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Self-Reported Assessment of Occupational Sitting and Physical Activity Among Employees

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ABSTRACT

The high prevalence of sedentary behavior among workers is an emerging health concern due to the negative impact on human health. This study aimed to evaluate employees' sitting behavior and physical activity during their working time. A total of 130 employees participated in this study, with an average of working hours/week (38.92 ± 20.28). The cross-sectional data were collected from Occupational Sitting and Physical Activity Questionnaire (OSPAQ) filled out by participants about their self-reported percentage of sitting, standing, walking, and heavy labor at work. The present data revealed that most workers reported a high rate of prolonged sitting time in the workplace, which is significantly higher among employees in the sedentary profession ($73.3.3 \pm 9.6$). Age and education level are also significant between physically active jobs and those with sedentary jobs. Concerning this, it is essential to develop and promote programs to reduce sedentary time and the importance of interrupting sedentary time and participating in light-intensity activities in the workplace due to the detrimental effect of sitting time on health among employees.

Keywords: Sedentary behavior, Physical activity, Worker, Workplace.

1. INTRODUCTION

Sedentary behavior can be defined as non-physical activities that do not require significant energy expenditure, such as sitting, lying down, watching television, reading books, and using computers [1]–[3]. Lack of physical activity (P.A.) and sedentary lifestyle has become a significant global public health problem associated with various chronic diseases, causes of death, decreased health-related quality of life, and reduced life expectancy [4]–[8].

Physical inactivity can occur due to various factors such as age, gender, health status, occupation, availability of sports facilities and equipment, and social environment [9], [10]. Currently, carrying out activities with more extended sitting portions has been considered typical at work, home, and when using transportation, even though it could be detrimental to health [11], [12]. In addition, along with the development of technology, with most of the work being screen-based with the majority of their daily time spent for prolonged sitting, sedentary behavior is increasing [13]–[17]. The research

shows that office workers spend at least two-thirds of their working hours doing passive activities [18], [19]. Shift workers are also less involved in moderate-intensity physical activity and have a longer sitting time than daily workers [20]. High levels of time spent sitting with prolonged periods are associated with obesity [21]–[23], increased prevalence of cardiovascular disease, type 2 diabetes, and multiple causes of death [24]–[27].

On the other hand, since the Covid-19 outbreak and the implementation of regulations to avoid social interactions and work from home, maximizing the use of existing information and communication technology can increase sedentary behaviors and screen-based work [28], [29], which have significant health implication [30]–[32]. This is due to the restrictions in normal daily activities (such as going to the gym, parks, sports centers) can lead to changes in physical activity with possible effects on the risk of developing the chronic disease due to increased sedentary time [30], [33], [34].

Trend analysis shows that sedentary behavior will continue to increase shortly [35]. Other studies have shown that each individual spends 55-70% of their

waking hours or the equivalent of 9-11 hours on sedentary behavior with a 2% increase for each additional hour spent [36]–[38]. In 2008, about 25% of workers in America were sedentary [13], whereas, in Australia, 47% of women and 42% of men spent an average of 6.3 hours of their 8-hour shift in sedentary work and sitting [39]. In Thailand, the employees spend 13 hours on sedentary behavior and spend 2 hours on physical activity [40]. However, only a few documents concerning specific sitting routines and biological activities were carried out by the working population with self-reported during the COVID-19 pandemic. Therefore, it is essential to examine employees' sitting behavior and physical activity (sitting, standing, walking, and doing heavy labor) during their working time.

2. METHODS

2.1. Study Design and Participants

This is a quantitative descriptive study with a cross-sectional design, conducted from June to July 2021. Participants were recruited using convenience sampling techniques from various workplaces. In this study, we included only working participants who engaged in physically active work (i.e., employees working in the health care sector, personal trainers) and workers who primarily engaged in sedentary work (i.e., office workers, manager, and administrative professions). We excluded data from non-employed respondents ($n = 6$) based on the inclusion criteria and the data cleansing process. Ultimately, a total of 130 workers aged 20 - 57 years participated in this study.

2.2. Data Collection

The data was collected by using Occupational Sitting and Physical Activity Questionnaire (OSPAQ). It is a validated instrument to assess self-reported percentages of sitting, standing, walking, and heavy labor at work in the past seven days and the number of days worked during the past seven days [39], [41], [42]. The questionnaire also included socio-demographic data (i.e., gender, education level, body mass index, smoking habit), working conditions (i.e., work from home, work schedule, working hours, and working day). Participants have received instructions for filling out the questionnaire by describing the percentage of sitting 45%, standing 25%, walking 10%, and doing heavy work 20% based on the rate of working time, with the result of total percentage is equal to 100%.

2.3. Statistical analysis

We employed STATA software (Version 14) to perform statistical analysis. Descriptive data are

presented in terms of percentage and mean (Standard Deviation (SD)). Differences mean between physically active and sedentary jobs were determined using an independent t-test. Chi-square was used to calculate the differences of the socio-demographic characteristic, with statistical significance set at the level of $p < 0.05$.

3. RESULTS

The sample in this study included 130 workers (54.62% female) aged between 20 to 30 years (48.46%). Higher education level was obtained by 86.92% of the participants. Most body mass index was standard, working from home, daily workers, not smoking, and working as a teacher 56.92%, 73.85%, 80.77%, 87.69%, and 33.85% of the participants, respectively (Table 1).

Table 1. Characteristics of socio-demographic

Characteristic	n = 130	
	N	%
Gender		
Male	59	45.38
Female	71	54.62
Age (years)		
20 – 30	63	48.46
31 – 40	46	35.38
> 40	21	16.16
Education level		
Medium	17	13.08
High	113	86.92
BMI		
Normal	74	56.92
Underweight	8	6.15
Overweight	48	36.92
WFH		
Yes	96	73.85
No	34	26.15
Work Schedule		
Day work	105	80.77
Shift work	25	19.23
Smokers		
Yes	16	12.31
No	114	87.69
Profession		
Personal trainer ^a	9	6.92
Health care sector ^a	19	14.62
Skilled worker ^a	11	8.46
Lecturer ^b	8	6.15
University employee ^b	12	9.23
Administration staff ^b	21	16.15
Teacher ^b	44	33.85
Manager ^b	6	4.62

BMI – body mass index, *WFH* – work from home, *educational level* until senior high school as "medium," and university as "high," *profession* – ^aphysically active job, ^bsedentary job

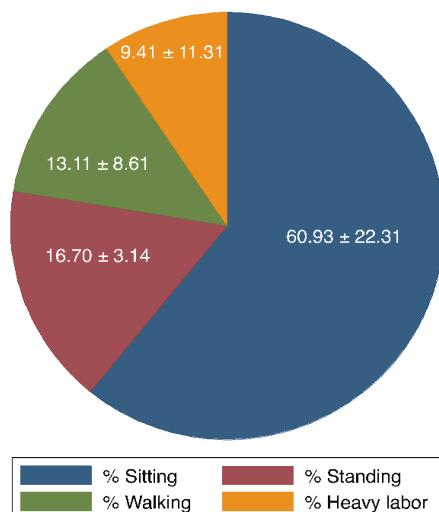


Figure 1 Self-reported percentage sitting and physical activity among employees

Participants reported that the majority of the percentage of their working time was done in a sitting position 60.93 ± 22.31 , then standing 16.70 ± 3.14 , walking 13.11 ± 8.61 and doing heavy labor 9.41 ± 11.31 during their working day (Figure 1).

Table 2. Working hours and working days in the last 7-day during the workday

Domain	n = 130	
	Mean	SD
Workhours/week	38.92	20.28
Workdays/week	5.4	1.2
Workhours/day	6.9	3.04

Additionally, the average working hours/week, working day/week, along with working hours/day among employees, 38.92 ± 20.28 hours/week, 5.4 ± 1.2 day/week, and 6.9 ± 3.04 hours/day, respectively (Table 2).

The differences of participants between both employment types are presented in Table 3. Due to the data distribution on sitting, standing, walking, and performing heavy labor at work are not normally distributed, so we used the Wilcoxon rank-sum (Mann-Whitney) test to calculate the difference between employment types groups. Of the total sample, for participants with physically active jobs, the percentage of each activity, based on self-reported sitting, standing, walking, and heavy labor, was significantly different compared to the portions of participants with sedentary jobs. Furthermore, the differences based on demographic characteristics of participants between physically active jobs and those with sedentary jobs, significant

differences only found in age and education level with a p-value of 0.006 and 0.005, respectively.

Table 3. Difference between employment types

	N = 130		
	Physically active jobs (n = 39)	Sedentary jobs (n = 91)	p-value
% Sitting	32.3 (16.3)	73.3 (9.6)	0.000*
% Standing	29.1 (16.3)	11.4 (6.3)	0.000*
% Walking	20.4 (11.1)	10 (4.64)	0.000*
% Heavy labor	18.2 (16.4)	5.6 (4.7)	0.000*
Work h/week	5.33 (1.17)	5.42 (1.22)	0.537
Work d/week	37.2 (16.0)	39.64 (21.9)	0.947
Work h/day	6.17 (2.4)	7.21 (3.23)	0.289
Gender	1.49 (0.50)	1.57 (0.49)	0.377
Age (years)	1.33 (0.47)	1.59 (0.49)	0.006*
Education level	1.74 (0.44)	1.92 (0.26)	0.005*
BMI	1.38 (0.49)	1.43 (0.50)	0.681
WFH	1.28 (0.45)	1.25 (0.43)	0.728
Work schedule	1.25 (0.44)	1.16 (0.37)	0.225
Smokers	1.92 (0.26)	1.85 (0.35)	0.229

Data are presented as mean (SD), BMI – body mass index, WFH – work from home, h – hours; d – days; *significant at 0.05

5. DISCUSSION

This study highlights employees' sitting behavior and physical activity (standing, walking, and heavy labor). Our results showed that the majority of participants in this study were employees with sedentary jobs. Their self-reported also revealed that most of their working time is engaged in a higher percentage of sitting (60.93 ± 22.31). Primarily during this COVID-19 pandemic, most of them work from home, with an average daily working time for sedentary jobs of 7.21 ± 3.23 hours/day. The results of this study are consistent with the other researchers who revealed that the majority of time spent by workers is sitting [43]–[45]. During the Covid-19 pandemic, employees who worked from home spent more time engaging in sedentary behavior [29].

Experiencing prolonged sitting time at work has become a common thing among employees [46]. College employees spend much time between 8.5 to 10.5 hours per day or about 55-65% of their day on sedentary behavior, both work and non-work time [47]. Likewise, daily workers in New Zealand got an average of 10334 steps at work as measured by a pedometer, while workers working on faculty and university staff only took 4442 and 4790 efforts, respectively [48].

The present study also disclosed that sitting was significantly lower among employees in the physically active job group (32.3 ± 16.3), and the physical activity (standing, walking, and heavy labor) was found significantly higher in the sedentary job groups (p-value

0.000). It is in line with other studies showing that skilled workers and laborers had significantly higher physical activity than managers and professional workers [49], and employment rates with higher sitting times are found among those with higher socioeconomic positions [50], which is included in the category of a sedentary profession.

Socio-demographic characteristics in our study showed that age and education level were significantly higher in the sedentary job group. Previous research has shown that the younger generation [51] and higher-level education are associated with higher self-reported workplace sitting time [52]. Most sedentary workers have a higher prevalence of cardiovascular disease than jobs requiring workers to stand [53]. Epidemiological studies have proven that prolonged sitting at work can impact mental health [54]. A prospective analysis also showed that women who did not engage in physical activity, and a high amount of sitting time, would increase the risk of depressive symptoms in the future [55].

It is essential to identify ways to increase physical activity and reduce sedentary behavior in the work environment. Replacing the sitting position by standing or doing light activities is highly recommended. Experts also advise workers not to sit and spend 2-4 hours standing per 8-hour working day [56]. Besides, teaching physical activity in work routines can improve the health, welfare of workers, increase social interaction, work performance [57], reduce cancer risk factors [58], prevent depression [59], [60], disease, aging, and premature death [61].

6. CONCLUSION

Our research provides insight into workers' socio-demographics, sitting, standing, walking, and heavy labor. The findings of this study indicate that from the participant's self-reported, most employees have a prolonged workplace sitting time, which is the main contributor to sedentary behavior. There are also significant differences in age and education level in physically active and passive jobs. It is imperative to develop and promote a program to stay active for employees adapted to the work environment to reduce sedentary behavior and various health risks. Future research is expected to use the accelerometer to obtain accurate numbers regarding the amount of time (minutes or hours) used by participants to sit, stand, walk, and do strenuous activities in the workplace.

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