

BMJ Open Screening for burn-out in Australian medical students undertaking a rural clinical placement

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ABSTRACT

Objective To investigate Australian medical student burn-out during rural clinical placement. Second, to examine the association between perceived burn-out and rural career intent at the time of finishing their rural placement.

Design, settings and participants The 2016 Federation of Rural Australian Medical Educators evaluation survey is a cross-sectional study of medical students from 17 Australian universities. Specifically, those medical students who completed a full academic year or more at a Rural Clinical School (RCS). Responses from 638 medical students from regional Australia were analysed in the study of all eligible 756 medical students (response rate 84.3%).

Primary and secondary outcome measures The primary objective was to determine self-reported burn-out (emotional exhaustion) in rural placements for medical students. Secondary outcome measures were designed to explore interactions with rural practice self-efficacy and rural intentions. Logistic regression models explored factors associated with burn-out.

Results 26.5% of students reported experiencing burn-out during a rural placement. Factors associated with burn-out were female gender, rural origin, low preference for RCS, stress in the year prior to a rural clinical placement, perceived social isolation during rural placement and lower rural practice self-efficacy. Burn-out was not associated with rural career intentions. Social isolation and low rural self-efficacy were independently associated with burn-out during rural placement and together explained 10% of variance in burn-out (Model Nagelkerke $R^2=0.23$).

Conclusion Burn-out during rural placement may be a consequence of stress prior to a medical school placement. Social isolation and rural self-efficacy are amendable factors to mitigate medical student burn-out during rural placements.

INTRODUCTION

Over the past two decades Rural Clinical Schools (RCSs) and Rural Medical Schools (RMSs) have substantially contributed to medical education. The RCS programme is beginning to address medical workforce shortages in rural Australia.^{1 2} The ongoing challenge for RCSs is to create a seamless rural training pathway to attract a maximum number of students and deliver high-quality

Strengths and limitations of this study

- Rural placement is a significant predictor of medical students' intentions to practise in rural areas. Burn-out can lead to mental distress and depression and may influence career decisions. Burn-out has not been previously explored among medical students on rural placements.
- The study contributes to the understanding of self-reported burn-out during a rural medical student placement. The association between burn-out, self-efficacy, social isolation and rural career intention is complex and requires further attention. Enhancing rural self-efficacy to mitigate medical student burn-out during rural placements has been raised as a discussion viewpoint.
- Data were derived from the longitudinal tracking study of Federation of Rural Australian Medical Educators of Australian Rural Clinical Schools with consistent definitions, agreed protocols and mechanisms for collecting and reporting data at the national level.
- The study is limited by its cross-sectional design, therefore, causal inferences cannot be confirmed.

rural learning experiences that translate to medical graduates who practise in rural areas. Medical students are, however, susceptible to stress and burn-out.³ Clinician burn-out is known to impact on patient-centredness and quality of care.⁴ Furthermore, burn-out may influence career choice and career regret.⁵ Burn-out during rural placement and its influence on rural career intent has not been previously explored in Australian medical students.

Burn-out as a syndrome includes emotional exhaustion and depersonalisation.^{6 7} High levels of either emotional exhaustion or depersonalisation are indicative of burn-out among medical professionals.^{8 9} A number of systematic reviews indicate prevalence of burn-out in medical students can range from 28% to 71%.^{3 10} In a national Australian-wide report, high levels of emotional exhaustion and cynicism were reported to be 51.6%

and 28.6%, respectively. Further, psychological distress has been reported to be substantially higher in medical students than in the general population.¹¹ Factors known to contribute to medical student burn-out include, female gender, personal life factors, personality and workplace or learning environment including workforce demands.¹²⁻¹⁴ Information on medical student psychological distress or burn-out from rural placements is scarce. In a qualitative study, rurally placed medical students reported experiencing distress during their first clinical year.¹⁵ In another study, King *et al* showed that social isolation during a rural placement deterred students from a future rural internship.¹⁶

Self-efficacy may modify stress-related outcomes, such as burn-out.¹⁷ Self-efficacy refers to confidence to deal with job-specific tasks and cope with challenges, stress and its consequences. In medical students, rural practice self-efficacy reflects their beliefs in their capabilities that they can or cannot be a successful medical practitioner in a rural location. Rural practice self-efficacy is an effective marker of rural career choice in Australian medical students, in addition to rural origin, rural training, rural interest or generalist discipline intent.¹⁸ Further rural practice self-efficacy may modulate the negative effect of social isolation on rural career intent.¹⁹ Both self-efficacy and social isolation are modifiable factors and to an extent assessable immediately following a rural clinical placement. In this study, we aim to identify factors associated with burn-out during rural clinical placements.

METHOD

The RCS programme has a mandate for 25% of all medical students to spend a year or more at an RCS campus. RCSs across Australia use different placement styles, including block rotations and longitudinal integrated clerkship (LIC). Students undertake multiple disciplines concurrently in LIC or traditional block rotations which typically address each medical discipline one at a time. Federation of Australian Medical Educators (FRAME) 2016 national exit questionnaire is an evaluation tool distributed to medical students from 17 Australian universities who completed a full academic year on clinical placements at an RCS.²⁰ The questionnaire includes demographic, educational, experiential and rural practice intention data. In the 2016 survey additional questions on self-perceived burn-out and empathy were included. All students who have undertaken rural placement in 2016 were invited to participate in the study (n=758).

Measurements

Rural practice self-efficacy

Rural practice self-efficacy questions were developed based on the five sources of self-efficacy, that is, vicarious learning, verbal persuasion, positive emotional arousal, negative emotional arousal and performance accomplishments.²¹ A composite score (range from 6 to 30) was calculated from the Likert scale score of each of

the questions. The scale previously demonstrated good internal consistency (alpha 0.78) and construct validity ($r=0.50$, $p<0.001$).¹⁸

Perceived burn-out (emotional exhaustion)

Students reported their perception of being burn-out on a 5-point Likert scale (strongly disagree to strongly agree). 'During rural/remote clinical placement, I felt burnt out'. Similarly, students expressed their feelings of empathy 'I became less empathetic towards patients during this time'. The burn-out question demonstrated construct validity with a significant correlation with the empathy question ($r=0.44$, $p<0.001$). These questions were developed based on validated single-item measures of emotional exhaustion and depersonalisation in burn-out assessment.²² The single-item screening measure of emotional exhaustion and depersonalisation has been validated in rural health settings.²³

Social isolation

Social isolation was measured by students self-reporting whether they felt socially isolated during their RCS placement on a 5-point Likert scale. 'I felt socially isolated during my rural placement.'

Stress prior to rural placement

Students reported their perception of stress on a 5-point Likert scale. 'Stress refers to a situation where a person feels tense, restless, nervous or anxious, or unable to sleep at night because his/her mind is troubled all the time. In the year prior to my rural/remote placement time I often felt this kind of stress.' These responses to Likert scales were dichotomised into: 'Somewhat agree' and 'strongly agree' versus 'Strongly disagree', 'somewhat disagree' and 'neutral'.

Rural origin

In recent years, the Australian Commonwealth Government has used a number of definitions for rural origin. Originally the definition required 5 years living outside a major city since commencing from after primary school. More recently the time requirement has been altered to 5 years consecutively, or 10 years cumulative living outside a major city. Contemporary research suggests that an individual's sense of rural origin is perhaps a stronger predictor of behaviour.²⁴ Rural origin was measured using the yes/no response to 'Do you consider yourself to come from a rural background.'

Location lived longest

In Australia, almost half of medical schools' places are for graduate entry students who are at least in their early 20's on commencement. While rural origin tends to describe upbringing, rurality, on the other hand, is a classification of geographical location in which an individual has lived longest. A place where one has lived longest would better describe their comfort level within a rural location. 'Please indicate the type of location within Australia you have lived longest. Options provided include:

capital city, major city >100 000, regional city/large town 25 000–100 000, smaller town 10 000–24 999, small rural community <10 000 or remote centre/area.

Rural career intention

Students were asked to identify their preferred location for future practice. 'In which geographical location within Australia would you most like to practise on completing your training?' The options were capital or major city; inner regional city or large town in Australia (25 000–100 000); smaller town—outer regional (10 000–24 999); small rural or remote communities (10 000) and very remote centre/area.

Other variables

Other variables included in the analyses were gender, preference for RCS clinical training and specialty preference. Specialty preference at entry was categorised as; general practice, generalist specialties (which are frequently found in regional centres, for example, anaesthetics, general medicine) or highly specialised specialties.

Patient and public involvement

There was no patient or public involvement in the development, design or conduct of this study.

Data analyses

Deidentified data were analysed using the statistical package SPSS V.21 (SPSS IBM). Descriptive data were examined to determine study variables. χ^2 and ORs with 95% CI were used to determine the factors associated with burn-out. Post hoc LSD analyses were used to understand specific differences between categories. A stepwise logistic regression analysis was used to develop three models to analyse the associations between study factors and burn-out. Gender, rural origin and RCS preference, prior stress, social isolation during placement and self-efficacy were included in the models as applicable. Nagelkerke R^2 was used to show the variance explained by social isolation and self-efficacy on burn-out.

RESULTS

Responses from 638 medical students from regional Australia were available for analysis (response rate 84.3%), 57.6% were female students. The descriptive details of the study variables are presented in [table 1](#). The survey results demonstrated that 40.7% of medical students considered they had come from a rural origin. General practice (family medicine) and generalist specialty preference at entry was 27.3% and 36.1%, respectively. First preference for RCS training was reported to be 67.1%, while a further 18.1% reported the RCS ranking high on their list for clinical training. Preferred locations of work after completion of rural placement were capital/major city 37.0%, regional 38.1%, rural 17.4% and small and remote location 6.5%. These characteristics were typical of students undergoing clinical rural placement.¹⁸

Table 1 Characteristics of the sample

Characteristics	N	%
Gender		
Male	265	40.9
Female	373	57.6
Rural background		
No	369	56.9
Yes	264	40.7
Type of location living longest in Australia		
Capital city	309	47.4
Major city	68	10.5
Regional	106	16.4
Rural	79	12.2
Small rural	82	12.7
Remote	4	0.6
Preference for RCS for Clinical training		
Last choice	29	4.5
Low on list	21	3.2
Mid-choice	40	6.2
High on list	117	18.1
First choice	435	67.1
Preference on entry		
General practice	117	27.3
General specialist	234	36.1
Sub specialist	232	35.8
Preferred location for work		
Capital/major city	240	37.0
Regional	247	38.1
Rural	113	17.4
Small rural	37	5.7
Remote	5	0.8

Percentages may not add up to 100% because of missing data. RCS, Rural Clinical School.

The proportion of students reported to have felt burn-out during rural placement was 26.5%. [Table 2](#) explores the factors associated with self-perceived burn-out. Burn-out was associated with female gender (OR 1.5, 95% CI 1.0 to 2.1, $p=0.04$); regional locale; geographical area lived longest (OR 1.7, 95% CI 1.1 to 2.7, $p=0.02$); stress in the year prior to rural placement (OR 3.4, 95% CI 2.3 to 4.9, $p<0.001$) and social isolation during rural placement (OR 4.0, 95% CI 2.8 to 5.9, $p<0.001$). Preference of RCS clinical training at entry (OR 0.5 95% CI 0.3 to 0.8, $p=0.006$), high rural practice self-efficacy (OR 0.3, 95% CI 0.2 to 0.6, $p<0.001$) and overall good health (OR 0.6, 95% CI 0.4 to 0.8, $p=0.006$) protected students from burn-out. There was no difference between students who spent the majority of their full-year placement in a remote location compared with

Table 2 Factors associated with self-perceived burn-out during rural clinical training

	N (%)	Burn-out	
		OR (95% CI)	P value
Gender			
Male	60 (22.6)	1.0	
Female	111 (29.9)	1.5 (1.0 to 2.1)	0.04
Rural background			
No	85 (23.1)	1.0	
Yes	77 (29.3)	1.4 (0.9 to 2.0)	0.09
Type of location living longest in Australia			
Capital city/major city	89 (23.7)	1.0	
Regional	37 (34.9)	1.7 (1.1 to 2.7)	0.02
Rural/remote	45 (27.6)	1.2 (0.8 to 1.8)	0.34
Preference for Rural Clinical School for clinical training			
Others	35 (38.9)	1.0	
First choice/high	134 (24.3)	0.5 (0.3 to 0.8)	0.006
Preference on entry			
General practice	48 (27.1)	1.0	
Generalist specialist	65 (27.8)	1.0 (0.6 to 1.6)	0.88
Sub specialist	57 (24.7)	0.8 (0.5 to 1.4)	0.57
Majority of placement in remote location			
No	150 (26.5)	1.0	
Yes	19 (25.7)	0.9 (0.5 to 1.6)	1.0
Perceived social isolation			
Strongly disagree/disagree/neutral	73 (17.0)	1.0	
Strongly agree/agree	97 (45.5)	4.0 (2.8 to 5.9)	<0.001
Stress in the year prior to rural placement			
Strongly disagree/disagree/neutral	78 (18.2)	1.0	
Strongly agree/agree	93 (43.3)	3.4 (2.3 to 4.9)	<0.001
Overall health was good in the year prior to rural placement			
Strongly disagree/disagree/neutral	59 (34.7)	1.0	
Strongly agree/agree	112 (23.6)	0.6 (0.4 to 0.8)	0.006
Self-efficacy			
Low tertile	88 (34.9)	1.0	
Middle tertile	57 (25.1)	0.6 (0.4 to 0.9)	0.02
High tertile	26 (16.4)	0.3 (0.2 to 0.6)	<0.001
Future work Intention			
Urban	134 (27.6)	1.0	
Rural/remote	36 (23.2)	0.7 (0.5 to 1.2)	0.29

a rural location. There was also no association between burn-out and future work intention in a rural location.

Table 3 explains the association between significant variables and burn-out in a multivariate logistic regression analysis. Model 1 shows student factors at entry to medical school. Female gender (OR 1.5, 95% CI 1.1 to 2.2), longest lived in a regional location (OR 1.8, 95% CI 1.1 to 2.9) and preference of RCS training (OR 0.4, 95% CI 0.3 to 0.7) were associated with burn-out. Model

2 adjusted for stress and overall health before their clinical placement. Stress in the year prior to rural placement was independently associated with burn-out (OR 3.1, 95% CI 2.1 to 4.6). Nagelkerke R² suggests prior stress could explain 9.6% in predicting student's burn-out during a rural placement. In model 3, we included social isolation and self-efficacy during a rural placement. The overall model explained 23% in predicting burn-out during rural placement (Nagelkerke R²=23%). Social isolation

Table 3 Multivariate logistic regression analysis for associations with burn-out during rural placement

	Burn-out during rural placement					
	Model 1		Model 2		Model 3	
	OR (95% CI)	Wald (df) p value	OR (95% CI)	Wald (df) p value	OR (95% CI)	Wald (df) p value
Gender (female)	1.5 (1.1 to 2.2)	4.6 (1) 0.03	1.4 (0.9 to 2.0)	2.3 (1) 0.12	1.4 (0.9 to 2.1)	2.7 (1) 0.10
Lived longest						
Capital city/major city	1.0		1.0		Ref	
Regional	1.8 (1.1 to 2.9)	5.9 (1) 0.02	1.6 (1.0 to 2.6)	3.4 (1) 0.06	1.8 (1.1 to 3.1)	5.1 (1) 0.024
Rural/remote	1.3 (0.8 to 2.0)	1.7 (1) 0.19	1.3 (0.8 to 2.0)	1.3 (1) 0.24	1.7 (1.1 to 2.7)	1.2 (1) 0.27
Preference for RCS training	0.4 (0.3 to 0.7)		0.4 (0.3 to 0.7)	10.9 (1) 0.001	0.6 (0.4 to 1.0)	3.3 (1) 0.06
Stress in the year prior to rural placement			3.1 (2.1 to 4.6)	34.2 (1)<0.001	3.1 (2.0 to 4.6)	28.8 (1)<0.001
Overall health was good in the year prior to rural placement			0.7 (0.5 to 1.1)	1.3 (1) 0.24	0.7 (0.5 to 1.1)	1.3 (1) 0.24
Social Isolation					3.1 (2.0 to 4.6)	30.4 (1)<0.001
Low self-efficacy (lower tertile)					2.1 (1.3 to 3.1)	11.4 (1)<0.001
Model X ²	19.2		60.9		110.9	
Nagelkerke R ²	0.03		13.2		0.23	

RCS, Rural Clinical School.

and low self-efficacy were independently associated with burn-out (OR 3.1, 95% CI 2.0 to 4.6) and (OR 2.1, (95% CI 1.3 to 3.1)) respectively, after adjusting for gender, rural origin, preference for RCS, prior stress and overall health. Social isolation and self-efficacy explained an additional 10% in predicting students' burn-out.

DISCUSSION

In this study of medical students who had completed their RCS term in all 17 Australian universities in the year 2016, 26.5% felt burn-out during their full year of rural placement(s). This was determined using the single-item screening measure for emotional exhaustion. Australian general practitioners in rural areas have similar rates of burn-out reported, however, this rate is lower than other studies which are not specific to rural placements.^{6 25} We found burn-out during rural placement may be a consequence of experiencing stress prior to their clinical placement, social isolation and low self-efficacy during a placement. Surprisingly, we found that burn-out during a rural clinical placement was not associated with reduced future rural career intent. We have previously shown that rural practice self-efficacy is a significant predictor of rural career intent and modulates the negative effect of social isolation on rural career intent.^{18 26} In this study, we additionally report that reduced social isolation and increased rural practice self-efficacy are associated with reduced burn-out during student rural placements.

There are a variety of factors during medical school that contribute to student burn-out, which could develop cumulatively over an extended period. In this study, we have identified female gender and rural origin as

important individual-level risk factors for medical student burn-out during a rural placement. Evidence suggests that women tend to report more anxiety, distress and physical symptoms than men. A multicentric study of 22 Brazilian medical schools reported that female medical students exhibit higher empathic concern and personal distress, lower perception of physical and psychological quality of life and higher emotional exhaustion.²⁷ This gender difference might be due to gender-linked variations in coping strategies used to manage personal stress.^{28 29} The implications of inequitable burn-out rates between female and male medical students require further consideration in view of the contemporary feminisation of the rural medical workforce in Australia.

Interestingly, this study found that rural origin is also associated with vulnerability to burn-out. The reason for this paradox remains unknown. Indeed previous studies have demonstrated no differences in personality attributes for Australian medical students based on urban or rural origins.³⁰ It remains unknown whether rural students' cumulative experiences influence stress responses differently. Potential factors could include dislocation from home, financial pressures and reduced academic capital in their social networks leading to academic stress.³¹ Although some studies suggest that students in their first year of university studies experience higher levels of stress, it is well recognised that the transition to clinical training is stressful for medical students.³² This may suggest academic stress may have cumulative effects. In our study, stress in the year prior to rural placement was experienced by 43.3% of medical students. Prior stress was a significant predictor of burn-out during a rural clinical placement.

Our study finds no association between burn-out and career intent. This suggests that rural career intent may not protect students from burn-out during rural placements. Pagnin *et al* found intellectual curiosity, professional autonomy, altruism and interest in human relationships were common reasons for choice of medicine, but found no correlation between burn-out and career motivation.³³

Social isolation was associated with burn-out in our study. Several studies suggest that perceived social isolation contributes to increases in depressive thoughts and/or distress. Rural medical students who felt socially isolated during an RMS placement were less likely to take up intern training in rural areas.¹⁶ We suggest that rural self-efficacy may mediate the association between social isolation in rural medical students and rural clinical workforce intentions.¹⁹ Rural self-efficacy is specific and not a global trait of efficacy. It includes self-beliefs linked to distinct realms of functioning in a rural context that may be developed through rural origin, mastery experiences in rural clinical placements and vicarious learning, that is, mentored and taught by rural clinicians. Promotion of rural self-efficacy and providing opportunities for student engagement to reduce social isolation may reduce medical student burn-out during rural placements.

The strength of our study includes the use of large cross-sectional study of 17 Australian RCSs with consistent definitions, agreed protocols and mechanisms for collecting and reporting data at the national level.²⁰ This is the first time that the FRAME survey has been used to investigate self-perceived burn-out during a rural placement. A potential limitation of the study is the use of self-reported burn-out question, however, a single-item screening measure of emotional exhaustion for perceived burn-out assessment has been previously used^{23 34} and shown to have consistent significant associations in other medical student populations.²² We also found positive correlation between self-perceived burn-out and empathy questions ($r=0.44$) in the present study indicating good concurrent validity. Causal inferences cannot be confirmed due to the cross-sectional nature of this study. Furthermore, the list of factors included in the study was not exhaustive of all potential confounders. In particular, personality traits may underlie both social isolation and burn-out. Nevertheless, the study has contributed some critical understanding on burn-out during rural placements for medical students.

In summary, this study demonstrates that perceived burn-out that occurs in Australian medical students during year-long RCS placements is somewhat lower than found in previous studies. Our findings of burn-out also correlate with female gender, students who had lived longest in regional locations, had recalled previous stress, low rural practice self-efficacy and social isolation during placements. Rural career intention was not associated with burn-out during rural placements. Social isolation and low rural self-efficacy together explained 10% of variance in burn-out. These are potentially amendable

factors to mitigate medical student burn-out during rural placements.

Contributors VI developed the study design and the survey questions on burn-out and self-efficacy, which were added to the standard FRAME survey and analysed the data and drafted the initial version of the manuscript. CSM contributed to initial project design, data interpretation and critical revision of the manuscript. LW contributed to initial project design, data interpretation and critical revision of the manuscript. JG contributed to initial project design, data interpretation and critical revision of the manuscript. All approved the final manuscript.

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Competing interests VI has leadership responsibilities for a medical student education programme in an Australian rural clinical school. CSM had previous leadership responsibilities for a medical student education programme in an Australian rural clinical school. LW has direct leadership responsibilities for a medical student education programme in an Australian rural clinical school. JG has direct leadership responsibilities for a medical student education programme in an Australian rural clinical school. Students from her programme participated in the FRAME exit survey.

Patient consent for publication Not required.

Ethics approval Ethics approval was obtained for the study through Flinders University Social and Behavioural Research Ethics Committee (project number 4098) for data from each of the participating universities.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement Data may be obtained from a third party and are not publicly available.

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