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Vocational and psychosocial predictors of medical negligence claims among Australian doctors: a prospective cohort analysis of the MABEL survey

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ABSTRACT

Objective To understand the association between medical negligence claims and doctors' sex, age, specialty, working hours, work location, personality, social supports, family circumstances, self-rated health, self-rated life satisfaction and presence of recent injury or illness.

Design and setting Prospective cohort study of Australian doctors.

Participants 12 134 doctors who completed the Medicine in Australia: Balancing Employment and Life survey between 2013 and 2019.

Primary outcome measure Doctors named as a defendant in a medical negligence claim in the preceding 12 months.

Results 649 (5.35%) doctors reported being named in a medical negligence claim during the study period. In addition to previously identified demographic factors (sex, age and specialty), we identified the following vocational and psychosocial risk factors for claims: working full time (OR=1.48, 95% CI 1.13 to 1.94) or overtime hours (OR 1.70, 95% CI 1.29 to 2.23), working in a regional centre (OR 1.69, 95% CI 1.37 to 2.08), increasing job demands (OR 1.16, 95% CI 1.04 to 1.30), low self-rated life satisfaction (OR 1.43, 95% CI 1.08 to 1.91) and recent serious personal injury or illness (OR 1.40, 95% CI 1.13 to 1.72). Having an agreeable personality was mildly protective (OR 0.91, 95% CI 0.83 to 1.00). When stratified according to sex, we found that working in a regional area, low self-rated life satisfaction and not achieving work–life balance predicted medical negligence claims in male, but not female, doctors. However, working more than part-time hours and having a recent personal injury or illness predicted medical negligence claims in female, but not male, doctors. Increasing age predicted claims more strongly in male doctors. Personality type predicted claims in both male and female doctors.

Conclusions Modifiable risk factors contribute to an increased risk of medical negligence claims among doctors in Australia. Creating more supportive work environments and targeting interventions that improve doctors' health and well-being could reduce the risk of medical negligence claims and contribute to improved patient safety.

Strengths and limitations of this study

⇒ Compared with prior studies, our study assessed a wider range of demographic, vocational and psychosocial variables,. and stratified exposure variables according to sex. This facilitated a deep analysis of the factors associated with medical negligence claims.
⇒ While Australia is geographically unique, its legal and healthcare systems are broadly similar to other jurisdictions, including the UK and Canada, allowing our findings to be extrapolated to other jurisdictions and healthcare settings.
⇒ Our unique prospective cohort study design, coupled to our analysis of a broad range of potential confounding factors, enabled us to draw stronger causal inferences compared with prior cross-sectional studies that less reliably distinguish predictors from consequences of medical negligence claims.
⇒ Recruitment into the survey was independent of whether doctors had been sued in the previous 12 months, so we believe that our results are an unbiased assessment of the association between the factors we studied and negligence claims.
⇒ We did not have data on medical negligence claims outcomes. Cases that were settled, withdrawn or found in favour of the doctor may differ from those where the doctor was found negligent. Yet, irrespective of their outcome, claims can still shine a light on healthcare quality and safety. Similarly, the relationship between working hours and medical negligence claims may be confounded by the number of clinical encounters. Although the MABEL survey asked doctors about the number of patients seen, running a model that corrects for the number of patient consultations would have reduced our sample size and increased the number of missing values in our dataset, as doctors such as radiologists and pathologists might have had difficulty answering this question.
⇒ The MABEL survey did not identify doctors with multiple claims. This is important as prior claims history is a strong predictor of future medicolegal events, and this may have confounded our results.

INTRODUCTION

Medical negligence litigation should promote healthcare quality improvement by sanctioning doctors who breach the legal obligations they owe to their patients.[1] Like other vehicles of patient complaints, medical negligence claims provide a window into patient experiences and can forewarn of wider systemic deficiencies.[2] When patients

suffer medical harm, they often prosecute legal claims in order to seek redress, answers and assurances that mistakes will not be repeated.[3] However, claims against doctors are increasing, with growing evidence that adversarial medicolegal processes are harmful to both doctors[4] and patients.[5] In addition, medical liability systems in Australia, the UK and the USA add significantly to the economic costs of healthcare.[6]

To date, little is known about the risks and predictors of Australian medical negligence claims beyond basic information such as the demographic profile of doctors who are subject to claims. This deprives us of information that could reduce avoidable patient harm, economic costs and the adverse impact of medical litigation on doctors' health and well-being. The current evidence is that increasing age, male sex, surgical specialties and prior complaints are associated with increased risk of medicolegal claims.[7] However, less is known about the impact of a doctor's personality, health or occupational well-being on medical negligence claims. This is important because, unlike demographic and historical predictors, vocational and psychosocial risk factors are potentially modifiable through education and support programmes.

Past research has relied on cross-sectional data, which limits causal inferences. The use of cohort survey data, such as the 'Medicine in Australia: Balancing Employment and Life' (MABEL), has the potential to illuminate previously unidentified associations between vocational and psychosocial variables and medical negligence claims. This also allows quality and safety researchers and health service managers to target interventions aimed at improving the psychosocial health and well-being of doctors and the quality and safety of the clinical services that they provide. The aim of this study was to explore the relationship between a wide set of demographic, vocational and psychosocial factors, and medical negligence claims. Specifically, we examined the association between medical negligence claims and doctors' sex, age, specialty, working hours, work location, personality, social supports, self-rated health, self-rated life satisfaction, number of dependent children and the presence of recent serious personal injury or illness. Based on prior research, our a priori hypothesis was that increasing age, male sex and working in surgical specialties would increase the risk of medical negligence claims against doctors in Australia. The other variables we studied were exploratory; thus, we did not have an ex ante hypothesis about the nature of those associations.

METHODS

Data source

MABEL is a longitudinal panel survey of workforce participation and its determinants among Australian doctors. It seeks to understand doctors' working conditions, job satisfaction, work–life balance, family circumstances, personality and measures of health and satisfaction. In 2008, the first wave of data collection established the baseline study cohort, which was drawn from a national directory of 58 620 practising doctors in Australia. Ten subsequent annual waves of data collection continued until 2018. At each wave, new doctors were added to the national directory and invited to participate. These new cohort recruits included new medical graduates and doctors migrating to Australia from overseas, and their inclusion was intended to replace doctors lost to follow-up as well as maintaining the cross-sectional representativeness of each wave of data collection. The MABEL survey excluded doctors working overseas and those not working due to retirement or leave. MABEL was developed by researchers at the Melbourne Institute of Applied Economic and Social Research and Monash University, Melbourne, Australia. Copies of the survey instruments are publicly available,[8] and a detailed description of the MABEL protocol and cohort has been published elsewhere.[9]

Study design, setting and participants

Our prospective cohort study analysed MABEL survey responses from waves 6 to 11 (2013–2018) because all these waves consistently asked respondents about medical negligence claims as well as the employment and psychosocial factors used to construct our outcome measures described below. We excluded data from waves 1 to 5 because not all questions relating to our variables of interest were included in those waves. We also excluded doctors in training and hospital non-specialists because they are usually hospital employees. In Australia, hospitals are vicariously liable for the negligence of doctors within their employ.[10] This means that the hospital, rather than its employed doctors, would defend medical negligence litigation.

Variables

Our primary outcome measure combined the responses to two questions. These were 'have you been named in a medical negligence claim?' (yes or no) and 'how long ago did it happen?' (≤3 months, 4–6 months, 7–9 months and 10–12 months ago). We constructed a binary variable representing whether or not the respondent had been named as a defendant (sued) in a medical negligence claim in the preceding 12 months. Our exposure variables included age, sex, personality type, work hours, geographical location, job control, stress and recent illness or injury. Apart from age, all variable values are carried forward from wave of entry. Table 1 describes how each variable was measured and coded.

Personality was measured using the 15-item big-five factor model,[11] which reliably classifies human personality into five broad categories: neuroticism, extraversion, openness, agreeableness and conscientiousness.[12] Self-rated health was measured using a five-point scale previously validated for use in large health surveys.[13] Self-rated life satisfaction provides information about respondents' levels of happiness and was measured using a 10-point scale that has been shown to be stable and sensitive to changing life circumstances.[14] Working

Table 1 Construction of exposure variables

Variable	Categories
Sex	Male, female
Age	Imputed from year of birth on enrolment. Coded into 10-year intervals: under 35, 35–44, 45–54, 55–64, 65 years and over
Specialty	46 recorded specialties were collapsed into the following 13 groups: ► General practitioners. ► Adult medicine physicians. ► Surgeons. ► Paediatricians. ► Anaesthetists. ► Pathologists. ► Radiologists. ► Emergency physicians. ► Obstetricians and gynaecologists. ► Ophthalmologists. ► Psychiatrists. ► Other: includes specialties with low participant numbers such as public health, rehabilitation medicine and dermatology.
Working hours per week	Total hours worked per week imputed by adding total hours worked per week in direct patient care, indirect patient care, education, management and administration and other. Coded as <35 hours, 35–45 hours and ≥45 hours.
Location of workplace	Australian Statistical Geographical Classification of main place of work (based on postcode) categorised into: metropolitan, regional and remote.
Openness personality type	Added scores together for the following questions (from 1=not does apply to me at all to 7=applies to me perfectly): ► 'Is original, comes up with new ideas'. ► 'Values artistic experiences'. ► 'Has an active imagination'. Total scores were then converted to a standardised score with a mean of 0 and SD of 1.
Conscientiousness personality type	Added scores together for the following questions (from 1=not does apply to me at all to 7=applies to me perfectly): ► 'Does a thorough job'. ► 'Does things effectively and efficiently'. ► 'Tends to be lazy' (reverse coded so that 1=applies to me perfectly and 7=does not apply to me at all). Total scores were then converted to a standardised score with a mean of 0 and SD of 1.
Extraversion personality type	Added scores together for the following questions (from 1=not does apply to me at all, to 7=applies to me perfectly): ► "Is outgoing, sociable" ► "Is communicative, talkative" ► "Is reserved" (Reverse coded so that 1=applies to me perfectly and 7=does not apply to me at all) Total scores converted to a standardised score with a mean of 0 and SD of 1.
Agreeableness personality type	Added scores together for the following questions (from 1=not does apply to me at all to 7=applies to me perfectly): ► 'Has a forgiving nature'. ► 'Is considerate and kind to others'. ► 'Is sometimes somewhat rude to others' (reverse coded so that 1=applies to me perfectly and 7=does not apply to me at all). Total scores converted to a standardised score with a mean of 0 and SD of 1.
Neuroticism personality type	Added scores together for the following questions (from 1=not does apply to me at all to 7=applies to me perfectly): ► 'Worries a lot'. ► 'Gets nervous easily'. ► 'Is relaxed, handles stress well' (reverse coded so that 1=applies to me perfectly and 7=does not apply to me at all). Total scores converted to a standardised score with a mean of 0 and SD of 1.

Continued

Table 1 Continued

Variable	Categories
High job demands	Added scores together for the following questions (from 0=strongly disagree/very dissatisfied, to 4=strongly agree/very satisfied): ► 'It is difficult to take time off when I want to'. ► 'My patients have unrealistic expectations about how I can help them'. ► 'Running my practice is stressful most of the time'. ► 'The majority of my patients have complex health and social problems'. Total scores converted to a standardised score with a mean of 0 and SD of 1.
Work–life balance	Added scores together for the following questions (from 0=strongly disagree/very dissatisfied to 4=strongly agree/very satisfied): ► 'The balance between my personal and professional commitments is about right'. ► 'I am satisfied with my hours of work'. ► 'I can take time off at short notice, for example if one of my children is ill or for a home emergency'. ► 'My colleagues understand the need for work-life balance'. ► 'I cannot work my preferred hours due to a lack of jobs offering those hours' (reverse coded so that 0=strongly agree and 4=strongly disagree). Total scores converted to a standardised score with a mean of 0 and SD of 1.
Low job control	Added scores together for the following questions (from 0=strongly disagree/very dissatisfied to 4=strongly agree/very satisfied): ► 'How satisfied or dissatisfied are you with you freedom to choose your own method of working?' (reverse coded so that 0=very satisfied and 4=very dissatisfied). ► 'How satisfied or dissatisfied are you with the amount of variety in your work?' (reverse coded so that 0=very satisfied and 4=very dissatisfied). ► 'How satisfied or dissatisfied are you with the amount of responsibility you are given (reverse coded so that 0=strongly agree and 4=strongly disagree). ► 'The hours I work are predictable'. ► 'I am restricted in my employment and/or the time and hours I work due to lack of available childcare'. Total scores converted to a standardised score with a mean of 0 and SD of 1.
Poor social supports	Added scores together for the following questions (from 0=strongly disagree/very dissatisfied to 4=strongly agree/very satisfied): ► 'I have a poor support of network of other doctors like me'. ► 'I don't have many friends or family members in my current work location'. ► 'It is easy to pursue my hobbies and leisure interests in my current work location' (reverse coded so that 0=strongly agree and 4=strongly disagree). Total scores converted to a standardised score with a mean of 0 and SD of 1.
Poor self-rated health	'In general, would you say your health is excellent, very good, good, fair poor' recoded into a binary variable: excellent to fair versus poor.
Low self-rated life satisfaction	'All things considered, how satisfied are you with your life in general? 1=Completely dissatisfied to 10=Completely satisfied' recoded into binary variable where 0 1 2 3 4 5=low and 6 7 8 9 10=high.

hours was measured in three categories based on the Australian Bureau of Statistics' definition of a standard full-time working week,[15] while geographical location was collapsed into three categories based on the five-category Australian Standard Geographical Classification.[16]

Statistical methods

First, we described the frequency of medical negligence claims during the study period by practitioner characteristics, examining any differences using a χ^2 test for contingency tables. Second, we performed a population-averaged panel data logistic regression model, which is appropriate for binary data where observations are clustered within individuals (multiple waves per respondent) to examine the association between being named in a medical negligence claim and the exposure variables. Third, we repeated the main analysis stratified by sex. All analyses were conducted using Stata V.16.1 (StataCorp). This study was reported using the Strengthening the Reporting of Observational Studies in Epidemiology guidelines for reporting of cohort studies.[17]

Patient and public involvement

It was not possible to involve patients or the public in the design, conduct, reporting or dissemination plans of our research. Results will be made available to MABEL participants at https://melbourneinstituteunimelbeduau/mabel/results-and-publications/journal-articles.

RESULTS

Characteristics of the study sample

Between 2013 and 2018, a total of 12134 doctors were available for analysis in the MABEL survey: 18.4% completed all six waves of data collection and 54.0% completed three or more waves. Six hundred and forty-nine doctors (5.35%) reported being sued. As shown in table 2, compared with respondents who were not sued, those sued were predominately male (69.6% vs 52.8%), working >45 hours per week (43.0% vs 27.6%) and specialists in surgery (14.5% vs 4.1%) or obstetrics and gynaecology (8.2% vs 2.6%). There were no observed differences between respondents with primary medical degrees obtained in Australia or overseas.

Demographic predictors of medical negligence claims

Our multivariate analysis identified a number of significant demographic risk factors associated with being sued in the preceding 12 months (see table 3 for reference categories). These included, being male (OR 1.51, 95% CI 1.20 to 1.89), aged ≥35 years (35–44 years: OR 2.27, 95% CI 1.36 to 3.79; 45–54 years: OR 2.84, 95% CI 1.70 to 4.73; 55–64 years: OR 3.22, 95% CI 1.93 to 5.36;>65 years: OR 2.51, 95% CI 1.44 to 4.39), being a surgeon (OR 3.69 95% CI 2.76 to 4.92), obstetrician and gynaecologist (OR 3.63, 95% CI 2.54 to 5.18), or radiologist (OR 1.95, 95% CI 1.21 to 3.15), working full time (OR 1.48, 95% CI 1.13 to 1.94) or over time (OR 1.70, 95% CI 1.29 to 2.23) and working in a regional centre (OR 1.69, 95% CI 1.37 to 2.08).

Vocational and psychosocial predictors of medical negligence claims

Our multivariate analysis also identified a number of significant vocational and psychosocial risk factors for being sued (see table 3 for reference categories). These included: increasing job demands (OR 1.16, 95% CI 1.04 to 1.30); low self-rated life satisfaction (OR 1.43, 95% CI 1.08 to 1.91); and recent serious personal injury or illness (OR 1.40, 95% CI 1.13 to 1.72). Having an agreeable personality was mildly protective (OR 0.91, 95% CI 0.83 to 1.00), as was experiencing low job control (OR 0.90, 95% CI 0.81 to 1.00), or being an adult medicine physician (OR 0.72, 95% CI 0.52 to 0.99).

Effect of sex on the predictors of medical negligence claims

Finally, we stratified the relationship between our exposure variables and medical negligence claims by sex (table 4). Working in a regional area (OR 1.83, 95% CI 1.43 to 2.34) and low self-rated life satisfaction (OR 1.51, 95% 1.08 to 2.11) predicted medical negligence claims in male, but not female, doctors. Achieving work–life balance (OR 0.97, 95% CI 0.94 to 1.00) was associated with a lower risk of medical negligence claims in male, but not female, doctors. However, working full time (OR 1.77, 95% CI 1.16 to 2.70) or overtime (OR 2.79, 95% CI 1.79 to 4.34) and having a recent personal injury or illness (OR 1.91, 95% CI 1.32 to 2.76) predicted medical negligence claims in female, but not male, doctors. Age ≥35 years and specialty predicted claims in both male and female doctors but more strongly predicted claims in male doctors. We found no difference between male and female doctors in the risk of medical negligence claims associated with personality type or other vocational variables studied.

DISCUSSION

This is the first study to longitudinally analyse demographic, vocational and psychosocial predictors of medical negligence claims in Australia. It is also the first to adjust for confounding factors and to stratify according to sex. Previous research shows that older male doctors working in surgical and psychiatric specialties with a prior complaints history are at the highest risk of complaints to Australian medical regulators.[18] Internationally, the risk of being sued is also highest among older surgeons, with high workloads, long working hours and a history of prior claims.[19] While our results lend weight to these earlier findings, they also reveal insights into additional psychosocial and workplace factors that may be associated with claims. Existing medicolegal risk prediction tools, such as the PRONE score,[20] focus on demographic factors and prior claims history, which are not modifiable. This limits opportunities for remedial action and does not explain why there is variation within high-risk categories: for example, being an older male surgeon does not guarantee that a doctor will be sued. Hence, there is a pressing need to better understand the role of psychosocial well-being, workplace stress and sociodemographic factors in medical litigation.[21] Our study addresses this need.

The most important and novel findings in this study are that doctors with lower self-rated health, lower self-rated life satisfaction (especially for male doctors) and those who had experienced a recent serious personal injury or illness were more likely to be sued. Prior studies have shown that poor doctor well-being, higher levels of burnout[22] and chronic illness among doctors can lead to poor patient safety outcomes and medical errors.[23] Our study reveals that acute and recent injury may also contribute to this risk. This suggests that the quality of treatment and workplace support offered to doctors experiencing recent illness or injury can impact on patient care. Our results also reinforce previous recommendations that preventive efforts to improve doctors' health and well-being need to be intensified. For example, healthy lifestyle and positive psychology interventions can boost doctors' subjective well-being, enhance patients' perceptions of doctors' empathy and improve clinical outcomes.[24] This is particularly important because we know from numerous studies that being sued can negatively impact on doctors' health and well-being.[25] Therefore, it is imperative to intervene early to prevent poor doctor health leading to claims that can then further compromise doctors' health.

Prior research has also demonstrated that male doctors are at higher risk of medicolegal claims than female

Table 2 Characteristics of doctors surveyed (waves 6–11) (n=12 134)

Characteristic	Doctors in the MABEL cohort who reported being sued				P value
	Yes (n=649)		No (n=11 485)		
	n	%	n	%	
Sex					<0.001
Female	197	30.4	5408	47.1	
Male	452	69.6	6061	52.8	
Unknown	0	0	16	0.1	
Age (years)					<0.001
<35	29	4.5	1839	16	
35–44	151	23.3	3259	28.4	
45–54	194	29.9	2771	24.1	
55–64	188	29	2221	19.3	
≥65	69	10.6	1007	8.8	
Unknown	18	2.8	388	3.4	
Specialty (at wave of entry)					<0.001
General practitioner	268	41.3	5796	50.5	
Adult medicine	68	10.5	1730	15.1	
Surgery	94	14.5	475	4.1	
Paediatrics	20	3.1	358	3.1	
Anaesthesia	34	5.2	851	7.4	
Pathology	7	1.1	202	1.8	
Radiology	21	3.2	222	1.9	
Emergency	11	1.7	369	3.2	
Obstetrics and gynaecology	53	8.2	293	2.6	
Ophthalmology	13	2	145	1.3	
Psychiatry	22	3.4	562	4.9	
Other (dermatology, public health, rehab)	37	5.7	443	3.9	
Unknown	1	0.2	39	0.3	
Attended medical school in Australia					0.155
Yes	465	27	7815	68	
No	174	71.6	3476	30.3	
Unknown	9	1.4	194	1.7	
Hours worked per week (on entry to study)					<0.001
<35 (part time)	145	22.3	4068	35.4	
35–45 (full time)	207	31.9	4046	35.2	
>45 (overtime)	279	43	3169	27.6	
Unknown	18	2.8	202	1.7	
Work location (on entry to study)					<0.001
Metropolitan	420	64.7	7974	69.4	
Regional/rural	159	24.5	2168	18.9	
Remote	69	10.6	1179	10.3	
Unknown	1	0.2	164	1.4	

doctors.[26] A recent meta-analysis of 32 studies found that, in 27 studies, male doctors were more likely to experience a claim over time and across jurisdictions.[27] For this reason, we stratified demographic, vocational and psychosocial predictors of medical negligence claims by sex. This identified differences in the risk factors experienced by

Table 3 Multivariate predictors of medical negligence claims (n=10 238)

Characteristic	Adjusted OR (95% CI)	P value
Sex		<0.001
Male (vs female)	1.51 (1.20 to 1.89)	
Age		<0.001
<35	1.00 (reference)	
35–44	2.27 (1.36 to 3.79)	
45–54	2.84 (1.70 to 4.73)	
55–64	3.22 (1.93 to 5.36)	
≥65	2.51 (1.44 to 4.39)	
Specialty		<0.001
General practitioner	1.00 (reference)	
Adult medicine	0.72 (0.52 to 0.99)	
Surgery	3.69 (2.76 to 4.92)	
Paediatrics	1.21 (0.74 to 2.00)	
Anaesthesia	0.68 (0.44 to 1.05)	
Pathology	0.59 (0.26 to 1.31)	
Radiology	1.95 (1.21 to 3.15)	
Emergency medicine	0.61 (0.31 to 1.20)	
Obstetrics and gynaecology	3.63 (2.54 to 5.18)	
Ophthalmology	1.46 (0.73 to 2.90)	
Psychiatry	0.84 (0.50 to 1.40)	
Other	1.53 (1.00 to 2.32)	
Hours worked per week		<0.001
<35	1.00 (reference)	
35–45	1.48 (1.13 to 1.94)	
>45	1.70 (1.29 to 2.23)	
Location of workplace		<0.001
Metropolitan	1.00 (reference)	
Regional	1.69 (1.37 to 2.08)	
Remote	1.21 (0.88 to 1.65)	
Personality, per one SD increase		
Openness	1.05 (0.95 to 1.15)	0.345
Conscientiousness	1.01 (0.91 to 1.11)	0.911
Extraversion	0.99 (0.90 to 1.10)	0.880
Agreeableness	0.91 (0.83 to 1.00)	0.050
Neuroticism	0.91 (0.82 to 1.01)	0.073
Vocational and psychosocial factors		
Job demands (per one SD increase)	1.16 (1.04 to 1.30)	0.011
Work–life balance (per one SD increase)	0.91 (0.82 to 1.01)	0.082
Low job control (per one SD increase)	0.90 (0.81 to 1.00)	0.048
Poor social supports (per one SD increase)	1.04 (0.94 to 1.16)	0.415
Dependent child(ren) (vs none)	1.02 (0.83 to 1.25)	0.868
Poor self-rated health (vs excellent to fair)	1.43 (0.68 to 3.02)	0.346
Serious personal injury or illness (vs none)	1.40 (1.13 to 1.72)	0.014
Low self-rated life satisfaction (vs high)	1.43 (1.08 to 1.91)	0.012

male and female doctors. Noticeably, working long hours and having a recent serious injury or illness increased the risk of medical negligence claims more in female doctors, whereas working in a regional area, experiencing poor self-rated life satisfaction and low work–life balance increased the risk more in male doctors. The effect of age and specialty was similar in both sexes. The reasons for these differences are unclear but may be linked to other variables not studied here, including the extent of perceived gender equality within a relationship and performing invisible household labour.

Workplace location is also associated with medical negligence claims. Compared with metropolitan doctors, we found that doctors practising in regional areas were at increased risk of being sued, while those in remote areas were not. There is a relative undersupply of doctors in both regional and remote Australia,[28] which adversely impacts on healthcare access[29] and health outcomes in these communities.[30] Similar problems exist in Canada[31] and the United States.[32] With increasing remoteness from Australian capital cities, the number of doctors per capita diminishes, while working hours, on-call demands and job complexity all increase.[33] Therefore, our findings are surprising, as we would expect medicolegal risk to increase with increasing remoteness. We propose several possible explanations. First, regional areas may have small hospitals that provide doctors with more opportunities for procedural work than in many remote Australian communities. Undertaking procedural work is a known risk factor for medical negligence claims.[34] Second, remote communities are often serviced by fly-in-fly-out doctors from nearby regional centres, due to a lack of suitable long-term accommodation in remote locations.[35] Doctors living in regional centres who visit remote communities may be less familiar with patients, staff or health systems in remote areas, and this may increase the risk of medical errors due to a lack of continuity of care.[36] Third, patients in remote areas may be required to access care in regional centres due to a lack of access to medical services in remote areas.

Irrespective of geographical location, doctors with higher self-rated job demand scores were more likely to be sued than those with lower scores. Many doctors work excessive hours and research has shown that this can

Table 4 Sex-stratified multivariate predictors of medical negligence claims

Characteristic	Female doctors (n=4602)		Male doctors (n=5591)	
	Adjusted OR (95% CI)	P value	Adjusted OR (95% CI)	P value
Age (years)		0.035		0.002
<35	1.00 (reference)		1.00 (reference)	
35–44	1.70 (0.89 to 3.27)		3.43 (1.43 to 8.26)	
45–54	1.86 (0.96 to 3.61)		4.57 (1.90 to 10.97)	
55–64	2.74 (1.42 to 5.30)		4.69 (1.96 to 11.22)	
≥65	2.20 (0.84 to 5.78)		3.57 (1.45 to 8.79)	
Specialty		<0.01		<0.001
General practitioner	1.00 (reference)		1.00 (reference)	
Adult medicine	0.89 (0.52 to 1.55)		0.67 (0.45 to 1.00)	
Surgery	2.95 (1.37 to 6.33)		3.79 (2.74 to 5.23)	
Paediatrics	1.10 (0.49 to 2.45)		1.38 (0.73 to 2.61)	
Anaesthesia	0.55 (0.20 to 1.52)		0.70 (0.43 to 1.15)	
Pathology	0.27 (0.03 to 2.17)		0.71 (0.29 to 1.76)	
Radiology	3.16 (1.18 to 8.46)		1.78 (1.03 to 3.10)	
Emergency medicine	0.40 (0.09 to 1.75)		0.67 (0.31 to 1.47)	
Obstetrics and gynaecology	3.32 (1.86 to 5.91)		3.57 (2.27 to 5.62)	
Ophthalmology	1.98 (0.52 to 7.58)		1.36 (0.61 to 3.02)	
Psychiatry	0.98 (0.44 to 2.22)		0.79 (0.41 to 1.50)	
Other	1.04 (0.41 to 2.65)		1.71 (1.06 to 2.76)	
Hours worked per week		<0.001		0.203
<35	1.00 (reference)		1.00 (reference)	
35–45	1.77 (1.16 to 2.70)		1.33 (0.94 to 1.89)	
>45	2.79 (1.79 to 4.34)		1.36 (0.96 to 1.92)	
Location of workplace		0.301		<0.001
Metropolitan	1.00 (reference)		1.00 (reference)	
Regional	1.24 (0.81 to 1.89)		1.83 (1.43 to 2.34)	
Remote	1.43 (0.87 to 2.35)		1.05 (0.70 to 1.56)	
Personality, per one SD increase				
Openness	1.00 (0.95 to 1.05)	0.990	1.02 (0.99 to 1.06)	0.237
Conscientiousness	0.95 (0.88 to 1.02)	0.137	1.02 (0.98 to 1.07)	0.320
Extraversion	0.97 (0.92 to 1.02)	0.171	1.01 (0.98 to 1.05)	0.458
Agreeableness	0.97 (0.91 to 1.04)	0.417	0.96 (0.92 to 1.00)	0.054
Neuroticism	0.96 (0.92 to 1.01)	0.095	0.98 (0.95 to 1.01)	0.294
Vocational and psychosocial factors				
Job demands (per 1 SD increase)	1.05 (0.99 to 1.11)	0.082	1.04 (1.00 to 1.08)	0.055
Work–life balance (per 1 SD increase)	1.01 (0.97 to 1.05)	0.765	0.97 (0.94 to 1.00)	0.028
Low job control (per 1 SD increase)	0.95 (0.90 to 1.01)	0.090	0.97 (0.94 to 1.01)	0.136
Poor social supports (per 1 SD increase)	0.99 (0.92 to 1.06)	0.754	1.02 (0.98 to 1.07)	0.313
Dependent child(ren) (vs none)	1.21 (0.83 to 1.78)	0.318	0.96 (0.76 to 1.23)	0.768
Poor self-rated health (vs excellent to fair)	--*		1.81 (0.82 to 4.00)	0.140
Serious personal injury or illness (vs none)	1.91 (1.32 to 2.76)	0.001	1.22 (0.94 to 1.56)	0.130
Low self-rated life satisfaction (vs high)	1.19 (0.68 to 2.08)	0.542	1.51 (1.08 to 2.11)	0.016

*Variable omitted from the model because it completely determined the outcome variable in this strata.

contribute to misdiagnoses[37] and other medical errors.[38] While this may also translate into increased medicolegal risk, we need to interpret this cautiously. First, it is possible that the association between work hours and medicolegal risk may be explained by increased patient volume. Second, a very recent report suggests that the quality of care rendered by part-time doctors may be inferior to that of doctors working full time.[39] The association between work hours and medicolegal risk is therefore complex. Adding to this complexity is our finding that the risk of medical negligence claims in doctors working long hours is more pronounced in female doctors.

It is similarly difficult to interpret our finding that doctors who perceived lower levels of job control were less likely to be sued. Although the effect size was small, we postulate that while highly structured workplaces afford doctors less autonomy, they may also enforce well-defined scopes of practice, surgical safety checklists or other patient safety initiatives that reduce medical errors. Moreover, doctors with higher job control may be more senior members of the clinical team, who carry greater clinical responsibility for adverse patient outcomes and may be more likely to face litigation.

Finally, we found that agreeableness, unlike other personality types, conferred a modest protective effect on the risk of being sued. Prior studies have not found a consistent association between personality type and medicolegal risk. However, studies of medical students' personality have shown that agreeableness is associated with greater empathy, which improves professionalism and patient communication.[40] This may protect agreeable doctors from being sued. Personality may also influence how a doctor responds following an adverse event, and this may also determine the risk of medical litigation. For instance, patients may feel less angry and less motivated to sue a doctor who expresses genuine empathy and regret following an adverse event.

Our findings add weight to ongoing calls[41] to address doctor fatigue and other system-wide causes of poor doctor health that could have far-reaching benefits both for doctors' health and patient safety. Our study has four important strengths. First, it assessed a wider range of demographic, vocational and psychosocial risks for claims than previous studies, facilitating a deeper analysis of the factors associated with medical negligence claims. Second, the use of longitudinal cohort data enabled identification of exposure variables present before medical negligence claims occurred. Prior research has largely relied on cross-sectional surveys that limit the ability of researchers to distinguish predictors from consequences of medical negligence claims (ie, whether poor health increases the risk of being sued or whether being sued increases the risk of poor health). In contrast, we were able to draw clearer causal inferences because of the longitudinal cohort design and because we controlled for possible confounding relationships (noting that a temporal association is only one of a number of criteria that need to be satisfied to establish a causal association). Third, we stratified our exposure variables according to sex. Fourth, invitation into the survey was independent of whether doctors had been sued in the previous 12 months, so we believe that our results are an unbiased assessment of the association between the factors we studied and medical negligence claims.

Our study has several limitations. First, although invitation into the survey was independent of whether doctors had been sued, doctors who accepted the invitation to join the MABEL study may differ from those who did not. However, MABEL measured a wide range of variables and was prospective in nature, so we believe that this was unlikely to have biased our results. Moreover, MABEL respondents have been shown to be broadly representative of Australian doctors in terms of other key characteristics, including age, sex, specialty, geographic location and hours worked.[42] Second, the cohort relied on recall when responding to survey questions. In particular, it relied on recall, rather than evidence of, a medical negligence claim. Despite this, we believe participant recall was likely to be reliable because being sued is a significant life event for a doctor. Third, we did not have data on claims outcomes. Cases that were settled, withdrawn or found in favour of the doctor may differ from those where the doctor was found negligent. However, regardless of the outcome, we believe that the prosecution of medical negligence claims shines a light on patient experiences and perceived quality of care. Fourth, we did not have data on patient numbers, so it is unclear whether the risk associated with long working hours was due to increased patient volumes or other factors. Finally, the survey did not identify doctors with multiple claims. This is important, as prior claims history is a strong predictor of future medicolegal events and may have been an influential confounding variable.

Despite these limitations, we believe that our paper contributes to a more nuanced understanding of the risks and predictors of medical negligence claims in Australia. While Australia is geographically unique, its legal and healthcare systems are broadly similar to comparable jurisdictions, including the UK, Canada and New Zealand, allowing our findings to be extrapolated to other jurisdictions and healthcare settings.

CONCLUSIONS

With healthcare workers and systems around the world under increasing pressure from the COVID-19 pandemic,[43] it is more important than ever to create supportive workplaces that promote the mental health and well-being of doctors. Mounting evidence demonstrates that workplace stress within healthcare organisations adversely affects doctors' health and the quality of patient care.[44] Our cohort study found that doctors who were older, male, working longer hours, in regional areas and in surgical specialties were over-represented in Australian medical negligence claims. In addition, high job demands, low self-rated life satisfaction and serious

personal injury or illness presaged an increased risk of claims, while an agreeable personality type was mildly protective. We also found differences in the pattern of predictors according to sex. Targeted interventions aimed at supporting the health and occupational well-being of doctors may reduce the incidence of events that lead to medical negligence claims, thereby benefiting patients, doctors and the wider community.

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Competing interests None declared.

Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants. The MABEL survey was approved by The University of Melbourne Faculty of Business and Economics Human Ethics Advisory Group (Ref. 0709559) and the Monash University Standing Committee on Ethics in Research Involving Humans (Ref. CF07/1102 -2007000291). This study was approved by the Melbourne School of Population and Global Health Human Ethics Advisory Group (Ref. 1956096). Participants gave informed consent to participate in the study before taking part.

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