

## Stress and Burnout among Physicians: Prevalence and Risk Factors in a Singaporean Internal Medicine Programme

### Dear Editor,

Stress is a feeling of strain and pressure while burnout is a multidimensional syndrome comprising emotional exhaustion, depersonalisation (establishment of distant and cynical relationships) and a diminished sense of personal accomplishment.<sup>1</sup> Psychological stress and burnout harm physician health and work performance, and can lead to poorer patient care.<sup>2</sup> Relatively little data are available from Asian academic medical centres. We thus investigated the prevalence and risk factors of stress and burnout among physicians in our institution's internal medicine programme.

### Materials and Methods

We performed a cross-sectional survey of attendings and trainees across 2 training sites: a 1081-bed sponsoring institution (SI), and a 400-bed participating site (PS). We assigned the physician to either the SI or PS depending on their place of practice in the previous month. We conducted the survey via SurveyMonkey® (www.surveymonkey.com) between June 2013 and October 2013. The survey was voluntary and consent was implied if physicians responded. Our institutional ethics board approved the study (F/2013/00770).

All measures reflected respondent experiences over the preceding month, except for the Patient Health Questionnaire (PHQ) which reflected experiences over 2 weeks. Our main outcome measures were assessed using the following psychometric instruments: Cohen Perceived Stress Scale (PSS; 4-question version, total score range 0-16)<sup>3</sup> and the Copenhagen Burnout Inventory (CBI).<sup>4</sup> To obtain the prevalence of stress, we dichotomised the PSS total score using prior normative data (high degree of stress if total score was >8).<sup>5</sup> The CBI is a freely available 19-item self-reported measure of burnout, comprising 3 subscales according to its perceived source (personal, work-related and patient-related subscales). High level of burnout was defined based on standard methods of at least 50 of 100 points on any subscale.<sup>4</sup> To assess for the correlation between the CBI and another widely used but proprietary burnout measure, the Maslach Burnout Inventory (MBI), participants completed a validated two-item version of the MBI.<sup>6</sup>

Our survey examined possible risk factors for stress and burnout: age, gender, having a religion, marital status,

number of children, hours spent per week on clinical work/research/teaching/exercise, number of overnight calls per week, number of hours slept per night and disrespect. As no previously published scales or objective measures were available, we assessed how much participants felt respected using these 3 questions: "How much do colleagues respect you?", "How much do patients respect you?" and "How much do patients' family members respect you?" Answers to these questions were scored on a scale of 0 (not at all) to 10 (extremely). To facilitate interpretation, scores were dichotomised to high degree of respect if the score was >5, and low degree of respect otherwise.

Univariate comparisons of proportions, means and medians were done using Fisher exact, student-t, and Wilcoxon rank-sum tests, respectively. Internal validity for the PSS and the CBI were computed using Cronbach's alpha. Correlation between the CBI and the two-item MBI was done using Spearman's correlation coefficient. Multivariate backward stepwise regression analyses (*P* for entry 0.1, *P* for removal 0.2) were done for PSS score (as a continuous outcome) and burnout (as a dichotomous outcome), adjusting for training site (SI vs PS) to account for possible site differences on stress/burnout. We did not include training stage (trainee vs attending) as a covariate as we expected it to be highly correlated with age, work hours and call frequency.

### Results

From 268 physicians (145 trainees, 123 attendings), we received 109 completed questionnaires (response rate 40.7%, median age 34 years old, 46.8% female). The PSS had moderate reliability while the CBI had excellent reliability (Cronbach's alpha 0.71 and 0.96, respectively). Correlations between the CBI total score and MBI items were good: Spearman's rho was 0.779 for the emotional exhaustion item and 0.813 for the depersonalisation item (both *P* < 0.001) (Table 1).

High stress was present in 17.4% (trainees 21.8%, attendings 11.1%, *P* = 0.201), while burnout was present in 55.1% (trainees 71.8%, attendings 31.1%, *P* < 0.001) (Table 1). Overnight calls and low degree of respect from colleagues were associated with increased PSS, controlled for training site (Table 2). Younger age, shorter exercise

Table 1. Outcome Measures

Outcome Measures	All (n = 109)	Trainees (n = 64)	Attendings (n = 45)	P Value
Perceived stress scale <sup>†</sup> (± SD)	6.2 ± 2.8	6.4 ± 2.5	5.9 ± 3.1	0.315
High degree of perceived stress <sup>‡</sup> (%)	19 (17.4)	14 (21.8)	5 (11.1)	0.201
CBI <sup>§</sup> score (± SD)				
Overall (range 0 – 300)	124 ± 57	140 ± 54	102 ± 55	<0.001*
Personal (range 0 – 100)	50 ± 23	57 ± 20	39 ± 22	<0.001*
Work-related (range 0 – 100)	45 ± 19	50 ± 18	38 ± 18	<0.001*
Patient-related (range 0 – 100)	30 ± 21	33 ± 21	38 ± 18	38 ± 18
Burnout as defined by the CBI (%)				
Overall	60 (55.1)	46 (71.8)	14 (31.1)	<0.001*
Personal	60 (55.1)	45 (70.3)	12 (26.7)	<0.001*
Work-related	60 (55.1)	36 (56.3)	12 (26.7)	0.003*
Patient-related	60 (55.1)	19 (26.7)	5 (11.1)	0.033*

CBI: Copenhagen Burnout Inventory; PHQ: Patient Health Questionnaire; SD: Standard deviation

\* $P < 0.05$ .

<sup>†</sup>Four-item version of the Cohen Perceived Stress Scale, graded on a scale of 0 – 16. Cronbach's scale reliability coefficient alpha = 0.71.

<sup>‡</sup>Using Cohen Perceived Stress Scale, dichotomised to high degree of stress if score was >8, and low degree of stress otherwise. This is in keeping with normative data from Internet users in Spain (Herrero J, Meneses J. Short web-based versions of the perceived stress (PSS) and Center for Epidemiological Studies-Depression (CESD) Scales: a comparison to pencil and paper responses among Internet users. *Comput Human Behav* 2006;22:830-46).

<sup>§</sup>Cronbach's scale reliability coefficient alpha = 0.96.

Table 2. Risk Factors for Stress as Determined by the Four-Item Cohen Perceived Stress Scale—Univariate Analysis and Multiple Linear Regression<sup>§</sup>

Risk Factor	Coefficient (95% CI)	Univariate P Value	Coefficient (95% CI)	Multivariate P Value
SI vs PS	1.45 (0.19, 2.70)	0.024*	0.57 (-0.66, 1.80) <sup>‡</sup>	0.362
Age (years old)	-0.06 (-0.12, -0.00)	0.040*	-	-
Female sex	0.67 (-0.38, 1.73)	0.211	-	-
Has a specific religion	0.67 (-0.79, 2.13)	0.367	-	-
Married	-0.37 (-1.44, 0.69)	0.484	-	-
Number of children	-0.25 (-0.75, 0.25)	0.326	-	-
Work hours per week	0.01 (-0.02, 0.04)	0.450	-	-
Overnight calls per week	1.09 (0.57, 1.62)	<0.001*	1.10 (0.59, 1.62) <sup>‡</sup>	<0.001*
Hours/week spent on exercise	-0.08 (-0.19, 0.03)	0.143	-0.09 (-0.19, 0.01) <sup>‡</sup>	0.087
Hours/week spent on research	0.00 (-0.09, 0.08)	0.937	-	-
Hours/week spent on teaching	0.01 (-0.11, 0.13)	0.815	-	-
Hours of sleep per day	-0.29 (-0.79, 0.20)	0.246	-	-
High degree of respect from colleagues <sup>†</sup>	-1.54 (-2.80, -0.30)	0.016*	-1.25 (-2.42, -0.08) <sup>‡</sup>	0.037*
High degree of respect from patients <sup>†</sup>	-1.39 (-2.74, -0.04)	0.043*	-	-
High degree of respect from patients' families <sup>†</sup>	-1.50 (-2.77, -0.22)	0.022*	-	-

CI: Confidence interval; PS: Participating site; SI: Sponsoring institution

\* $P < 0.05$ .

<sup>†</sup>Graded on a Likert scale of 0 – 10, then dichotomised to high degree of respect if score was >5, and low degree of respect otherwise.

<sup>‡</sup>Variance inflation factors between 1.03 – 1.15.

<sup>§</sup>All risk factors were included in backward stepwise multivariable logistic regression ( $P$  for entry 0.1,  $P$  for removal 0.2), adjusted for training site (SI vs PS).

duration, and low degree of respect from colleagues were associated with increased burnout, controlled for gender, religion, sleep duration and training site (Table 3).

## Discussion

In our programme, stress levels were moderate but the burnout rate was high with significantly more trainees than attendings suffering from burnout. Risk factors included the following: more overnight calls per week and less respect from colleagues were associated with increased stress, while younger age, fewer hours of exercise per week and less respect from colleagues were associated with increased burnout. The high correlation between the CBI and two-item MBI showed that both instruments were measuring the same construct of burnout.

For attending physicians, it appeared that our institution's burnout rates (31.1%) were lower than in the United States (US) (45% to 55%) despite similar work hours (median ~50 hours/week).<sup>2</sup> In comparison, although our psychometric instrument was different, the burnout rate of 31.1% among our attendings was very close to that in Hong Kong public hospital doctors (31.4%), possibly reflecting similar work and cultural milieus in both Asian countries.<sup>7</sup> Our Asian values could have blunted the effect of chronic stress in an academic environment, as prior studies have shown that

Chinese work values, comprising collectivism (prioritising group goals over personal interests), endurance (patience and persistence), hard work (thrift and steadiness), and guanxi (relation orientation, respecting social order and protecting others' reputation), contributed to greater overall well-being.<sup>8,9</sup> It is possible that promotion of such values may help reduce stress and burnout in both Asian and non-Asian settings.

Conversely, the burnout rate among our trainees was very high at 71.8%, more than twice that of the attendings, and near the upper limit of that found in a systematic review of burnout during residency training.<sup>10</sup> Trainees could be adversely affected by competition for increasingly limited fellowship and attending positions. For both attendings and trainees, we could show that overnight calls predisposed to increased stress, older age was associated with less burnout, exercise was a protective factor for burnout, and respect was a protective factor for both stress and burnout.<sup>2,11-13</sup>

Our study had several limitations. Firstly, the response rate was only ~40%, but this was comparable to other surveys among US and Hong Kong physicians.<sup>2,7,14</sup> Secondly, we did not control for internal medicine subspecialty as our practice model involved managing both general medical and subspecialty cases, regardless of subspecialty. Thirdly, our cross-sectional survey could only reveal associations and not prove causation.

Table 3. Risk Factors for Overall Burnout as Determined by the Copenhagen Burnout Inventory: Univariate Analysis and Multiple Logistic Regression<sup>‡</sup>

Risk Factor	Burnout Group (n = 60)	Non-Burnout Group (n = 49)	Univariate P Value	Odds Ratio (95% CI)	Multivariate P Value
SI vs PS (%)	54 (90.0)	31 (63.3)	0.001*	2.04 (0.57 – 7.33)	0.275
Age in years (SD)	31.9 (6.0)	38.2 (10.2)	<0.001*	0.93 (0.87, 0.99)	0.028*
Female sex (%)	36 (60.0)	15 (30.6)	0.004*	2.49 (0.93, 6.67)	0.071
Has a specific religion (%)	49 (81.7)	43 (87.8)	0.436	0.38 (0.09, 1.61)	0.188
Married (%)	27 (45.0)	31 (63.3)	0.082	-	-
Number of children (IQR)	0 (0 – 2)	0 (0 – 3)	0.007*	-	-
Work hours per week (IQR)	65 (10 – 80)	60 (40 – 80)	0.031*	-	-
Overnight calls per week (IQR)	1 (0 – 2)	0 (0 – 1)	0.003*	-	-
Hours/week spent on exercise (IQR)	1 (0 – 4)	2 (0 – 7)	<0.001*	0.64 (0.45, 0.89)	0.009*
Hours/week spent on research (IQR)	0 (0 – 6)	2 (0 – 10)	<0.001*	-	-
Hours/week spent on teaching (IQR)	2 (0 – 10)	5 (0 – 10)	<0.001*	-	-
Hours of sleep per day (SD)	5.7 (1.2)	6.3 (0.8)	0.007*	0.66 (0.37, 1.16)	0.145
High degree of respect from colleagues <sup>†</sup> (%)	40 (66.8)	45 (91.8)	0.002*	0.21 (0.06, 0.80)	0.022*
High degree of respect from patients <sup>†</sup> (%)	43 (71.7)	46 (93.9)	0.003*	-	-
High degree of respect from patients' families <sup>†</sup> (%)	41 (68.3)	45 (91.8)	0.004*	-	-

CI: Confidence interval; IQR: Interquartile range; PS: Participating site; SD: Standard deviation; SI: Sponsoring institution

\* $P < 0.05$ .

<sup>†</sup>Graded on a Likert scale of 0 – 10, then dichotomised to high degree of respect if score was >5, and low degree of respect otherwise.

<sup>‡</sup>All risk factors were included in backward stepwise multivariable logistic regression ( $P$  for entry 0.1,  $P$  for removal 0.2), adjusted for training site (SI vs PS).

## Conclusion

We hope our results can stimulate academic medical centres to check for and manage the known risk factors of stress and burnout. Since the major source of burnout stemmed from personal burnout, which is a generic measure of physical and psychological fatigue and exhaustion experienced by the person regardless of occupational status, non-work-based approaches would be important. For instance, a 12-week aerobic training programme was shown to reduce overall perceived stress and symptoms of burnout.<sup>12</sup> Given that we found that fewer night calls, greater exercise, and greater respect were associated with less stress/burnout, other solutions might include assigning more physicians to the call roster (thereby decreasing the call frequency per physician), incentivising exercise using monetary and other rewards, promoting a supportive work atmosphere, and conducting team-building activities.<sup>15</sup>

## REFERENCES

- Maslach C, Schaufeli WB, Leiter MP. Job burnout. *Annu Rev Psychol* 2001;52:397-422.
- Shanafelt TD, Boone S, Tan L, Dyrbye LN, Sotile W, Satele D, et al. Burnout and satisfaction with work-life balance among US physicians relative to the general US population. *Arch Intern Med* 2012;172:1377-85.
- Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav* 1983;24:385-96.
- Borritz M, Rugulies R, Bjorner JB, Villadsen E, Mikkelsen OA, Kristensen TS. Burnout among employees in human service work: design and baseline findings of the PUMA study. *Scand J Public Health* 2006;34:49-58.
- Herrero J, Meneses J. Short web-based versions of the perceived stress (PSS) and Center for Epidemiological Studies-Depression (CESD) Scales: a comparison to pencil and paper responses among Internet users. *Comput Human Behav* 2006;22:830-46.
- West CP, Dyrbye LN, Sloan JA, Shanafelt TD. Single item measures of emotional exhaustion and depersonalization are useful for assessing burnout in medical professionals. *J Gen Intern Med* 2009;24:1318-21.
- Siu C, Yuen SK, Cheung A. Burnout among public doctors in Hong Kong: cross-sectional survey. *Hong Kong Med J* 2012;18:186-92.
- Lu L, Kao SF, Siu OL, Lu CQ. Work stress, Chinese work values, and work well-being in the Greater China. *J Soc Psychol* 2011;151:767-83.
- Iwamoto DK, Liu WM. The impact of racial identity, ethnic identity, asian values and race-related stress on Asian Americans and Asian international college students' psychological well-being. *J Couns Psychol* 2010;57:79-91.
- Ishak WW, Lederer S, Mandili C, Nikravesh R, Seligman L, Vasa M, et al. Burnout during residency training: a literature review. *J Grad Med Educ* 2009;1:236-42.
- Nicol AM, Botterill JS. On-call work and health: a review. *Environ Health* 2004;3:15.
- Gerber M, Brand S, Elliot C, Holsboer-Trachsler E, Puhse U, Beck J. Aerobic exercise training and burnout: a pilot study with male participants suffering from burnout. *BMC Res Notes* 2013;6:78.
- Leape LL, Shore MF, Dienstag JL, Mayer RJ, Edgman-Levitan S, Meyer GS, et al. Perspective: a culture of respect, part 1: the nature and causes of disrespectful behavior by physicians. *Acad Med* 2012;87:845-52.
- Dyrbye LN, West CP, Satele D, Boone S, Tan L, Sloan J, et al. Burnout among U.S. medical students, residents, and early career physicians relative to the general U.S. population. *Acad Med* 2014;89:443-51.
- Leape LL, Shore MF, Dienstag JL, Mayer RJ, Edgman-Levitan S, Meyer GS, et al. Perspective: a culture of respect, part 2: creating a culture of respect. *Acad Med* 2012;87:853-8.

Kay Choong See,<sup>1,2,MBBS</sup>, Tow Keang Lim,<sup>1,2,MBBS</sup>,  
Ee Heok Kua,<sup>3,4,MD</sup>, Jason Phua,<sup>1,2,MBBS</sup>,  
Gerald SW Chua,<sup>2,5,MBBS</sup>, Khek Yu Ho,<sup>1,2,MD</sup>

- <sup>1</sup>University Medicine Cluster, National University Hospital, Singapore  
<sup>2</sup>Department of Medicine, Yong Loo Lin School of Medicine, National University of Singapore, Singapore  
<sup>3</sup>Department of Psychological Medicine, National University Hospital, Singapore  
<sup>4</sup>Department of Psychological Medicine, Yong Loo Lin School of Medicine, National University of Singapore, Singapore  
<sup>5</sup>Department of Medicine, Ng Teng Fong General Hospital, Singapore

Address for Correspondence: Dr See Kay Choong, Level 10 NUHS Tower Block, 1E Kent Ridge Road, Singapore 119228.  
 Email: kay\_choong\_see@nuhs.edu.sg