Title: Coping with medical training demands: Thinking of dropping out, or in it for the long haul

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Abstract

Medical trainees are at risk of psychological distress due to training workload demands. Dropping out of medicine has hidden and real costs to both the public and the individual. Using quantitative and qualitative methodologies, this study assessed differences in stress and coping strategies between those serious and not serious about dropping out of medicine. A total of 854 medical students and junior doctors completed a web-based survey assessing training stress, problem solving coping, seeking support coping, avoidance coping, and risky behaviour coping. Those serious about dropping out of medicine were high on training stress, avoidance coping and risky behaviour coping. Specifically, males were high on risky behaviour coping, and doctors were high on avoidance coping. Reasons for contemplating dropping out of medicine were professional fit, workload, work-life balance, and the medical education training system. Identification of at-risk groups can inform efforts to design and deliver wellness interventions for medical trainees.

Key Words: medical training; dropping out; training stress; coping strategies; medical students; junior doctors

The demands of medical training can have a detrimental effect on the psychological and physical well-being of medical students and junior doctors (Dahlin, Joneborg, and Runeson 2005; Devi 2011; Tyssen and Vaglum 2002). Concerns about the mental health of students and doctors are front and centre in the minds of Australian students (Coombs et al. 2013). Workload demands that include learning vast amounts of complex material, long hours, examinations, and the stresses of academic and clinical performance leave limited time for family, social, and recreational activities, and can be a significant cause of stress (Saipanish 2003; Stewart et al. 1999). As occupational well-being is an essential element of overall well-being, assisting medical students and junior doctors to achieve career satisfaction not only benefits them, but also benefits their patients and the community at large (Leigh et al. 2002; Spickard, Gabbe, and Christensen 2002). This study examined the differences between two groups of Australian medical trainees: one group with serious thoughts about dropping out of medicine and a second group who did not have serious thoughts about dropping out. We considered stage of medical training (medical students and junior doctors) and gender (male, female) and tested for differences on training stress, problem solving coping, seeking support coping, avoidance coping, and risky behaviour coping.

Dropping out of Medicine

To better understand medical student attrition, Dyrbye et al. (2010) surveyed medical students, assessed their severity of thoughts of dropping out, and tested the relationship with burnout and other indicators of distress, such as depressive symptoms. Dyrbye et al. found that 11% of the students surveyed had serious thoughts of dropping out of medical school, and burnout was associated with an increased likelihood of these thoughts. Reasons for dropping-out of medicine included academic, personal or family reasons, professional fit, mental health concerns, and experiencing a major negative personal event. While attrition rates from medical courses are low compared to other courses (1.4% in 2008; Australian

Government 2012), half of those who are serious about dropping out will actually leave medicine (Garrison, Mikesell, and Matthew 2007). Dropping out also costs the public. It is estimated that it costs over \$50,000.00 per year to train/educate a medical student (Medical Deans Australia and New Zealand 2011).

Medical training demands

There is a complex relationship between occupational satisfaction and a satisfying lifestyle, and mediating this relationship are factors such as control over schedule, hours worked, marital status, gender, and having dependents (Shanafelt et al. 2012; Heiligers and Hingstman 2000; Keeton et al. 2007). For example, although female physicians are generally satisfied with their careers, they are more likely to report difficulty in managing a career in medicine while also maintaining a work-life balance (Parsons et al. 2009; Mobilos, Chan, and Brown 2008). Lifestyle considerations are also increasingly influential factors for men, as they too report a preference for a controllable lifestyle that allows them to work fewer hours (Dorsey, Jarjoura, and Rutecki 2005). Even though there is some recognition of the lack of work-life balance in the field of medicine, little is known about how workload stressors and coping strategies are associated with contemplating dropping out of medicine. Identifying risk factors will inform efforts to design and deliver wellness interventions for medical students and junior doctors.

In addition to contributing to attrition rates, academic stress reduces an individual's health and well-being (Rogers, Creed, and Searle 2012). Medical students worry about examinations, falling behind in their learning, and receiving poorer results than expected (Saipanish 2003). According to Oaten and Cheng (2005), students with high levels of stress also report increased smoking and caffeine consumption, decreased healthy eating, emotional control, physical activity, and self-care habits, and deterioration in sleep patterns and study habits. Undergraduate and postgraduate medical training is physically and emotional

demanding with research showing that the training workload of junior doctors and medical students can lead to negative effects on well-being and general health as they have limited opportunities to recover from depletion (de Abreu Santos et al. 2011; Campbell et al. 2010; Levey 2001).

Although burnout and stress are manifested in most professions, it is more common where there is a helper and client relationship (Awa, Plaumann, and Walter 2010), such as in care-giving professions like medicine, nursing, teaching, and social work (Maslach, Schaufeli, and Leiter 2001). Risk factors for the development of burnout and stress include an imbalance between job demands and job skills, a lack of job control, prolonged and unrelenting commitments, and a discrepancy between resources, expectations, and job realities (Bakker, Demerouti, and Verbeke 2004). These stressors contribute to an abnormally high burnout rate for medical practitioners; as high as 76% for US internal medicine residents (Shanafelt et al. 2002). In Australia, 69% of junior doctors report symptoms of burnout (Markwell and Wainer 2009), with the severity of these symptoms increasing over the course of the intern year (Willcock et al. 2004; Goebert et al. 2009).

High rates of occupational burnout in health professionals result from job related stressors, including exposure to chronic pain and death, role confusion and ambiguity, patient safety issues, poor opportunities for professional development, high workload, lack of supervisor support, maintaining dual roles, fear of making mistakes, work-family imbalance, interpersonal conflicts and communication issues, and a lack of knowledge or experience (Bakker, Le Blanc, and Schaufeli 2005; Rudman and Gustavsson 2012). These stressors affect decisions regarding work progression and retiring from the profession after only a short time practicing (Guthrie et al. 1998; Kiessling et al. 2004).

Coping strategies

Coping, or the cognitive and behavioural efforts to manage demands that are appraised as taxing the resources of the individual (Sica et al. 1997), includes a potentially limitless number of coping strategies available to the individual (Sica et al. 1997). Researchers suggest that there are two primary coping techniques: problem-focused coping, which encompasses changing the situation, and emotion-focused coping, which involves reducing or managing the emotional distress (Lazarus 1993). Problem-focused coping tends to occur when a person feels that he/she can reduce the demands of the stressful situation (e.g., by planning or taking action). Emotion-focused coping usually occurs when a person believes that a situation has to be endured (i.e., stress is relieved by seeking support, avoiding the problem, or engaging in dysfunctional behaviours; Carver, Scheier, and Weintraub 1989).

Students and doctors use a variety of coping strategies to process stress, including problem solving (Stern, Norman, and Komm 1993), seeking support (Sreeramareddy et al. 2007; Levey 2001), avoidance (Tattersall, Bennett, and Pugh 1999), and potentially harmful methods such as using psychoactive substances, excessive alcohol, engaging in unsafe sex, and reckless driving (Weissberg et al. 2006). Medical trainees who engage in problem solving strategies and seek advice from seniors are more capable of adjusting to their workload stress and less likely to experience deterioration in their physical health and wellbeing (Park and Adler 2003; Sreeramareddy et al. 2007). Male medical trainees are particularly vulnerable to engaging in risky behaviour as a coping mechanism (Newbury-Birch, White, and Kamali 2000; Boland et al. 2006), and increasingly use these strategies as they advance into their more senior clinical years (Newbury-Birch, Walshaw, and Kamali 2001).

Theoretical framework for understanding thoughts of dropping out

According to the demands-resources model (Demerouti et al. 2001), job demands are stressors that require sustained physical and mental effort, are associated with physiological

and psychological costs, and can result in job stress and exhaustion. Resources refer to the physical, psychological, and social motivational processes used to achieve goals or reduce job demands (Bakker and Demerouti 2007). Thus, demands and resources can affect an individual's health and well-being as well as the way they think, feel, and behave. In applying this model to the current study, job demand was operationalised as training stress, resources as the individual's coping mechanisms, and the outcome as psychological and physical strain reflected in thoughts of dropping out of medicine. We expected that medical trainees' job demands (training stress) and resources (coping strategies) would be associated with their job strain (thoughts of dropping out of medicine).

Current study

The current study addresses Dyrbye et al.'s (2010) call for research that explores the association between training stress, coping skills, and thoughts of dropping out of medicine. Such research will lead to a better understanding of how to promote wellbeing among medical trainees. Furthermore, there is scant literature available regarding medical trainees' thoughts of dropping out of medicine. Informed by the demands-resources model (Demerouti et al. 2001), this study examined differences between those who had serious thoughts of dropping out of medicine and those who did not (also split by the level of training, medical students and junior doctors, and gender). It was expected that thoughts of dropping out of medicine would be more likely to occur when job demands (i.e., training stresses) were perceived as high, maladaptive resources were high (i.e., high avoidance coping and risky behaviour coping), and adaptive resources (i.e., problem-focused coping, seeking support coping) were low. The main hypotheses tested are that medical trainees who are seriously thinking about dropping out of medicine will have higher levels of training stress, and use more avoidance and risky behaviour coping, and less problem-focused and seeking support coping than trainees not seriously thinking about dropping out. Due to the limited existing

evidence, no direct hypotheses were stated for differences between medical students and junior doctors, and between males and females on thoughts of dropping out of medicine. Furthermore, to enhance the quantitative data, reasons for contemplating dropping out of medicine were explored using qualitative methodology.

Method

Participants

Participants were 505 medical student's aged between 19 and 52 years ($M = 25$, $SD = 5.3$) and 349 junior doctors (response rate 81.5%; similarly calculated) aged between 23 and 58 years ($M = 28$, $SD = 4.4$), located in all States of Australia, who responded to a web-based survey. The sample was 67% female and predominantly Caucasian (88.3%). Students were enrolled in years 2 - 6 (25 in year 2, 91 in year 3, 225 in year 4, 145 in year 5 and 19 in year 6), and junior doctors were in their first (intern year) to fourth postgraduate year (136 in PGY1, 45 in PGY2, 95 in PGY3 and 73 in PGY4). The response rate, which was based on responses to emails to available email addresses, was 82%. When tested using t-tests and chi-square analyses, we found no differences between responders and non-responders on demographic variables, suggesting no bias in the sample based on reply to emails.

Materials

Thoughts of dropping out of medicine. Three questions were asked: (a) 'Over the course of your medical training, have you had any thoughts of dropping out of medicine?' (response options: 1 = yes, 0 = no); (b) those who responded 'yes' were asked to 'Please explain your reason/s for wanting to drop out of medicine?'; and (c) to indicate the seriousness of these thoughts. Options ranged from 1 to 6: *I have never considered dropping out, not serious (i.e., I thought about it but not seriously), somewhat serious (i.e., I seriously considered dropping out but never took any actions), serious (i.e., I seriously considered dropping out, and I met with supervisors to discuss my options), very serious (i.e., I seriously considered dropping*

out and actually took time out to consider options), and extremely serious (i.e., I am dropping out and am in the final phase of this process). The first and third questions were similar to questions developed by Dyrbye et al. (2010). We included the additional response options to capture broader considerations about dropping out. Students who indicated that they had never considered dropping out or that they were not serious about dropping out were categorised as ‘not serious’, while students who indicated that they were somewhat serious, serious, very serious or extremely serious were categorised as having ‘serious’ thoughts of dropping out. Questions 1 and 3 were analysed quantitatively; Question 2 was analysed qualitatively.

Training stress. Participants completed a four-item scale assessing training stress that was devised for the study. The items were ‘I feel overwhelmed by the amount of work I have to do’, ‘I worry about the effect that my current performance will have on my future medical career’, ‘I feel stressed about how I am performing’, and ‘When I compare myself to others, I worry about how well I am doing’. Response end-points were 1 = *strongly disagree* and 5 = *strongly agree*, with higher scores indicating more training stress. The four items loaded onto a single factor, and in support of validity, training stress was associated positively with avoidance coping and negatively with problem solving coping. Alpha coefficients were .86 (medical students) and .81 (junior doctors).

Coping. The 15-item Coping Strategy Indicator (CSI; Amirkhan 1990) measures the coping strategies of problem solving, seeking support, and avoidance. Participants responded using a 5-point Likert-like scale (end-points 1 = *never or almost never* and 5 = *always*) to items such as ‘Tried to solve the problem’ (problem solving; 5 items), ‘Sought reassurance from those who know you best’ (seeking support; 5 items), and ‘Avoided being with people in general’ (avoidance; 5 items). Higher scores on all scales indicate the greater use of that strategy. In support of validity, Tyson (2002) showed that avoidance coping and seeking

support were associated positively with workload stress while problem-solving was associated negatively. Previous alphas were .89 (problem solving), .93 (seeking support), and .84 (avoidance; Amirkhan 1990); the corresponding alphas in our study were .76, .92, and .70 (medical students) and .70, .90, and .74 (junior doctors).

As medical trainees have a high rate of using risky behaviours as a means of coping (Weissberg et al. 2006), we also assessed the level of this using six items developed specifically for the study. The six items referred to recourse to alcohol, tobacco, prescription medicine, illicit drugs, aggressive behaviour, and behaviour that put their health at risk. Sample items were “‘Drank more alcohol than I usually do’ and ‘Smoked or used more tobacco than I usually do’”. The six items formed a single factor, and in support of validity, the scale was associated positively with avoidance coping and negatively with problem-solving coping. Alphas were .72 (students) and .67 (junior doctors).

Procedure

Participants were recruited via email through their medical schools as part of an ongoing project examining the career development of medical students and junior doctors. They completed the survey online, and had their name placed in a lotto style draw to win a store voucher. Ethics approval was provided by the authors’ university ethics’ committee.

Data analysis

Quantitative. First, we conducted descriptive analyses and second, a MANOVA was used to test for differences between groups on the dependent variables of training stress, problem solving, seeking support, avoidance, and risky behaviour. The independent variables were seriousness of dropping out of medicine (not serious, serious), group (medical students, junior doctors), and gender (male, female). There were 635 (74.4%) participants categorised as not serious and 219 (25.6%) categorised as having serious thoughts of dropping out.

Qualitative. Open-ended responses were reviewed for thematic content and manually coded using the following steps: (a) two members of the research team reviewed the responses to identify themes and sub-themes; (b) these were formed into categories, which were then coded; (c) differences between medical students and junior doctors were analysed; (d) differences between those who were serious and those who were not serious about dropping out were analysed; and (e) illustrative quotes were then selected.

Results

Quantitative analyses

The combined dependent variables were significantly affected by the level of seriousness of dropping out, group, and gender. There were significant interaction effects for seriousness x group, and seriousness x gender, but not for group x gender, or group x gender x seriousness. See Table 1 for descriptive statistics and Table 2 for MANOVA multivariate results.

For the univariate analyses, we set the alpha at .01 to minimise the possibility of Type I errors (Tabachnick and Fidell 2013). Main effects were that seriousness of dropping out was associated with higher training stress, avoidance, and risky behaviour. Those who had serious thoughts about dropping out had significantly higher mean scores on training stress, avoidance coping, and risky behaviour coping. Group was associated with training stress, and seeking support. Students were higher on training stress than doctors, while doctors were higher on seeking support compared to students. Gender was associated with seeking support. There was an interaction effect between seriousness of dropping out x group for avoidance coping. For the not serious group, students had higher levels of avoidance coping; whereas, for the serious group, doctors had higher levels of avoidance coping (see Figure 1). Finally, there was an interaction between seriousness of dropping out x gender for risky behaviour coping. For the not serious group, there was no difference between males and females on

risky behaviour coping; whereas, for the serious group, males reported higher levels of risky behaviour coping (see Figure 2). See Table 2 for MANOVA univariate analyses.

Open-ended comments analyses

Four broad themes emerged: workload, the medical education training system, work-life balance, and professional fit. The main theme for students related to professional fit, whereas the main theme for doctors was workload (see Table 3).

Workload. Students commented on being overwhelmed, study demands, long hours, exhaustion, and stress associated with workload. Reasons referred to both current workload as well as expectations for future workload based on observations of senior doctors at work.

The hours some doctors work is just too much. I see the mental and emotional exhaustion in them, and it scares me that I could lose (my current) idealism (Serious, female);

I felt that the work was overwhelming and that I wouldn't be able to cope with the amount of work that is expected of me (Serious, male);

Feeling that there is no end to amount of study (Not serious, female).

Comments from doctors who seriously contemplated dropping out related to the long hours of work, limited time off, exhaustion, being overwhelmed, and inability to cope with the workload. Those not serious of dropping out gave similar reasons, although none mentioned being depressed or unable to cope.

As an intern, working 80 hour weeks during one... rotation was brutal (Serious, female);

There is a constant feeling of stress in our work. I see people in other jobs who don't have that stress and I am envious (Not serious, male).

Medical education training system. Students commented on poor treatment by senior doctors, concern about getting into their chosen specialty, the lack of support from teachers, and whether the financial reward compensated for the poor lifestyle.

So little humanity and such disrespect and disregard (both professionally and in funding) ... which means that there are few great doctors and many who just couldn't get into the program they really wanted... I lost the passion for medicine quite early and am only still in it because I haven't tried [specialty named] and because it's silly to drop out so close to graduation. At best its 60/40 against if I will practice as a doctor (Serious, male);

Doctors commented on the culture within medicine, the difficulty with being accepted into a training program, the lack of support and encouragement, and whether a junior doctor's pay adequately compensated for the hard work.

The system is male-dominated, hierarchical and I have often felt my career choices are limited as I don't want to work excessive hours or be bullied. The culture of medical school was awful with minimal supports (Serious, female);

Feeling underappreciated and unsupported with little feedback on whether what I was doing was correct (Not serious, female).

Work-life balance. Students were concerned about having enough time to spend with their children, the hours of work required, and the absence of a social life. Comments from females dominated this category.

Very few have a good work-life balance, many seem to pay a high price for having a career in medicine... families and hobbies fall by the wayside (Serious, female);

Not sure if I want to commit to this lifestyle forever. There are other things in life (Not serious, female).

Doctors compared themselves to friends in other occupations who they perceived as having a better lifestyle, and commented on the effect that medical work had on personal relationships and interests. Again, there were more comments from women than men here.

Other people our age who have not done medicine... seem to have better lifestyles and still be successful (Serious, female);

It interferes with relationships, family, and social life... it can get really depressing and I wonder if I can take the emotional stress for much longer (Not serious, female);

Couldn't envisage work being manageable with a family in the future due to a lack of flexibility in training (Not serious, female).

Professional fit. Students questioned their suitability for the profession, their ability to pass the course and become a competent doctor, and the working conditions.

(Unsure) whether I'll ever be good enough to meet the job's demands, and survive in the system (Serious, male);

Unsure if I still enjoy the study involved, which will be on-going even after graduating with my MBBS. Also since commencing my clinical years I have realised that I have romanticised the career in the past. (Not serious, female)

Level of enjoyment for the course/career has greatly reduced this year (third year) as I'm getting closer to becoming an intern, I have a new awareness of the reality of poor working conditions (long, erratic hours, poor[ish] pay, lack of support, amount of paperwork etc.) facing a junior doctor (Not serious, female).

Doctors' comments related to their lack of interest in practicing medicine, their dissatisfaction and disillusionment with their medical career, and feelings of inadequacy about their ability to be a good doctor.

During internship, very poor job satisfaction (Serious, female);

Sometimes I think I'm not cut out for it... not smart enough (Not serious, female);

Didn't feel like it was a viable career choice for my level of interest (Not serious, male).

Additional findings relevant to coping strategies. Some students and junior doctors recognised that being stressed due to workload demands, exams, and expectations from teachers and supervisors was normal, and reported feelings of 'toughing it out' and strategies related to managing training stress.

Stress, feeling overwhelmed by course load quickly passed! So glad I stuck out the tough times because I love it now! (Not serious, female student);

I took this year off and now am very keen to go back (Not serious, female student);

I was very overwhelmed with the workload but have dealt with these issues and am now very happy with my career (Serious, female doctor);

I felt no interest in the job I was doing, which was very disappointing. Now that I am working in [specialty], I am much happier because there is teaching and feedback... and feel I am learning again (Not serious, female doctor).

Discussion

The current research, informed by Demerouti et al.'s (2000) demands-resources model, tested for differences between two groups of medical trainees (those with serious thoughts about dropping out of medicine and those with no such thoughts; split also by training level and gender) on levels of training stress and coping strategies (problem solving, seeking support, avoidance, and using risky behaviours). We also examined the reasons for dropping out, to expand on and complement the quantitative findings.

We found that those who experienced serious thoughts of dropping out were significantly higher on training stress, avoidance coping, and risky behaviour coping, compared to those who were not serious. First, the result for training stress is consistent with previous research that shows an association between training pressures (including workload and academic demands) and lower levels of wellbeing (de Abreu Santos et al. 2011; Campbell et al. 2010; Dyrbye, Thomas, and Shanafelt 2005; Dahlin, Joneborg, and Runeson 2005; Levey 2001). Second, the finding for avoidance coping is also supported by other research. While avoiding a problem will temporarily reduce emotional distress, it is often used by those with poor problem solving skills and has been identified as the most reliable symptom of job dissatisfaction (Tyson, Pongruengphant, and Aggarwal 2002; Carver, Scheier, and Weintraub

1989). This suggests that the more that medical trainees avoid or distance themselves from job demands, the less likely they are able to change their situation and improve their satisfaction with the demands of training. Third, the relationship between thoughts of dropping out and risk taking behaviour has not been identified previously. This is an important finding that provides evidence of the vulnerability of medical trainees engaging in risk-taking behaviour as a way of coping with training demands.

These results were also supported by the qualitative findings. Comments regarding workload and work-life balance lend support to the relationship between training stress and serious thoughts of dropping out of medicine. Both students and junior doctors commented on the long hours, demanding study requirements, and large workloads, describing themselves as overwhelmed, exhausted, and stressed. However, an important difference between those who were serious and those who were not, was that only those serious about dropping out commented on feeling depressed and unable to cope. Medical students also commented on the 'mental and emotional exhaustion' they expected to experience when they commenced working in the pressured environment of a junior doctor. Both students and doctors made reference to the impact that workload had on family responsibilities, such as having children, and the perception of limited time spent with family and friends. This is supported by others who have found that medical students and doctors often find themselves re-evaluating their work-life balance due to the heavy workload (Gutherie et al. 1995). While most of the comments relating to work-life balance were predominantly from female trainees, this result is supported by others who have found that women are more likely to report difficulties with maintaining a work-life balance (Parsons et al. 2009; Mobilos, Chan, and Brown 2008).

We did not find an association between those who were or were not serious about dropping out and problem solving coping or seeking support coping. This is contrary to other

studies, which found that students who engaged in problem solving methods (e.g., planning, taking action, and positive reframing), and who sought advice from others on academic and day-to-day problems, were more likely to reduce stress and increase emotional well-being (Sreeramareddy et al. 2007; Park and Adler 2003). However, qualitative comments relating to problem solving efforts (e.g., ‘taking the year off’; ‘dealt with the issues’) and seeking support from others (‘working in a different area of medicine and much happier due to the teaching and feedback’) tend to show that these types of coping methods assisted in changing their mind about dropping out of medicine.

Main effects for groups and gender

Medical students had higher levels of training stress compared to junior doctors. Others have reported that medical students suffer from training stress associated with long hours of study, preparing for examinations, clinical work, heavy workload, lack of guidance, peer competition, and key transition periods such as from pre-clinical to clinical training (Radcliffe and Lester 2003; Saipanish 2003; Stewart et al. 1999). We also found that junior doctors were higher on seeking support from others, than medical students. This suggests that doctors have more support from family and peers and a more supportive learning environment that enables them to seek reassurance and advice, compared to students. This might reflect the supervision process that ensures junior doctors’ progress is monitored regularly (Kilminster and Jolly 2000).

Interaction effects

Doctors used avoidance coping more than students when serious about dropping out. This suggests that doctors who are considering dropping out due to training stressors also seem to distance themselves more from the problem rather than solve it. However, when not serious, students were more likely to use avoidance coping. It may be that students who are not serious expect that the problem will resolve itself in due course. The interaction effect for

risky behaviour coping shows that, when serious about dropping out, males use risky coping strategies more than females. This finding tends to support others who have found that males are more vulnerable to substance abuse than females (Newbury-Birch, White, and Kamali 2000) and that male and female trainees respond differently to the demands of medical training (Schwenk, Davis, and Wimsatt 2010; Dahlin, Joneborg, and Runeson 2005).

Qualitative

In addition to workload demands and the absence of a work-life balance, the medical education training system and issues surrounding professional fit were other reasons for both students and junior doctors wanting to drop out of medicine. Trainees commented on the lack of respect from senior doctors towards students and junior doctors, the difficulty and uncertainty of getting accepted into a chosen specialty, the imbalance between effort and reward, and they criticised the medical education training system citing inadequate support from academic staff and supervisors as the reasons why they wanted to drop out. Further, students and junior doctors questioned their suitability for the profession. However, more of these comments came from students. Many questioned their ability and potential to practice as a doctor, some mentioned that their interest had waned, while others felt dissatisfied and disillusioned with medicine causing them to feel that they were inadequate or 'just not cut out for it'. This is not an unexpected finding given the high intensity workload and stressful environment that often affords medical students and junior doctors little control (Riley 2004).

Strengths, limitations, future research, and implications

The findings extend prior research on the demands-resources model by testing the relationship among training stress, coping mechanisms, and the psychological and physical strain associated with serious thoughts of dropping out of medicine. The study had a high response rate, and included a large and diverse sample of medical students and junior doctors (from medical school to fourth postgraduate year). Further, in addition to quantitative data,

qualitative responses provided insight into the reasons why medical students and doctors contemplate dropping out. However, the study is limited by the cross-sectional design. Future researchers should consider using a longitudinal study to assess the causal relationships among the variables. We specifically devised a scale for risky behaviour coping, and this scale needs to be used by future researchers in other settings to confirm its usefulness. We also chose a short coping measure that specifically focused on coping strategies used by medical trainees (Levey 2001; Sreeramareddy et al. 2007; Stern, Norman, and Komm 1993). Other researchers could consider using longer scales to tap different aspects of coping (e.g., the COPE Inventory; Carver, Scheir and Weintraub 1989). Also, the sample was drawn from one country and contained more women than men. Future studies should look at replicating the study elsewhere, as medical training programs, and the resources available to medical trainees differ across countries according to health care needs and other factors.

Future research should build on the current research by identifying the full range of risk factors to dropping out of medicine. Moreover, research that measures the outcomes of preventive intervention measures would be beneficial. Given that approximately 25% of participants had thoughts about dropping out of medicine, such findings would be useful for senior doctors and medical educators, as well as for students, junior doctors, and individuals considering a career as a doctor.

Interventions directed at medical students and junior doctors will assist with preventing burnout and help with thoughts of dropping out of medicine if they incorporate training in coping strategies, how to recognise and prevent risk-taking behaviours, provide students and junior doctors with problem solving skills, and strategies to better access social support and individual counselling. Based on the findings of the current study, it is recommended that both student/doctor-directed and system-directed intervention programs aimed at managing training stress to prevent thoughts of dropping out be implemented to empower individuals,

reduce adverse reaction to training demands, improve mental well-being and effectively spend public investment in workforce training.

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Table 1

Means and Standard Deviations by Group, Level of Seriousness of Dropping Out, and Gender; N = 854

Variables	Medical students (<i>n</i> = 505)						Junior doctors (<i>n</i> = 349)					
	Not serious (<i>n</i> = 384)		Serious (<i>n</i> = 121)		Total		Not serious (<i>n</i> = 251)		Serious (<i>n</i> = 98)		Total	
	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>	<i>M</i>	<i>F</i>
	Mean <i>SD</i>	Mean <i>SD</i>	Mean <i>SD</i>	Mean <i>SD</i>	Mean <i>SD</i>	Mean <i>SD</i>	Mean <i>SD</i>	Mean <i>SD</i>	Mean <i>SD</i>	Mean <i>SD</i>	Mean <i>SD</i>	Mean <i>SD</i>
1. Training stress	12.69	13.66	15.32	15.33	13.19	14.11	10.66	11.77	12.94	13.34	11.36	12.19
	3.31	3.43	3.23	3.55	3.44	3.54	3.02	3.19	3.86	3.46	3.45	3.33
2. Problem solving coping	17.57	17.97	17.53	17.39	17.56	17.81	17.66	17.86	18.33	17.80	17.87	17.84
	3.32	2.90	3.82	3.09	3.41	2.96	2.41	2.76	3.44	2.85	2.77	2.78
3. Seeking support coping	15.59	18.57	15.15	17.99	15.51	18.41	16.61	19.29	17.15	19.08	16.78	19.24
	4.52	4.47	5.95	4.58	4.80	4.50	3.94	3.97	4.44	4.27	4.09	4.04
4. Avoidance coping	10.39	11.16	11.94	12.38	10.68	11.48	9.51	10.62	13.48	12.75	10.74	11.19
	3.60	3.79	4.25	3.72	3.77	3.81	3.74	3.54	4.33	3.65	4.32	3.68
5. Risky behaviour coping	7.83	7.75	8.91	8.49	8.03	7.95	7.45	7.97	10.48	8.85	8.38	8.20
	2.83	2.46	2.73	3.55	3.03	2.81	1.62	2.21	5.01	2.80	3.37	2.41

Table 2

Multivariate and Univariate Results for MANOVA; N = 854

Variables	Multivariate		Univariate									
	<i>F</i>	η_p^2	Training stress		Problem solving		Seeking support		Avoidance		Risky behaviour	
			<i>F</i>	η_p^2	<i>F</i>	η_p^2	<i>F</i>	η_p^2	<i>F</i>	η_p^2	<i>F</i>	η_p^2
Seriousness (Ser)	18.53***	.10	50.55***	.06	.00	.00	0.21	.00	48.59***	.05	36.84***	.04
Group (Grp)	15.31***	.08	52.41***	.06	1.37	.00	10.36**	.01	0.16	.00	3.46	.00
Gender (Gen)	12.97***	.07	4.70*	.01	.01	.00	48.14***	.05	1.55	.00	2.92	.00
S x Grp	2.66*	.02	0.16	.00	1.45	.00	0.81	.00	6.82**	.01	4.87	.01
S x Gen	2.27*	.01	2.12	.00	1.53	.00	0.35	.00	2.90	.00	6.93**	.01
Grp x Gen	.41	.00	0.22	.00	.34	.00	0.64	.00	0.42	.00	0.43	.00
Grp x Gen x Ser	.95	.01	0.05	.00	.04	.00	0.18	.00	1.40	.00	3.71	.00

Note. Multivariate df = 5, 842; univariate df = 1; * $p < .05$, ** $p < .01$, *** $p < .001$

Table 3

Categories relating to reasons for thoughts of dropping out of medicine, for medical students and junior doctors

Categories	Medical students (<i>n</i> = 191)		Junior doctors (<i>n</i> = 148)	
	Not serious	Serious	Not serious	Serious
	(<i>n</i> = 81)	(<i>n</i> = 110)	(<i>n</i> = 66)	(<i>n</i> = 82)
	Frequency	Frequency	Frequency	Frequency (%)
	(%)	(%)	(%)	
Workload	40 (49.4)	46 (41.8)	37 (39.4)	54 (54.5)
Medical education training system	14 (17.2)	30 (27.2)	26 (27.7)	35 (35.4)
Work-life balance	24 (29.6)	49 (44.5)	11 (11.7)	15 (15.2)
Professional fit	42 (51.8)	56 (50.9)	21 (22.3)	35 (35.4)

Note: 99 (51.6%) medical students provided one reason, 72 (37.5%) two reasons, 19 (9.9%) three reasons, and 2 (1%) provided four reasons; 73 (49%) doctors provided one reason, 63 (42.3%) two reasons, and 12 (8.1%) provided three reasons.