

PSYCHOSOCIAL DETERMINANTS OF PHYSICAL ACTIVITY AMONG PUBLIC SECTOR LIBRARIANS: A CROSS-SECTIONAL STUDY IN BRUNEI DARUSSALAM

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ABSTRACT

Background: Physical inactivity is a leading global health risk, with 31% of adults worldwide not meeting recommended activity levels, yet evidence on psychosocial determinants among sedentary professionals remains limited. **Aims:** To examine psychosocial determinants of physical activity and their associations with socio-demographic characteristics. **Methods:** A cross-sectional survey was conducted in May to June 2025 among 153 librarians. Data were collected using a validated psychosocial and behavioural PA questionnaire informed by established psychosocial theories. Descriptive statistics and multiple linear regression were conducted to examine the associations between demographic variables and psychosocial determinants, with P value of < 0.05 considered statistically significant. **Results:** Librarians reported moderate self-efficacy, behavioural intention, leisure-time PA, and workplace PA, with high perceived benefits and response efficacy. Female librarians had significantly lower self-efficacy ($\beta = -0.43$, $p = 0.023$), behavioural intention ($\beta = -21.56$, $p = 0.001$), and workplace PA ($\beta = -0.50$, $p = 0.007$) than males. Older groups perceived fewer benefits ($\beta = -0.74$ to -0.53 , all $p < 0.05$) and lower inactivity severity ($\beta = -0.72$, $p = 0.023$). Higher education was unexpectedly linked with lower perceived vulnerability ($\beta = -0.39$, $p = 0.046$) and weaker intention ($\beta = -8.70$, $p = 0.031$). Officer-level librarians reported higher leisure-time PA ($\beta = 8.59$, $p = 0.042$) and workplace PA ($\beta = 0.46$, $p = 0.003$) than support staff. **Conclusion:** Socio-demographic characteristics shaped psychosocial determinants and PA behaviours among librarians. Tailored interventions should be considered. Findings may extend to other sedentary ISCO-08 occupations.

Keywords: Brunei Darussalam, ISCO-08, Physical Activity, Psychosocial, Sedentary

INTRODUCTION

Physical inactivity (PI) is a major global public health concern. In 2022, 31% of adults worldwide, equivalent to approximately 1.8 billion people, did not meet the recommended levels of physical activity (PA). This lack of activity contributes substantially to the global burden of non-communicable diseases (NCDs), including cardiovascular disease, type 2 diabetes, and certain cancers. The

World Health Organization (WHO) recommends that adults engage in at least 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity PA each week to maintain optimal health (World Health Organization, 2020). Despite these guidelines, global surveillance data indicate that a substantial proportion of adults fail to meet recommended PA levels, with sedentary behaviours increasingly common in many occupational groups (Quinn et al., 2020).

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Prolonged PI not only contributes to physical health risks but is also associated with reduced work productivity, absenteeism, and diminished quality of life (Booth, Roberts, and Laye, 2012). Librarians represent a professional group whose employment is largely sedentary, typified by prolonged sitting, heavy computer use, and administrative or information-management responsibilities (Labajo, 2017; Bureau of Labour Statistics U.S. Department, 2024). Within the International Standard Classification of Occupations (ISCO-08), librarians are classified under Major Group 2: Professionals, a group including knowledge-intensive, desk-based jobs. Comparable occupational groups with similar sedentary work patterns include office workers (Parry and Straker, 2013a), bankers (Okafor et al., 2020), hospital employees (Ramautar, Tlou and Dlungwane, 2021), academic staff (Prakash, Mohammadnezhad and Khan, 2021), and university personnel (Yhi, Saat and Farah, 2018). Studies show that individuals in sedentary employment are more likely to have PI outside of work, increasing their risk of chronic diseases related to PI musculoskeletal discomfort, metabolic disorders, and other sedentary-related health problems (Parry and Straker, 2013b; Parry et al., 2013).

In Brunei Darussalam, a previous study assessing knowledge, attitudes, and practices (KAP) towards PA among public sector librarians reported good knowledge and satisfactory practices but poor attitudes (Rahman et al., 2025). While KAP surveys are valuable for providing an initial overview, they offer only a broad understanding of the issue. Attitudes, in particular, are influenced by a range of underlying psychosocial factors, such as self-efficacy, perceived barriers, outcome expectations, and behavioural intention, that are not fully captured by traditional KAP frameworks.

Assessing psychosocial factors and levels of PA allows for more exact

identification of the determinants that influence PA behaviour. Psychosocial factors based on behavioural theories such as the Social Cognitive Theory (SCT), the Transtheoretical Model (TM), and the Theory of Planned Behaviour (TPB) have been demonstrated to predict both the beginning and persistence of PA. This is evidenced by studies conducted by various professional groups that show that psychosocial factors, particularly self-efficacy, decisional balance, and behavioral intention, are among the strongest predictors of PA adoption and maintenance (Plotnikoff et al., 2005; Blake et al., 2015; Shafieinia et al., 2016). Understanding these factors may help explain differences in attitudes and aid in the development of future interventions for this demographic and other ISCO-08 professionals with similar job characteristics. Such an approach has clear practical implications. By expanding beyond broad awareness efforts and addressing the underlying psychosocial causes that underpin low attitudes about PA, workplace health promotion strategies can be personalised for higher impact. Targeting these drivers increases the likelihood of generating meaningful and sustainable increases in PA among librarians. This evidence is particularly significant in sedentary occupational groups in Brunei, where culturally adapted, theory-driven interventions remain uncommon.

This study aimed to provide a more comprehensive understanding of the psychological factors influencing PA in this occupational group because there is limited published research on the psychosocial and PA levels of public sector librarians in Brunei Darussalam, and previous KAP-based assessments have not adequately explained the underlying behavioral determinants. Therefore, the study sought to determine the prevalence of psychosocial factors and PA levels and to explore their associations with demographic characteristics.

METHODS

Study Design

A descriptive cross-sectional study was conducted using a self-administered online survey among public sector librarians in Brunei Darussalam. Participants were recruited from government-run libraries across the country between May 2025 and June 2025.

Participants and recruitment

Eligible participants were full-time librarians aged 18 to 60 years, employed in the public sector, fluent in either English or Malay, and willing to participate in the study. Those younger than 18 or older than 60, as well as individuals not working as librarians, were excluded. Participants were recruited using the purposive sampling method. Eligible respondents were selected and contacted through focal persons appointed from participating libraries who granted consent for the study. These focal persons facilitated the distribution and collection of surveys. Participants were provided with a detailed description of the study's objectives and informed that their responses would remain confidential, as identifiable data were coded with unique ID numbers.

Data Collection

Data were collected using a modified psychosocial and behavioural PA questionnaire. The adaptation process followed established guidelines for cross-cultural instrument modification and included WHO forward-backward translation (World Health Organization, 2017), validation, and reliability testing with input from librarians and public health experts. This modified questionnaire underwent content validity assessment through expert review, with all items achieving $I-CVI \geq 0.83$ and an overall $S-CVI/Ave$ of 0.899, indicating good content validity (Polit and Beck, 2004).

Self-efficacy (SE)

SE refers to an individual's belief in their ability to engage in PA. The items were assessed using an eight-item scale based on SCT (Plotnikoff et al., 2001), with participants rating their confidence to engage in PA on a five-point Likert scale ranging from 1 ("not at all confident") to 5 ("extremely confident"). Scores were calculated as the mean of all items, with higher scores indicating greater self-efficacy. In this study, the scale demonstrated good internal consistency (Cronbach's $\alpha = 0.89$).

Pros and Cons items

Perceived benefits and disadvantages, or Pros and Cons, are part of the Transtheoretical Model's concept of decisional balance (Prochaska and Velicer, 1997). They explain how people weigh the advantages and disadvantages of changing their behavior or keeping their current one. The items, which included five PA-related Pros and five Cons items, were adapted from the measures used by Plotnikoff et al. (2005). Participants rated each item on a five-point Likert scale, with 1 indicating "not at all" and 5 indicating "very much," to show how much each factor influenced their decision to engage in PA regularly. Pros and cons were measured and analyzed as separate subscales. Mean scores were calculated for pros and cons separately; larger values reflected greater perceived benefits or drawbacks, respectively. Cronbach's α for the Pros subscale was 0.916, indicating excellent internal consistency, while Cronbach's α for the Cons subscale was 0.741, indicating acceptable internal consistency.

Protection Motivation Theory (PMT)

The PMT component assessed three factors: perceived severity (PS), which reflects an individual's estimate of how serious a health threat is; perceived

vulnerability (PV), or the perceived likelihood of experiencing the threat; and response efficacy (RE), which is the belief that the recommended behavior will reduce the threat (Plotnikoff and Higginbotham, 1998). Each construct was measured with three items rated on a five-point Likert scale from 1 (“definitely not”) to 5 (“definitely yes”). Mean scores were calculated separately for each construct, with higher scores indicating greater perceived severity, vulnerability, or response efficacy. The scale showed acceptable internal consistency across the PMT items in this study (Cronbach’s $\alpha = 0.774$).

Behavioural Intention (BI)

Behavioural intention was assessed using a single item from the TPB (Courneya et al., 2001). Responses were recorded on an 11-point Likert scale ranging from “0%” (not at all likely) to “100%” (extremely likely) (Courneya et al., 2001). As this was a single-item measure, internal consistency reliability (Cronbach’s α) was not analysed.

Godin’s Leisure Time Exercise Questionnaire (GLTEQ)

PA behavior was evaluated using the original version of Godin’s Leisure Time Exercise Questionnaire (Godin and Shephard, 1985). Participants reported the weekly frequency of engaging in strenuous, moderate, and light exercise for at least 15-minute periods during their free time. Each activity intensity was assigned a metabolic equivalent (MET) score (strenuous = 9, moderate = 5, light = 3), and a total weekly leisure activity score was calculated by multiplying the frequency by the MET value and summing across intensities. Higher scores indicate greater levels of leisure-time PA. The scale showed excellent internal consistency in this study (Cronbach’s $\alpha = 0.959$).

Self-Reported Workplace Physical Activity (SRWPA)

Another PA behavioral item, self-reported workplace physical activity (SRWPA), was assessed using a self-reported question adapted from Plotnikoff et al. (2005). Participants were asked, “How active are you at your workplace on most days?” Responses were recorded on a four-point Likert scale, ranging from 1 (sedentary) to 4 (very active). Since this was a single-item measure, internal consistency reliability (Cronbach’s α) was not evaluated. The variables measured in this study included socio-demographic characteristics (age, gender, job category, and education level) and outcome measures related to psychosocial and behavioural factors towards PA, namely self-efficacy, pros, cons, perceived severity, perceived vulnerability, response efficacy, behavioural intention, GLTEQ, and SRWPA.

Statistical Analysis

The data were examined using RStudio version 2025.05.1+513. Descriptive statistics were presented as frequencies and percentages for socioeconomic variables (exposures) and as means with standard deviations for psychosocial factors and PA measures (outcomes) (Table 1 and Table 2). Sociodemographic variables such as job position and education were recoded into binary categories. Job positions were classified as officer or non-officer in accordance with Brunei Public Service scheme, where Divisions I to III represent officer-level roles (such as senior librarians, librarians, library officers, assistant library officers) and Divisions IV to V represent non-officer roles, including library assistants. (Brunei Resources, 2005). Education was recoded as secondary or tertiary, with diploma level and above considered as tertiary education

(Ministry of Education, 2011). Multiple linear regression was further conducted to assess the association between sociodemographic variables, psychosocial factors, and PA levels. A p -value of <0.05 was considered statistically significant.

Ethical considerations

Ethical approval for the study was obtained from Pengiran Anak Puteri Rashidah Sa'adatul Bolkiah Institute of Health Science Research Ethics Committee (PAPRSBIHSREC) (Reference: UBD/PAPRSBIHSREC/2024/127). All

participants provided informed consent before participation.

RESULT

Table 1 shows the descriptive characteristics of the participants. A total of 153 public sector librarians took part in the study. The majority of the participants were from the age group 30 - 39 years (32.7%), and were predominantly female (83.7%). In terms of education, the majority of participants held a degree qualification (60.8%), and were employed at the support level (Division IV) (60.8%).

Table 1. Socio-demographic characteristics of the participants.

Variables	n	%
Age		
18 - 29	19	12.4
30 - 39	50	32.7
40 - 49	40	26.1
50 - 60	44	28
Gender		
Male	25	16.3
Female	128	83.7
Education		
Secondary	18	11.8
Diploma	24	15.7
Degree	93	60.8
Master	18	11.8
PhD		
Job Category		
Division I	-	-
Division II	18	11.8
Division III	24	15.7
Division IV	93	60.8
Division V	18	11.8

Table 2 presents the mean scores and standard deviations (SD) of the psychosocial and behavioural variables. Participants reported moderate self-efficacy ($M = 2.71$, $SD = 0.80$) and relatively high perceived benefits (Pros, $M = 3.70$, $SD = 0.79$) compared with perceived barriers (Cons, $M = 2.56$, $SD = 0.74$). Perceptions of severity ($M = 3.64$, $SD = 1.09$) and vulnerability ($M = 3.80$,

$SD = 1.10$) were moderate to high, while response efficacy was the most favourable construct ($M = 4.10$, $SD = 0.92$). Behavioural intention was moderate ($M = 48.88$, $SD = 23.92$), and actual PA levels, measured by GLTEQ ($M = 26.67$, $SD = 22.41$) and SRWPA ($M = 2.56$, $SD = 0.53$), also indicated moderate levels.

Regression analyses on Table 3 presented several socio-demographic

Variables	PS MLR ^a			PV MLR ^a			BI MLR ^a		
	<i>b</i> ^b	95% CI	<i>P</i>	<i>b</i> ^b	95% CI	<i>P</i>	<i>b</i> ^b	95% CI	<i>P</i>
Lower				1			1		
Higher				-0.386	-0.764, -0.008	0.046	-8.70	-16.61, -0.79	0.031

Abbreviations: PS = Perceived Severity; PV = Perceived Vulnerability; RE = Response Efficacy; BI = Behavioural Intention

* no significant association among variables

^a Multiple linear regression (PS $R^2 = 0.068$; PV $R^2 = 0.036$; BI $R^2 = 0.104$)

^b Adjusted regression coefficient

For BI, both gender and education were significant. Female librarians reported noticeably lower intention compared with males ($b = -21.56$, 95% CI: -31.99 to -11.13, $p < 0.001$), while those with higher education also reported lower intention compared with those with lower education ($b = -8.70$, 95% CI: -16.61 to -0.79, $p = 0.031$). This may signify that being both female and having higher education were associated with reduced motivational readiness to be physically active. The model explained 10.4% of the variance (Table 4). Furthermore, job category was significantly associated with leisure-time PA, with officers reporting higher GLTEQ scores than support staff ($b = 8.59$, 95% CI: 0.29 to 16.89, $p = 0.042$). The model explained 3.3% of the variance.

As for SRWPA, both gender and job category were significant. Female librarians reported lower workplace PA compared with males ($b = -0.50$, 95% CI: -0.85 to -0.14, $p = 0.007$), while officers reported higher workplace PA than support staff ($b = 0.46$, 95% CI: 0.16 to 0.75, $p = 0.003$). This shows workplace PA was lower among female librarians and higher among officers compared with support staff. The model accounted for 7.9% of the variance (Table 5). In contrast, cons and RE items showed no significant associations with socio-demographic variables, suggesting that perceived barriers to PA and beliefs in its effectiveness for disease prevention were consistent across groups. Both models only showed minor variance.

Table 5. Association between socio-demographic characteristics and physical activity behaviour.

Variables	GLTEQ			SRWPA		
	MLR ^a			MLR ^a		
	<i>b</i> ^b	95% CI	<i>P</i>	<i>b</i> ^b	95% CI	<i>P</i>
Age						
18-29						
30-39						
40-49						
50-60						
Gender						
Male				1		
Female				-0.50	-0.85, 0.14	0.007
Job Category						

Variables	GLTEQ			SRWPA		
	MLR ^a			MLR ^a		
	<i>b^b</i>	95% CI	<i>P</i>	<i>b^b</i>	95% CI	<i>P</i>
Support	1			1		
Officer	8.59	0.29, 16.89	0.042	0.46	0.16, 0.75	0.003
Education						
Lower						
Higher						

Abbreviations: GLTEQ = Godin's Leisure-Time Exercise Questionnaire; SRWPA = Self-reported Workplace Physical Activity

^a Multiple linear regression (GLTEQ $R^2 = 0.054$; Pros $R^2 = 0.066$; PS $R^2 = 0.068$; PV $R^2 = 0.036$; BI $R^2 = 0.104$)

^b Adjusted regression coefficient

DISCUSSION

Main findings

This study examined psychosocial factors and PA levels among public sector librarians in Brunei Darussalam. In general, our data reveal that participants reported moderate levels of SE, BI, GLTEQ, and SRWPA, alongside relatively high perceived benefits and response efficacy. Multiple regression analysis further revealed that gender, age, education, and job category were significantly associated with several psychosocial factors and levels of PA outcome.

Remarkably, female librarians consistently reported less favourable psychosocial factors and lower PA outcomes than males, while older age groups perceived fewer benefits (Pros) and lower severity. Higher educational attainment was unexpectedly linked to lower vulnerability and intention, while officer-level librarians were more active than support staff.

Gender Differences in Psychosocial Factors and Physical Activity

Our findings reported that female librarians had lower self-efficacy, pros, behavioural intention, and workplace PA. This is supported by a study by Edwards & Sackett (2016), who found women

generally report lower SE for PA, which reduces their likelihood of doing regular PA compared with men. Women were also found to receive less diverse and weaker social support for PA and have different primary sources of motivation, such as health, stress management, weight control, and appearance-related reasons. Gender norms may further constrain women's participation in PA, which could explain the consistent disadvantage observed in this study. Despite the professional status of our participants, this finding is consistent with population-based research from Portugal (Araújo and Dosil, 2015) and Iran (Ramezankhani et al., 2013), which showed that women face particular sociocultural barriers to participation in PA.

Age-Related Patterns

Our study found that older age was negatively associated with both perceived benefits of PA and recognition of inactivity severity. Older librarians valued PA less and were less likely to acknowledge the risks of inactivity compared to their younger counterparts. This may reflect barriers commonly reported among older adults, such as reduced motivation, health concerns, fear of falling, and perceived risk of injury (Meredith et al., 2023; Kilgour et al., 2024). These factors may contribute to older librarians underestimating the

benefits of PA and perceiving inactivity as less severe, thereby reinforcing sedentary patterns.

Educational Attainment and Perceptions of Vulnerability and Intention

Our study found that librarians with higher educational attainment reported lower vulnerability and weaker behavioural intention towards PA. This means librarians with higher education felt less at risk from being active and were less likely to intend to exercise compared with librarians with lower education. Although higher education is often associated with better health knowledge, this does not necessarily lead to stronger motivation or engagement. This is consistent with evidence from healthcare professionals in Fiji and India, who demonstrated high knowledge and positive attitudes but reported low PA practices (Bako, Mohammadnezhad, and Khan, 2021; Ramautar, Tlou, and Dlungwane, 2021; Prakash, Mohammadnezhad, and Khan, 2021; Jaiswal, Pai, and Verma, 2024). These findings suggest that educational attainment alone is insufficient to drive intention or practice, likely due to occupational and structural barriers.

Job Category and Opportunities for Physical Activity

Our study found a positive association between officer-level librarian roles and both leisure-time and workplace PA. This is in contrast with studies among other ISCO-08 professionals, such as healthcare workers and university staff, which have reported that rigid schedules, heavy workloads, and limited facilities constrain PA despite good knowledge and attitudes (Yhi, Saat and Farah, 2018; Ramautar, Tlou and Dlungwane, 2021; Jaiswal, Pai and Verma, 2024). These findings suggest that across professional occupations, job role and structure play a critical role in shaping opportunities for PA.

Strengths and limitations

This study has several strengths, including the use of a validated, theory-driven instrument that enabled a comprehensive examination of psychosocial determinants of PA. However, several limitations must be acknowledged. The cross-sectional design precludes causal inference. The sample size, while adequate, was limited to public sector librarians, potentially reducing generalisability to other sectors or countries. Measures relied on self-report, which may introduce recall and social desirability bias.

CONCLUSION

Our study reports the influence of socio-demographic characteristics on psychosocial factors and PA among librarians in Brunei Darussalam. Female gender, older age, and support-level job categories were associated with less favourable outcomes, while officers reported more positive PA behavioural patterns. The findings underscore the importance of tailored, context-sensitive interventions to promote PA in sedentary professional groups, particularly among women and older employees. Furthermore, given that librarians are part of the broader ISCO-08 Major Group 2 professionals, the implications of this study may extend to other sedentary occupations within this category, such as educators, health professionals, and administrative specialists, who share similar work-related physical inactivity risks. Future research should explore longitudinal designs and intervention studies to confirm and extend these findings.

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