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Sedentary Screen Time and Health-Related Outcomes among Female Workers at North Aceh Government Office

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Abstrak

Mayoritas tenaga kerja di dunia mendedikasikan sebagian besar waktu kerja mereka di kantor, di mana mereka biasanya melakukan aktivitas yang tidak banyak bergerak seperti menggunakan komputer. Pekerja kantoran biasanya menghabiskan lebih dari enam jam untuk duduk dan bermain game di smartphone atau menonton video. Perempuan duduk lebih dari enam jam sehari selama hari kerja. Risiko kematian akibat kanker, penyakit jantung koroner (PJK), dan penyakit kardiovaskular (CVD) lebih tinggi pada wanita yang memiliki tingkat aktivitas sedentari tinggi. Penelitian ini bertujuan untuk menilai tingkat sedentary screen time pada wanita dan hubungannya dengan masalah kesehatan. Penelitian potong lintang dilakukan pada 115 pekerja perempuan di Kantor Pemerintah Aceh Utara dari Juli 2023 hingga Februari 2024. Data dikumpulkan melalui wawancara tatap muka dengan menggunakan kuesioner waktu layar dan pengukuran langsung. Korelasi Pearson dan uji-t independen digunakan untuk menilai korelasi antara waktu penggunaan smartphone dan masalah kesehatan. Regresi linier digunakan untuk melihat variabel mana yang paling berhubungan. Hasilnya menunjukkan bahwa sebagian besar pekerja perempuan berusia muda, pegawai negeri sipil, memiliki hipertensi tingkat 1 (35,7%) dan kelebihan berat badan (53%). Rata-rata penggunaan layar pada hari kerja adalah 476,87 menit, rata-rata penggunaan layar pada malam hari adalah 194,61 menit, dan rata-rata penggunaan layar pada akhir pekan adalah 491,48 menit. Penggunaan layar pada hari kerja dan malam hari merupakan prediktor potensial untuk BMI, dan penggunaan layar pada hari kerja dan akhir pekan merupakan prediktor potensial untuk hipertensi

Kata Kunci : *Screen time*, pekerja dewasa, sedentari, BMI, hipertensi

Abstract

A significant segment of the global labor force dedicates a significant portion of their working days to office environments, where they typically engage in sedentary activities such as using computers. An office worker's typical workday consists of more than six hours spent sitting down to play games on their smartphones or watch videos. During the workday, women sat for over six hours a day. The risk of all-cause mortality from cancer, coronary heart disease (CHD), and cardiovascular disease (CVD) was higher in women who reported the highest levels of sedentary behavior. This study aimed to assess the level of sedentary screen time in women and its association with health problems. A cross-sectional study was conducted among 115 female workers at the North Aceh Government Office from July 2023 to February 2024. Data were collected through face-to-face interviews using screen-time questionnaires and direct measures. Pearson correlation and independent t-tests were used to assess the correlation between screen time and health problems. Linear regression was used to see which variables were most related. The result shows that most female workers were young, civil servants, had grade 1 hypertension (35.7%) and were overweight (53%). Average screen use on a weekday is 476.87 minutes, average screen use on a weeknight is 194.61 minutes, and average screen use on a weekend is 491.48 minutes. Screen use on weekdays and weeknights can be potential predictors for BMI, and screen use on weekdays and weekends can be potential predictors for hypertension.

Keywords : Screen-time, working adults, sedentary behavior, BMI, hypertension

Introduction

Sedentary behavior in adults is associated with the following poor health outcomes: all-cause mortality, cardiovascular disease mortality, and cancer mortality, as well as the incidence of cardiovascular disease, cancer, and type-2 diabetes (1). A large proportion of the global workforce spends a major part of their working days in office settings, being to a large extent sedentary, for example, while doing computer work (2). The average office worker sits for more than 6 hours per day, beginning with the drive to and from work and continuing with work, rest, and socializing. In addition, there is no object to distract workers from their habit of sitting while working, causing them to sit even when they take a short break by playing smartphones or watching YouTube (3). The study in Saudi Arabis shows that sedentary behavior among women was generally greater than what had previously been reported in other populations. According to the study, the average sitting time on workdays is 690 minutes (IQR 541-870), with nearly half of that time spent at work. Respondents also reported spending nearly 20% less time sitting on non-working days (4). In comparison to women who reported the lowest levels of sedentary behaviour, women who reported the highest levels of sedentary behaviour exhibited an elevated risk of all-cause mortality due to cardiovascular disease (CVD), coronary heart disease (CHD), and cancer (5).

Sedentary screen time is spent watching screen-based entertainment (TV, computer, mobile devices). It does not include active screen-based games where physical activity or movement is required (1). On working days, 82.7% of men and 82.5% of women reported engaging in high recreational screen-time sedentary behavior. Furthermore, 63.9% of men and 65.8% of women reported engaging in high recreational screen-time sedentary behavior on non-working days. In their spare time, 56.3% of men and 48.1% of women were physically inactive (6). Approximately women spending four or more hours of screen time a day (7). A meta-analysis study showed that both sedentary behaviour and a lack of physical activity were associated with an increased risk of obesity among both adults and older adults (8). The principal factor linking sedentary behaviour with an increased risk of cardiovascular disease was the time spent engaged in activities such as watching television and using electronic devices. Furthermore, it was observed that when computer time was substituted with telephone use or reading, this resulted in elevated blood pressure levels. Another research study reported a positive correlation between television viewing and numerous health problems including body mass index (BMI), waist-to-hip ratio, blood

pressure (BP), total cholesterol, triglycerides and low-density lipoprotein cholesterol (LDL-C) (9).

Based on Basic Health Research (Riskesdas) in 2018, the prevalence of obesity among adults in Indonesia was 21.8% and Aceh was 24.4%. Compared to the national level, Aceh's number is quite high. Correspondingly, Aceh ranks 10th in the national obesity incidence (10). In 2023, data from the Aceh Health Office (Dinkes) shows that people with obesity reached 106,044 people (11). Obesity is more prevalent in women than men, according to data from several Aceh regions. Research in Aceh Besar showed that women had a higher prevalence of obesity (77.3%) than men (58.8%) (12). The same thing happened in Lhokseumawe City, where the prevalence of central obesity was 6.190 cases, with 1.283 men and 4.907 women (13). Hypertension affects 34.1% of the Indonesian population aged 18 years and older, per the 2018 Riskesdas (10). In 2019, there were 283,910 people with hypertension in Aceh, representing 25% of the population (14). A study conducted by the Aceh Government Office found that 33.3% of women had high blood pressure (15).

According to one study, the majority of Aceh government offices do not provide physical activity facilities for their employees. The data revealed that low-moderate physical activity is the most common type of physical activity among workers, with little participation in activities like cycling or light exercise. The observation also noted that workers spend a significant portion of their time sitting in front of their laptops and computers. Additionally, workers dedicate the majority of their weekends to activities at home, such as cleaning, while the remaining time is spent on sedentary activities like watching television, lying down, and using mobile phones (12). It was also found that in Aceh Province, activity was measured in 15,622 people, and the results showed that 35.8% had insufficient physical activity and 64.2% had moderate physical activity (10).

Methods

A. Study Design and Study Population

A cross-sectional study was conducted among a convenience sample of 115 women employees working at randomly selected ten out of 32 government offices in North Aceh. Furthermore, the study population was stratified according to job rank, including both civil servants and non-civil servants. To ensure a representative sample of workers, the proportional allocation technique was applied, and a fixed number of workers were randomly selected from each office. Data collection was conducted from July 2023 to February 2024.

B. Study Variables and Data Collection

A self-administered questionnaire was employed to gather data regarding the socio-demographic characteristics of the participants, including age, educational background, and occupational level. Age classification follows WHO (2019); young (25-44), middle age (44-60), elderly (60-75), senile (75-90), and long-livers (after 90) (16). To assess screen-time, participants were instructed to estimate total time spent in hours and minutes using each device. An 18-item screen-time questionnaire was created to quantify use of commonly used screen devices (e.g. television, smartphone, tablet) across different time points during the week (e.g. weekday, weeknight, weekend). Total time for each screen-based device was quantified in minutes (e.g. 1 h and 30 min = 90 min). The questionnaires used were Screen-time Questionnaire (17). Blood pressure was measured in the morning for all participants. Participants were instructed to follow certain guidelines before the measurement, including not eating or drinking for 30 minutes, emptying their bladder, sitting in a comfortable chair with their back supported for at least 5 minutes, with both feet flat on the floor and their legs uncrossed. These instructions were given to ensure accurate measurements (18). The Omron upper arm blood pressure monitor (Omron Healthcare, Illinois, USA) was used to measure blood pressure. This device has been clinically tested and validated for accuracy by the US National Opinion Research Center (NORC) (19). Pre-hypertension is defined as having a systolic blood pressure level of between 120 and 139 mmHg and a diastolic blood pressure level of between 80 and 89 mmHg. Stage 1 hypertension is defined as a systolic blood pressure reading of 140 mmHg or more, or a diastolic blood pressure reading of 90 mmHg or more. Stage 2 hypertension is defined as a systolic blood pressure reading more than 160 mm Hg or a diastolic blood pressure more than 100 mmHg (20). BMI was calculated by dividing body weight (in kg) by height (in m2), which was measured directly. The cut-off points of each category as determined by Centers for Disease Control and Prevention (CDC). Underweight was define less than or equal to 18.4 kg/m2, normal weight : 18.5 to 24.9 kg/m2, overweight: 25.0 to 39.9 kg/m2 and Obese: ≥40.0 kg/m2 (21).

C. Statistical Analysis

An independent t-test was conducted to evaluate the relationship between age and occupation with BMI and hypertension. Conversely, the Pearson correlation test was performed to evaluate the relationship between screen use on weekday, screen use on weeknight, screen use on weekend, BMI, and hypertension. In order to ascertain the strength of the linear relationship between two variables, the correlation coefficient will be employed

under the subsequent circumstances: 0.00-0.199 = very low; 0.20-0.3999 = low; 0.40-0.5999 = moderate; 0.60-0.799 = strong; 0.80-1.000 = very strong (22). A predictive model for a health-related outcomes was produced through the statistical analysis of linear regression models. A $p<0.05$ was considered significant and all the analyses were conducted using IBM SPSS Statistics 23 (IBM, New York, US). Multiple linear regression analysis is an analytical tool that forecasts the effect of two or more independent variables on a dependent variable, thereby proving the existence of a functional relationship between two or more independent variables and one dependent variable (23).

Research Results

A. Sociodemographic Characteristics, Screen Time and Overview of Health-Related Problems

A total of 115 female workers were included in this study. Most of the respondents were young age (72.2%) and civil servants (57.4%) (Table 1). Most of the respondents had grade 1 hypertension (35.7%), and overweight (53%). Average screen use on weekday is 476.87 minutes, average screen use on weeknight is 194.61 minutes and average screen use on weekend is 491.48 minutes (Table 1).

Table 1. Characteristics, Average Screen Time (Min/Day) and Overview of BMI and Hypertension Among the Sample of North Aceh Female Workers

Variable	Frequency (n=115)	Percentage (%)
Group of age (%)		
Young	83	72.2
Middle-age	31	27.0
Elderly	1	0.9
Job positions (%)		
Civil servants	66	57.4
Non-civil servants	49	42.6
Hypertension (%)		
Normal	33	28.7
Prehypertension	36	31.3
Grade 1 hypertension	41	35.7
Grade 2 hypertension	5	4.3
Grade 3 hypertension	0	0
Body Mass Indeks (%)		
Underweight	2	1.7
Normal weight	51	44.3
Overweight	61	53
Obese	1	0.9
Screen use on an average weekday (Mean, SD)		
Mean = 476.87		
SD = 242.85		

Variable	Frequency (n=115)	Percentage (%)
Screen use on an average weeknight (Mean, SD)		
Mean = 194.61		
SD = 133.83		
Screen use on an average weekend (Mean, SD)		
Mean = 491.48		
SD = 223.07		

B. Screen Time as Risk Factors for BMI and Hypertension on Female Workers

Based on statistics analysis, age and job positions has no correlation with BMI and hypertension (pv > 0,05). Meanwhile, screen use on average weekday, screen use on average weeknight and screen use on weekend has correlation with BMI and hypertension (pv < 0,05) (table 2). Correlation coefficient (r) shows that screen use in weekday, weeknight and weekend had moderate correlation with BMI (r = 0.48; 0.58; 0.46). Meanwhile, screen use on weekend has a very strong correlation with hypertension (r = 0.84), screen use on weekday had strong correlation with hypertension (r = 0.73), and screen use on weeknight had moderate correlation with hypertension (r = 0.47) (table 2).

The multivariate test using the linear regression suggested that screen use on weekday and weeknight can be potential predictors for BMI (table 3), and screen use on weekday and weekend can be potential predictors for hypertension (all had p<0.05) (table 4). It is also conclude that the regression model obtained can explain 38.8% of the variation in BMI and 76.5% the variation in hypertension (R^2 = 0.380; 0.765) (table 3,4). The correlation value also shows a positive relationship, meaning that every increase in the number of minutes of screen use will increase BMI and blood pressure values.

Table 2. Characteristics and Sedentary Screen Time as Risk Factors for BMI (Kg/m^2) and Hypertension (mmHg)

		BMI			Hypertension		
Variable	**n**	**Mean ± SD**	**r**	**p-value**	**Mean ± SD**	**r**	**p-value**
Group of age							
Young	83	25.79 ± 4.02	-	0.215	127.81 ± 21.17	-	0.826[a*]
Middle-age	31	24.80 ± 3.84			129.77 ± 18.60		
Elderly	1	20.31			137.00		
Job positions							
Civil servants	66	25.06 ± 3.64	-	0.590	129.58 ± 20.87	-	0.908[a]
Non-civil servants	49	26.04 ± 4.39			126.86 ± 19.77		
Screen use on an average weekday (min/day)	115	476.87 ± 242.85	0.48	0.001	476.87 ± 242.85	0.73	0.001[b*]

Screen use on an average weeknight (min/day)	115	194.61 ± 133.83	0.58	0.001	194.61 ± 133.83	0.47	0.001[b]
Screen use on an average weekend (min/day)	115	491.48 ± 223.07	0.46	0.001	491.48 ± 223.07	0.84	0.001[b]

[a] Analyzed using Independent *t*-test

[b] Analyzed using Pearson correlation

*Statistically significant at p=0.05

Table 3. Sedentary Screen Time and BMI Prediction Model

Model	Variable	Body Mass Indeks			
		t	B (95% CI)	R^2	p Value
Model 1	Screen use on an average weekday	1.61	0.003 (-0.001 – 0.006)	0.390	0.110
	Screen use on an average weeknight	4.62	0.012 (0.007 – 0.018)		0.001
	Screen use on an average weekend	1.33	0.002 (-0.001 – 0.006)		0.183
Model 2	Screen use on an average weekday	2.80	0.004 (0.001 – 0.007)	0.380	0.006
	Screen use on an average weeknight	5.05	0.013 (0.008 – 0.019)		0.001

Table 4. Sedentary Screen Time and Hypertension Prediction Model

Model	Variable	Body Mass Indeks			
		t	B (95% CI)	R^2	p Value
Model 1	Screen use on an average weekday	4.85	0.027 (0.016 – 0.037)	0.766	0.001
	Screen use on an average weeknight	-0.52	-0.005 (-0.021 – 0.012)		0.598
	Screen use on an average weekend	10.12	0.059 (0.048 – 0.71)		0.001
Model 2	Screen use on an average weekday	4.94	0.005 (0.015 – 0.036)	0.765	0.001
	Screen use on an average weekend	10.32	0.006 (0.047 – 0.070)		0.001

Discussion

The study suggested that screen use in weekday, weeknight and weekend can lead to weight gain and increased blood pressure among female workers. In Japanese adults, including older adults, screen time is linked to obesity; this association is especially strong in work-related behaviors (24). The dramatic rise in computer time was much greater than the decrease in reading time in China. Consequently, Chinese women of reproductive age saw a progressive increase in their overall amount of sedentary behavior. These results

offered compelling proof that watching more television was strongly linked to higher BMI, as well as increased risks of overweight and abdominal obesity in Chinese women of reproductive age (25). Women who engage in screen-based sedentary behavior are more likely to develop metabolic syndrome and hyperglycemia. Furthermore, for every hour that sedentary behavior centered around screens was engaged in by inactive women, the likelihood of abdominal obesity increased. Screen-based sedentary behavior has been linked to the interaction between hours of sleep and metabolic syndrome. A long-term study discovered that adults who slept for less than 6 hours a day or for longer than 9 hours a day gained more visceral fat than those who slept for 7 to 8 hours a night. As a result of decreased insulin function and increased catecholamine production, some authors have discovered a link between prolonged sleep and dysregulation of blood pressure and glucose levels through hormonal changes. This mechanism may help to explain the correlation between screen-based sedentary behavior and sleep and metabolic syndrome and its constituent parts, as well as the rise in body fat attributed to sedentary behaviors like screen-based activities and sleeping patterns (26).

High levels of total sedentary behaviour and television viewing were associated with hypertension (27). People who engage in high levels of sedentary behavior have an 8.7-fold increased risk of developing hypertension, according to a significant correlation found between sedentary activity and the incidence of the condition. The chance of having hypertension rises when one does not exercise. This is due to the fact that people who are passive often have higher heart rates, so the longer blood pressure is applied to the arteries, the higher the risk of blood pressure increasing (28).

Workplace-based primary prevention interventions program for cardiovascular disease were effective in promoting healthy lifestyle and reducing the incidence of hypertension among employees (29). Blood pressure at work was successfully lowered by the multicomponent intervention strategy that combined monthly visits with guidelines-based hypertension management and workplace-based health promotion. Programs for managing hypertension at work should be taken into consideration for inclusion in hypertension control initiatives, as they have the potential to reach a much wider audience and provide improved accessibility among staff members (30). Physical activity is one of the modifiable risk factors for preventing obesity. One effective way to promote physical activity in public and professional settings is through stair climbing. The impact that this strategy can have on people who may use stairs in their daily routine or at work. As a result, promoting stair climbing could lead to an increase in physical activity across a broad

demographic. Workplace walking interventions have demonstrated noteworthy enhancements in physical activity levels, health perception, subjective vitality, work performance, and fatigue. There is currently research indicating that walking indoors (7500–9999 steps) can improve work quality. Still, there seems to be some evidence in favor of outdoor walking paths and routes. Therefore, researchers and practitioners recommend building walking routes/trails as a useful environmental strategy to promote physical activity (31). Adults should limit their sedentary behavior. Replacing sedentary time with physical activity of any intensity (including light intensity) improves health (1).

With a growing number of women entering the workplace, there must be a support the use of workplace wellness programs to reduce sitting time and promote physical activity, thereby reducing chronic diseases and their risk factors as part of a holistic public health approach. Identifying correlates of sedentary behavior within this population will allow for the development of more effective programs that prevent the negative consequences of sedentary behavior (4). This study's primary limitation is its reliance on self-reporting, which is less reliable than sedentary behavior measured by specially designed devices. Self-report is likely to be influenced by recall and social desirability biases, which could lead to an underestimation of sedentary behavior. Furthermore, due to resource limitations, the study did not take into account ecological variables related to sedentary behavior, such as psychosocial factors, organizational/community, environmental, and policy factors. Lastly, this study may not be generalizable to all working adults in Aceh, as the study population was drawn only from ten government offices. Nonetheless, this study's strengths were rare among Acehnese workers and broadly applicable to this group of workers in context-rich working adult areas.

Conclusions and Suggestions

Most female workers were young, civil servants, had grade 1 hypertension and were overweight. Weekday screen time averages are 476.87 minutes, weeknight screen times are 194.61 minutes, and weekend screen times are 491.48 minutes. Utilizing screens during the weekdays and evenings may have an impact on BMI, and using screens on the weekends may have an impact on hypertension.

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