undergraduate entry into medical school	Cross-sectional study	688	Medical Students	<ul style="list-style-type: none"> <li>Greater satisfaction was noted in graduate entry students.</li> <li>No difference noted in rates of burnout in graduate versus undergraduate medical students.</li> <li>Graduate entry medical students had greater levels of alcohol use and hazardous drinking behaviour.</li> </ul>	Copenhagen Burnout Inventory Interpersonal Reactivity Index Alcohol Use Disorders Identification Test
Yangpan et al.	Determine the association of psychologic distress and the work environment and coping mechanisms.	Cross-sectional study	540	Interns and Residents	<ul style="list-style-type: none"> <li>Workplace bullying was reported by 27% of junior doctors.</li> <li>50% of junior doctors reported moderate or higher levels of psychological distress.</li> <li>Factors strongly associated with psychological distress were increased workload, poor work satisfaction and experiencing workplace bullying and</li> </ul>	Kessler Psychological Distress Scale



**FIGURE 2** (A) Distribution of studies focusing on medical students and doctors-in-training (DiT). (B) Studies stratified according to speciality training pathway,  $n = 24$  (total). (C) Studies stratified according to design type  $n = 24$  (total).

disorders and suicidal ideation compared to the reference group working 40–44 h per week. A recent qualitative study noted that the aforementioned variables were acutely worsened during the height of the COVID-19 pandemic, owing to staff furlough and rapid re-deployment of the junior medical workforce.<sup>22</sup>

Another variable impacting the mental health of residents is the specialty of practice. Non-General Practice (GP) training pathways have increased difficulty in gaining entry owing to challenging application processes, with the idea of recurrent failure causing reduced morale and resilience.<sup>23</sup>

Of the eight studies on interns and residents, two focused on interventions to improve the mental health of this group. The effect of peer-led mentoring of interns assessed with a randomised control study demonstrated significant benefits including improved

navigation of the hospital system, improved clinical skills, provision of rotation-specific advice, and greater connectedness among junior doctors. This was in part due to increased debriefing opportunities and an improved sense of overall support in all aspects of being a junior doctor.<sup>24</sup> However, debriefing alone was not associated with any meaningful reduction in overall burnout in interns as noted in another RCT assessing the impact of debriefing alone on burnout.<sup>25</sup>

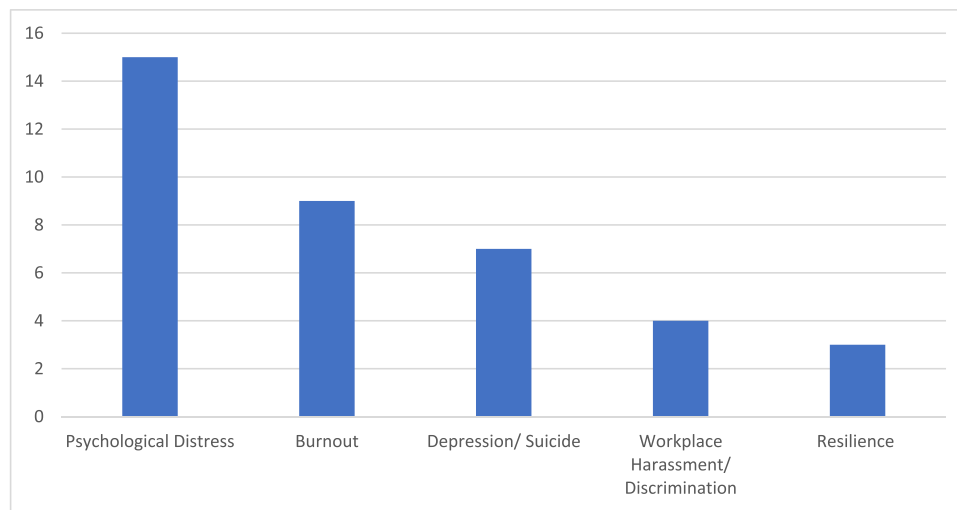
### 3.2.2 | Mental health status of registrars

Of the seven studies focusing on registrars, two focused on GP trainees. Hoffman et al identified through thematic analysis that the main determinants of psychological distress in GP registrars stem from imbalances in maintaining self-expectations and poor self-care with burnout occurring when the above domains crossover.<sup>26</sup> A novel strategy to mitigate work-related stress in GP registrars, was the use of an online Balint Group. Work-related stress significantly declined in the Balint group compared to the control arm.<sup>27</sup>

Of the five studies focusing on hospital registrars, trainees from surgical backgrounds were included exclusively. Surgical registrars have significantly poorer scores in vitality, social functioning, and role emotion domains compared to the general population.<sup>28</sup> Variables that were associated with poor mental health included the amount of overtime worked including unpaid overtime, poor work satisfaction, and perceived lack of support. Similarly, job security and perception of meaningful work were associated with improved mental health scores. Notably, no significant difference was present between male and female surgical registrars. This is contrary to the findings of Kooroor et al, who noted that female registrars were more likely to have a poorer mental health state than their male colleagues.<sup>29</sup> Other factors significantly associated with stress included being from a minority ethnic background and the degree of exposure to COVID-19 patients in the workplace. Junior registrars had increased amounts of stress, however seniority within registrars was positively correlated with depression. A cross-sectional study performed assessing the mental health in orthopaedic trainees noted a 53% burnout rate. Main determinants of burnout were poor satisfaction with work and suboptimal work-life balance.<sup>30</sup> In otolaryngology and head and neck surgical registrars, high rates of burnout is similarly noted with 73% of trainees reporting burnout.<sup>31</sup> In this cohort, trainees in New South Wales had a significantly higher rate of burnout compared to other states. Other notable factors linked with burnout included poor work-life balance and geographic isolation, particularly the duration of rural rotations away from support networks. Registrars experiencing burnout felt less comfortable approaching their professional mentors compared to those not experiencing burnout.

In obstetric and gynaecology registrars, the rate of burnout was comparable to that of orthopaedic trainees, with 55% of trainees self-reporting burnout with similar rates of personal and workplace-associated stress.<sup>32</sup> Trainees who had considered leaving the program had lower mean resilience scores measured using the 14-item Resilience Scale and a higher rate of self-reported depression compared





**FIGURE 3** Frequency of mental health themes ( $n = 24$  studies).

to registrars who did not consider leaving the training program. The level of trainee support received from the Royal Australian and New Zealand College of Obstetricians and Gynaecologists (RANZCOG) was noted to be low or very low; a third of trainees reported low to very low support from their direct supervisor. Of self-reported burnout, personal and workplace stress, there appears to be a significant bivariate correlation among these factors, with burnout and workplace stress having the strongest correlation.

## 4 | DISCUSSION

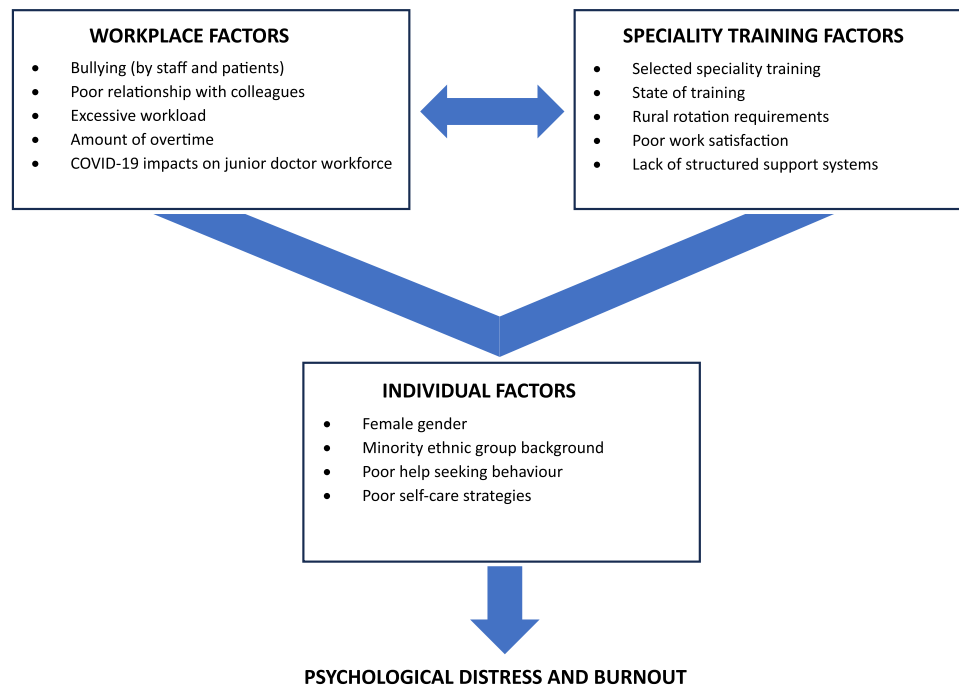
Our review of the current data on mental health in medical students and doctors in training (DiT) demonstrate that most of the studies are cross-sectional analyses (56%) with qualitative studies using thematic analyses being less well represented (24%). Quasi-experimental (8%), randomized control studies (8%) and cohort studies (4%) were not common. There were five themes identified in the literature surrounding the mental health of medical students and DiT as represented in Figure 3.

The most common themes noted in studies focusing on medical students were psychological distress, burnout, depression, and suicidal ideation. While the emphasis is certainly placed on the higher rates of poor mental health, there is a paucity of longitudinal assessments to determine the evolving nature of psychological distress, or the development of common mental health disorders as medical students progress from their first to final year of medical training. Factors contributing to psychological distress and burnout in medical students were not assessed, owing to the lack of qualitative studies in this demographic. Common factors described elsewhere include high workload often resulting in a perceived lack of control, self-imposed expectations of academic performance, poor time management skills, and poor management of work-life balance.<sup>33,34</sup> Common coping mechanisms identified were support from social networks and the practice of mindfulness. Seeking help from mental healthcare professionals was uncommon, owing to the stigma of

mental illness, which could predispose them to further mental health issues during the next phase of their careers as junior doctors.

In doctors, common mental health themes included psychological distress and burnout, with a good distribution of qualitative and quantitative analysis. In pre-vocational DiT (interns and residents), workplace factors contributed to poor mental health, including workplace bullying and harassment, work dissatisfaction, and poor relationships with colleagues. In contrast, the putative factors for poor mental health in registrars varied based on community or hospital placements. GP registrars identified burnout due to poor management of self-expectations and self-care. Hospital-based registrars shared common workplace factors as interns and residents in addition to a lack of support from senior staff members, a lack of unpaid overtime work, and geographic isolation from support networks during their vocational training.

It remains a challenge to quantify the exact contributions of workplace and specialty training factors to the mental health burden in DiT as these factors have an inextricable association. In addition to the aforementioned determinants of poor mental health, individual factors can further alter the risk of experiencing psychological distress with female gender, belonging to a minority ethnic group, and poor self-care strategies being identified as independent risk factors (Figure 4). The degree to which these major determinants impact DiT is further complicated by a poor representation of different vocational training pathways. GP registrars were poorly represented with no representation from specialties including paediatric and adult medicine physician trainees. This is further demonstrated in the 2022 Medical Training Survey; an annual national survey aiming to assess the working conditions of all DiT. Adult physician specialties comprised only 16% of all the participants with paediatrics constituting 7%.<sup>35</sup> Given that there exist multiple adult and paediatric physician sub-specialties with varying training requirements, studies should aim to capture the impact of training for each subspecialty, instead of distilling the trainees into an adult and paediatric group for the sake of simplicity.



**FIGURE 4** Factors contributing to poor mental health in Australian doctors-in-training.

Our review has several limitations as it only included peer-reviewed studies and excluded grey literature on this topic. Reports such as the 2016 AMA Safe Hours Audit and the annual Medical Training Survey data were therefore excluded. It may well be possible that these sources contain information about DiT that was not represented in the literature included in this review. Secondly, the review restricted studies from countries such as New Zealand and the United Kingdom that share many similarities to the Australian medical education curriculum. This was to ensure that the variance in work culture and environment did not negatively impact the findings of the scoping review for Australian medical students and DiT. Thirdly, due to the paucity of a large body of evidence, the scoping review did not grade the studies based on the robustness of the methodologies and included both qualitative and quantitative analyses.

## 5 | CONCLUSION

This scoping review explores the current state of literature focusing on the mental health of medical students and DiT. The key determinants of a poor mental health state include a complex interaction of workplace and training-specific factors. Due to the similarity in medical training, these factors likely reflect the current landscape of training globally and provide useful insight for generating interventions to combat poor mental health in junior doctors. Lastly, this review highlights the unequal representation of different specialties, and identifies key putative factors that require upstreamlevel interventions to remedy the issue of exaggerated psychological distress in our medical students and DiT.

## AUTHOR CONTRIBUTIONS

**Anand Ganes:** Conceptualization; methodology; data curation; validation; writing—original draft; writing—review and editing; formal analysis. **Priya Sunder:** Conceptualization; data curation; validation; writing—review and editing.

## ACKNOWLEDGMENTS

Anand Ganes and Priya Sunder were both involved in the conception of this review, development of the search strategy, and conducting data extraction for the shortlisted studies. Anand Ganes conducted thematic analyses of common mental health themes identified in the studies and drafted the manuscript. All authors were involved in reviewing and approving the manuscript before submission.

## CONFLICT OF INTEREST STATEMENT

The authors declare no conflict of interest.

## DATA AVAILABILITY STATEMENT

All relevant information has been included in the manuscript and Supplemental material.

## TRANSPARENCY STATEMENT

The lead author Anand Ganes affirms that this manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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## SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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