

# The association between physical activity and burnout among anaesthesia postgraduate trainees in Malaysia

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## ABSTRACT

**Introduction:** Burnout is a psychological problem which is becoming more prevalent among medical professionals resulting in various negative outcomes. Physical activity has been found to be an effective method in alleviating burnout. The aim of this study was to determine the association between physical activity and burnout among postgraduate anaesthesia trainees in Malaysia. The study also intended to determine the level of physical activity among trainees, the factors affecting this practice, and the prevalence of burnout among anaesthesia trainees.

**Materials and methods:** An online self-administered questionnaire was sent out to all postgraduate anaesthesia trainees between August 2020 and January 2021 via email and respondents were recruited on a voluntary basis.

**Results:** The prevalence of burnout among postgraduate anaesthesia trainees was high (54%). This prevalence was higher among trainees with low a level of physical activity. Half of the trainees (50.8%) engaged in moderate physical activity while only 12% reported a high level of physical activity. The postgraduate study year was found to be a significant factor affecting the practice of physical activity.

**Conclusion:** There is a significant association between physical activity and burnout among postgraduate anaesthesia trainees in Malaysia. Physical activity has the potential to be an essential method of reducing burnout. Hence, measures should be implemented to improve the practice of physical activity among healthcare professionals in order to reduce workplace burnout.

## KEYWORDS:

*Burnout, physical activity, postgraduate trainee*

## INTRODUCTION

Burnout is a psychological syndrome characterised by depersonalisation, emotional exhaustion, and reduced personal accomplishment as a result of a chronic exposure to stress at work.<sup>1</sup> It has been recognised in the early 1970s as a potential problem within a broad range of occupations and has been increasing in incidence among medical professionals. The high demands and stress levels of anaesthesia and critical care medicine account for the high incidence of burnout and suicide.<sup>2</sup> According to the Medscape

National Physician Burnout and Suicide Report 2020, 42% of physicians were reported as burned out with anaesthesia and critical care ranking as one of the top specialties repeatedly associated with burnout over the past 5 years.<sup>3</sup> Burnout has negative effects on medical care by not only affecting the workforce, but it may also jeopardise patient care.<sup>4</sup>

In view of the numerous adverse effects of burnout on the healthcare system, it is pivotal to have in place coping mechanisms to counteract these undesirable outcomes. Regular physical activity has been found to be an effective method to reduce burnout.<sup>5</sup> The positive impact of exercise on general health has been well researched and there is increasing evidence to support its role in reducing stress and burnout among anaesthetists. In spite of the established benefits of physical activity, the practice of physical activity among anaesthesia trainees is low as evident by the survey on welfare conducted amongst Australian and New Zealand College of Anaesthetists (ANZCA) trainees in 2017.<sup>6</sup>

This aim of this study was to determine the association between the practice of physical activity and the severity of burnout among anaesthesia trainees in Malaysia. The study also researched the level of physical activity among anaesthesia trainees, the factors affecting this practice, and the perceived barriers among anaesthesia trainees.

## MATERIALS AND METHODS

This was a cross-sectional questionnaire-based study conducted among all trainees in the Master of Medicine (Anaesthesiology) programme in postgraduate training hospitals in Malaysia. The study was approved by the Medical Research and Ethics Committee (MREC), Ministry of Health Malaysia (MOH) and registered with the National Medical Research Register with the ID NMRR-20-1316-55035. The email of the respondents was obtained from the Bahagian Pengurusan Latihan after approval from the MREC. An online self-administered questionnaire was sent out between August 2020 and December 2020 via email and respondents were recruited on a voluntary basis. Data collection was carried out over a period of 6 months.

Demographic details collected were age, gender, height, weight, year of postgraduate training, number of years in training, place of practice, marital status, and number of children.

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International Physical Activity Questionnaire (IPAQ) short form was used to assess practice of physical activity and the barriers. Physical activity was graded as low, moderate, or high.<sup>7</sup> Oldenburg Burnout Inventory (OLBI) was used to assess the level of burnout. The higher the score, the greater the level of burnout.<sup>8</sup> The severity of burnout was categorised into high and low by using the median of the burnout score as the cut-off point. Information about the responders remained confidential and non-attributable.

#### Definition of terms

**Level of physical activity:** Measure of the volume of activity which is computed by weighting each type of activity by its energy requirements defined in METs to yield a score in MET-minutes. METs are multiples of the resting metabolic rate and a MET-minute is computed by multiplying the MET score of an activity by the minutes performed. The level of physical activity is classified into low, moderate, and high based on the MET-min per week. (MET-min per week = MET level × minutes of activity per day × days per week).<sup>8</sup>

**Low level of physical activity:** No activity is reported or some activity is reported but not enough to meet moderate or high level of physical activity.

**Moderate level of physical activity:** Fulfil any of the following three criteria which are 3 or more days of vigorous activity of at least 20 minutes per day, 5 or more days of moderate-intensity activity and/or walking of at least 30 minutes per day, 5 or more days of any combination of walking, moderate intensity or vigorous intensity activities achieving a minimum of at least 600 MET-minutes/week.

**High level of physical activity:** Fulfil any of the following 2 criteria which are vigorous-intensity activity on at least 3 days and accumulating at least 1500 MET-minutes/week, 7 or more days of any combination of walking, moderate or vigorous intensity activities accumulating at least 3000 MET-minutes/week

**Physical activity:** Any bodily movement produced by skeletal muscles that requires energy expenditure – including activities undertaken while working, playing, carrying out household chores, travelling, and engaging in recreational pursuits.<sup>9</sup>

**Postgraduate anaesthesia trainee:** Anaesthesia medical officers who are enrolled in the Master of Medicine (Anaesthesiology) Training Programme Malaysia

#### Data Analysis

Data collected were analysed using the software Statistical Package for the Social Sciences (SPSS) version 26 (Armonk, NY: IBM Corp). Categorical variables are presented as frequency and percentage (%). Normally distributed numerical variables are reported as means and standard deviation (SD) and not normally distributed variables are reported as medians and interquartile ranges (IQR). Analysis of variance or Kruskal–Wallis H test was used to analyse the association between level of physical activity and severity of burnout, as appropriate. The practice of physical activity in relation to the demographic details was analysed via ordinal

regression. Multiple models were built and the model with the lowest Akaike Information Criterion (AIC) was selected as the final model. A *p* value of less than 0.05 was considered as statistically significant.

#### RESULTS

A total of 185 anaesthesia trainees out of 455 participated in this study. The mean age of the trainees was 33 years and the mean BMI was 23.9 kg/m<sup>2</sup>. Majority of the trainees who participated in this study were females who comprised 62%. Forty percent of the trainees were in postgraduate year 4 (PGY4) followed 28% in postgraduate year 1 (PGY1), 22% in postgraduate year 3 (PGY3) and 20% in postgraduate year 2 (PGY2). Fifty-six percent of the trainees were practicing in university hospitals compared to 44% in non-university hospitals. Majority of the trainees were married (63%).

The median burnout score in this study was 40 with an IQR of 45.5–32.5. The level of practice of physical activity and burnout among anaesthesia trainees is depicted in Table I. Half of the trainees in this study were found to have engaged in moderate physical activity and only 12% reported to have a high level of physical activity. One hundred trainees reported high burnout levels accounting for 54% of the total number in the study.

Kruskal–Wallis H test showed a statistically significant difference in burnout scores between the different levels of physical activity ( $H=96.069$ ,  $p<0.001$ ); with a median burnout score of 46 for low level of physical activity, 36 for moderate physical activity, and 25 for high level of physical activity (Figure 1).

There was an inverse relationship between body mass index (BMI) and physical activity ( $p=0.024$ ). Postgraduate year also significantly affected the level of physical activity among trainees ( $p<0.05$ ). Compared to trainees in PGY1, trainees in PGY2 and PGY3 were 65% and 64% less likely to have low physical activity, respectively. Work commitment and tiredness with laziness were perceived by 79% and 81% of the respondents, respectively, as barriers to physical activity. In particular, tiredness and laziness were found to be a statistically significant barrier ( $p=0.009$ ). Anaesthesia trainees who reported this were 2.69 times more likely to unveil lower practice of physical activity (Table II).

However, on further analysis with multiple variable ordinal regression, BMI was not significantly associated with lower level of physical activity (OR=1.07; 95% CI=0.98,1.16,  $p=0.119$ ). In contrary, there was a statistically significant association between postgraduate year and level of physical activity. Compared to PGY1, subjects in PGY3 (OR=0.42; 95% CI=0.19, 0.96,  $p=0.039$ ) were 58% less likely to have low practice of physical activity whereas subjects in PGY2 (OR=0.41; 95% CI=0.17, 0.95,  $p=0.038$ ) were 59% less likely to experience the same. Tiredness and laziness were still found to be a significant barrier associated with a lower level of physical activity ( $p=0.034$ ). Trainees who stated this as a barrier were 2.27 times more likely to practice a low level of physical activity (Table III).

**Table I: Level of physical activity and burnout among anaesthesia trainees**

	n (%)	95% CI
Level of physical activity		
Low	68 (36.8)	30.1–43.9
Moderate	94 (50.8)	43.6–58.0
High	23 (12.4)	8.3–17.8
Burnout		
Low	85 (45.9)	38.9–53.1
High	100 (54.1)	46.9–61.1

**Table II: Associated factors of low physical activity and barriers**

Variable	B(SE)	OR (95% CI)	Wald (df)	p value
Age	-0.01 (0.04)	0.99 (0.91,1.08)	0.02 (1)	0.883
Gender (Female vs Male)	0.55 (0.29)	1.73 (0.98,3.09)	3.51 (1)	0.061
BMI	0.09(0.04)	1.10 (1.01,1.18)	5.10 (1)	0.024
Postgraduate year				
4	-0.67 (0.38)	0.51 (0.24,1.08)	3.13 (1)	0.077
3	-1.04 (0.41)	0.36 (0.16,0.79)	6.44 (1)	0.011
2	-1.06 (0.43)	0.35 (0.15,0.80)	6.25 (1)	0.012
1		Ref		
Year of training	-0.16 (0.10)	0.85 (0.70,1.04)	2.52 (1)	0.113
Place				
Non-university hospital	0.31 (0.28)	1.37 (0.78,2.39)	1.21 (1)	0.271
University hospital		Ref		
Single vs Married	-0.12 (0.30)	0.89 (0.50,1.59)	0.16 (1)	0.687
Number of children	0.21 (0.14)	1.23 (0.94,1.61)	2.18 (1)	0.140
Barriers to physical activity				
Health problem	0.62 (0.51)	1.87 (0.69,5.03)	1.52 (1)	0.217
Family commitment	0.26 (0.30)	1.30 (0.72,2.35)	0.75 (1)	0.386
Ideal body	0.71 (0.68)	2.04 (0.53,7.79)	1.08 (1)	0.299
Older age	0.16 (1.05)	1.18 (0.15,9.30)	0.02 (1)	0.878
Work commitment	0.12 (0.35)	1.13 (0.57,2.24)	0.13 (1)	0.722
Tiredness and laziness	0.99 (0.38)	2.69 (1.29,5.64)	6.89 (1)	0.009
Financial	1.06 (0.90)	2.89 (0.50,16.84)	1.39 (1)	0.239
No place to exercise	0.31 (0.35)	1.36 (0.68,2.73)	0.77 (1)	0.381

B = slope; CI = confidence interval; df = degree of freedom; OR = odds ratio; SE = standard error  
 Univariable ordinal logistic regression was applied using the group with higher physical activity as the reference group

**Table III: Multiple variable ordinal regression for associated factors of low physical activity and barriers**

Variable	B (SE)	Wald-statistic (df)	OR (95% CI)	p value*
BMI	0.06 (0.04)	2.43 (1)	1.07 (0.98, 1.16)	0.119
Postgraduate year				
4	-0.55 (0.39)	2.03 (1)	0.58 (0.27, 1.23)	0.155
3	-0.86 (0.42)	4.24 (1)	0.42 (0.19, 0.96)	0.039
2	-0.90 (0.43)	4.32 (1)	0.41 (0.17, 0.95)	0.038
1			Ref	
Tiredness & laziness				
Yes	0.82 (0.39)	4.51 (1)	2.27 (1.06, 4.84)	0.034
No			Ref	

B = regression coefficient; CI = confidence interval; df = degree of freedom; SE = standard error  
 \* Ordinal regression was applied. AIC = 334.79. Proportional odds assumption was verified

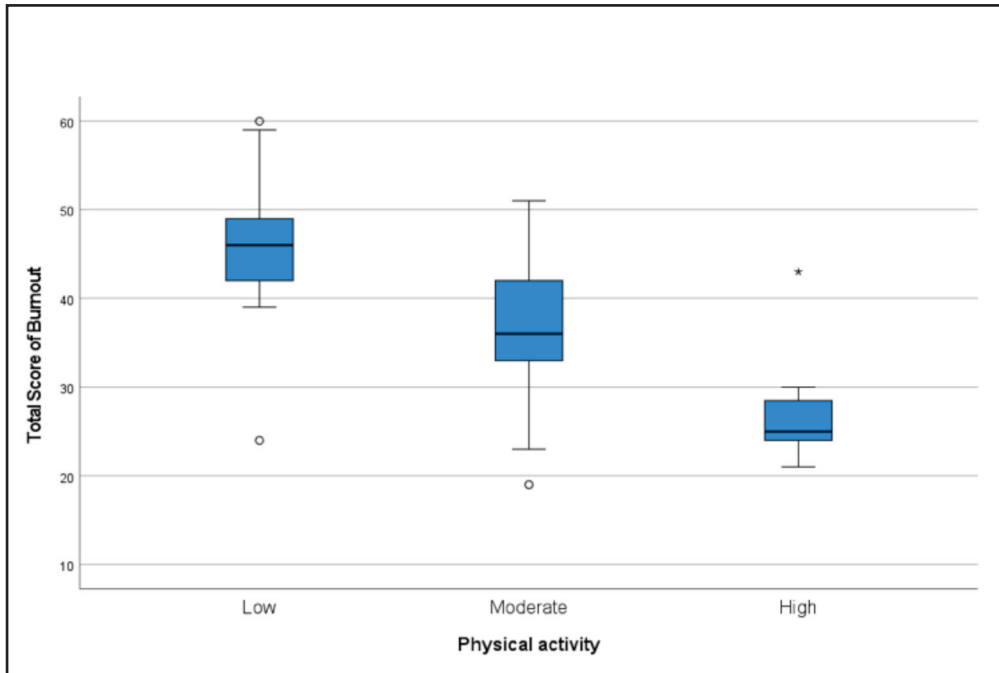


Fig. 1: Relationship between level of physical activity and severity of burnout.

**DISCUSSION**

This study showed an inverse relationship between the severity of burnout and level of physical activity among postgraduate trainees. The majority of trainees had a moderate level of physical activity with BMI, postgraduate year, and “tiredness with laziness” being significant contributory factors towards a low level of activity.

Burnout has been a struggle dealt with by doctors for decades and has become worse during the pandemic especially in the field of anaesthesia and intensive care.<sup>4</sup> It is of paramount importance to ascertain strategies to reduce the incidence of burnout. Growing evidence proposes that physical activity has a protective effect on occupational stress and has been used as an effective coping method for burnout. Jonsdottir et al suggests that the practice of physical activity is inversely related to burnout, depression, and perceived stress among health care workers.<sup>10</sup> In this study, it is evident that the severity of burnout was high among Malaysian postgraduate anaesthesia trainees who had a low level of physical activity.

Majority of the anaesthesia postgraduate trainees were physically active with half of them reporting a moderate level of physical activity. However, only a small proportion were engaged in a high level of physical activity. In contrast, 79% of trainees in the ANZCA training scheme reported lack of exercise.<sup>6</sup> The current study was conducted during the COVID-19 outbreak when the movement control order was implemented in the country. The restrictions imposed were likely to have affected the level of practice of physical activity among trainees.

Among the various factors affecting the practice of physical activity that were investigated, only the year of postgraduate study showed a significant impact. Postgraduate anaesthesia

trainees in PGY1 were more likely to be physically inactive compared to PGY2 and PGY3. This can be due to the change in workplace and environment upon starting the postgraduate training. More time is spent at work to familiarise themselves with the new training hospital demands and schedule. Besides this, PGY1 trainees lack time for physical activity due to their heightened study commitments as the primary conjoint examination is conducted in year 1. This is not the case for trainees in PGY2 or PGY3 as there are no major examinations for during those years, hence more time is available for participation in physical exercise. Being in another major examination year, trainees in PGY4 did not demonstrate any significant difference in physical activity when compared to PGY1 trainees.

BMI did not appear to be a significant factor in determining the level of practice of physical activity among trainees in this study. Similar findings were reported in a study in 2014 among physicians of residency training programmes in Saudi Arabia.<sup>11</sup> There have been contradicting findings among studies which revealed BMI as a significant factor. One researcher reported that respondents with higher BMI tend to have a higher practice of physical activity.<sup>12</sup> On the other hand, Anuar et al reported that normal or underweight respondents had better practice of physical activity.<sup>13</sup> Furthermore, a study among Malaysian adults based on data from the 2015 National Health and Morbidity Survey (NHMS) revealed that obese adults tend to have a poorer practice of physical activity. Nevertheless, this was only observed among men and not among women.<sup>14</sup> Majority of the respondents in this study were females (62%), which could explain the insignificance of BMI as a contributing factor.

Guthold et al found that females have less physical activity when compared with males (31.7% vs 23.4%).<sup>15</sup> Baum et al reported the prevalence of low level of physical activity was higher among females compared with males in a study conducted over 20 countries.<sup>16</sup> Yeliz et al and McCarthy et al also showed that the level of physical activity was lower in female students.<sup>17,18</sup> However, this study did not show female as a significant contributing factor towards low level of physical activity ( $p=0.061$ ). This may be because the small sample size resulted in a Type II error.

As for barriers to physical activity, tiredness, and laziness was the only barrier identified to be significant. This is possibly due to the physical and mental exhaustion from the high workload and studying for examinations. Concerns pertaining to future job prospects and examinations were reported to cause severe stress in two-thirds of trainees in the Australian and New Zealand College of Anaesthetists training programme.<sup>6</sup>

The stressors and prolonged hours in anaesthesia and intensive care training predispose the postgraduate trainees to high levels of burnout.<sup>2</sup> In line with this, it is not unforeseen that more than half of the subjects in this study suffer from high levels of burnout. De Oliveira Jr. et al discovered a link between burnout and poorer quality of care delivered with increased medication errors.<sup>19</sup> Hence, it is essential that preventive and positive coping strategies be employed to reduce the rising prevalence of burnout among postgraduate trainees in Malaysia.

Efforts should be made to emphasize the importance of physical activity and encourage trainees to be physically active to reduce the severity of burnout. Incorporating facilities such as gymnasiums and sports halls at the workplace may be useful as it provides better opportunities for trainees to engage in physical activity. Amelioration of the anaesthesia postgraduate training programme may also prove beneficial as a method to cultivate physical exercise.

There are several limitations that need to be addressed in this study. Firstly, this study was done among postgraduate anaesthesia trainees, hence it is not possible to generalize the findings to other postgraduate trainees due to the different training demands and requirements. As this is a questionnaire-based study, there is a possible risk for under or overestimation of self-reported physical activity. Besides this, lengthy online questionnaires may pose a risk of wrong data entry by the respondents. The cross-sectional design of this study also poses limitations to causal relationships among the variables studied.

## CONCLUSION

This study concludes that there is a significant association between physical activity and burnout among postgraduate anaesthesia trainees in Malaysia. Physical activity reduces the risk of burnout. The implications of these findings should be directed towards strategies and methods in reducing the incidence and severity of burnout among postgraduate anaesthesia trainees. The importance of promoting a healthy

lifestyle as well as facilitating trainees' participation in physical exercise should also be emphasized.

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## CONFLICT OF INTEREST

We have no conflicts of interest.

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