ORIGINAL ARTICLE

Behind the Desk: Sociodemographic and Lifestyle Factors Associated With Obesity Among Working Adults in Kuala Lumpur

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ABSTRACT

Introduction: The rising prevalence of obesity is a growing concern nationwide and increases the risk of non-communicable diseases. This study aims to determine the association between sociodemographic characteristics, lifestyle factors, and work environment, with overweight/obesity among Malaysian working adults in Kuala Lumpur. **Methods:** A cross-sectional study design is carried out among Malaysian workers aged 18 to 64 years with data collected through online administered questionnaires. A total of 290 respondents were involved using convenient sampling. Multiple logistic regression analysis was used to determine the odds of overweight/obesity among working adults for each study factor. **Results:** In this study, 24.8% of workers were found to be overweight/obese. Male workers had 3.47 times greater odds of being overweight/obese, while married individuals had 4.39 times greater odds. Those who slept less than seven hours per night had 2.75 times greater odds and individuals who skipped breakfast daily had 2.46 times greater odds of being overweight/obese compared to those workers who are not overweight/obese. **Conclusion:** Overall, one in four working adults were classified as overweight/obese. This research found that gender, marital status, sleeping hours and frequency of meals were associated with being overweight/obesity among workers, significantly. Further research is warranted to explore additional occupational and lifestyle determinants such as work-related stress, dietary quality, and specific job categories that may contribute to elevated BMI, particularly within the Malaysian workforce.
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INTRODUCTION

Obesity is a disease in which excess fat in the body accumulates to a degree that may affect one's medical condition. The rising prevalence of obesity is alarming nationwide and has been described as a global epidemic associated with morbidity and mortality. The latest data from the World Health Organization reported having about 2.5 billion overweight (43%) and 890 million obese (16%) adults at the age of 18 years and above, in 2022 (1). According to the findings from the recent National Health and Morbidity Survey (NHMS) 2023, half of the Malaysian adults are overweight/obese and have abdominal obesity, making the country one of the highest in Southeast Asia for over-nutrition prevalence (2). Obesity increases the risk of premature deaths, heart failure with aging, and non-communicable diseases (NCDs) such as hypertension, diabetes mellitus and cancer (3).

There is growing evidence showing work environments contribute to the increase in the prevalence of overweight/obese workers. Work-related factors like working hours, sedentary time, type of work, shift patterns, and stress are linked to body weight especially among working adults (4–6). A stressful life can impact on the ability to maintain a healthy weight, leading to cravings for unhealthy foods, consumption of high glycemic foods, overeating, and disrupted sleep. (7). Furthermore, studies have found that workers often have meal skipping and poor nutritional habits at workplace

that lead to unhealthy body weight status (8,9). In addition, the research conducted in European countries showed that older workers are more susceptible to gain weight when working beyond 59 hours per week (10).

The rise of obesity is not a problem unique to Malaysia. A systematic review by Smith et al. (2021) reported that from 2009 to 2015 the prevalence of overweight (9.5% to 43.5%), obesity (1.77% to 26.4%), and abdominal obesity (11.4% to 57.4%) among Malaysian working-age adults increased dramatically (11). Having a higher BMI status was found to link with the reduction in cognitive flexibility, memory, fluency in talking, and ability of planning and analyzing which eventually may affect their work productivity (12). By comparing the top overworked country in the world, Kuala Lumpur was reported to be one of the cities in Malaysia with an overworked population (21%), having the longest working hours, and minimum vacations offered (13). Furthermore, due to the urban lifestyle in Kuala Lumpur, many workers are likely to experience high levels of stress, engage in sedentary occupations, adopt unhealthy eating habits, and have limited physical activity which is linked to the rising prevalence of obesity (14). Hence, a better understanding of the factors associated with overweight/obesity among Malaysians is therefore necessary to raise awareness in the work community especially to the employees and employers on recognizing obesity as a serious health condition concerning public health.

MATERIALS AND METHODS

Study Participants and Settings

This cross-sectional study was targeted in Kuala Lumpur, Malaysia from April to June 2022. There are a total of 290 working adults aged 18 to 60 years old who were approached through social media including Facebook, Twitter, WhatsApp, and Instagram. The participants were given a set of questionnaires administered through a google form. The questionnaire was divided into three sections which are sociodemographic characteristics, lifestyle factors, and work-related factors. The sociodemographic factors included age, sex, ethnicity, marital status, education level, and monthly household income. For lifestyle factors, physical activity, mode of commute, sleeping hours, and meal pattern were identified. While work-related factors such as type of work, work status, work shift, and average working hours per week are included in the questionnaire. The questionnaire also included a description that explains the purpose of the study and with written informed consent was obtained from all the subjects prior to study initiation that ensures the data provided by the participants are anonymous and confidential and only for research purposes.

Sample Size Calculation

The sample size was calculated using G*Power 3.1 software with the power of 80% and significance of 5% under the statistical z-test of proportions, difference between two independent proportions (P1 and P2) (6). Based on Dagne et al. (2019) showed that the proportion of working adults who are obese is higher among unmarried (81.5%) than married (65.4%). The minimum total sample size calculated was 234 respondents. After adjusting for expected response rate of 81.83%, the total sample size that required in this study was 286 respondents. After comparing the sample size from all the variables, the highest sample size will be selected. Hence, the minimal sample size required in this study is 286 working adults in Kuala Lumpur. From the data collected, there were 290 working adults who participated in this study.

Study Instrument

Sociodemographic characteristics

Sociodemographic data was obtained using a set of questionnaires that included information on age, sex, ethnicity, marital status, level of education, and monthly household income. For monthly household income, they are categorized into T20 (>RM10,960), M40 (RM4,850-RM10,960), and B40 (RM<4,850).

Lifestyle factors

In this study, physical activity was estimated using Global Physical Activity Questionnaire (GPAQ) based on which the physical activity level can be quantified in METs (15). The data was reported as “low intensity physical activity”, “moderate intensity physical activity”, or “high intensity physical activity” among the participants. Mode of commuting was measured by using a closed ended question regarding mode of transport to get to and from work. The mode of commute was classified into active transport (walking or cycling), public transport (bus or train) and motor vehicle user (car or motorcycle). While sleeping hours, there was an open-ended question like “How much sleep do you usually get a night on weekdays/weekends?”. The responses of the question were classified into short sleep (< 7 h/night) and adequate sleep (7–9 h/night) (16). In this study, the participant’s pattern of having meal was measured using the Meal Pattern Questionnaire (MPQ) with minor modification to measure the eating pattern (17). The frequency of meals was then classified into 3 including “no to 14 days”, “15 to 27 days”, and “every day”.

Work-related factors

The type of work in this study was assessed which required the participants to state in the questionnaire and occupation type was categorized into three groups including “professionals and technicians”, “service and sales workers”, and “manual laborers” (18). This study assessed the hours of working of the respondents with an open-ended question “How many hours per day did you work on average last week?” and “How many days per week did you work on average last week?”.

Similar working hours assessment questions have been used in other survey (19). To have a better estimation of work hours, the time of the participants begin and end their job was included. The hours of work were categorized into two groups which are ≤40 working hours per week and >40 working hours per week. Next, an open-ended question like "Do you have a work shift, if yes please state the time" will be used to determine if the participants have work shifts. Then it will be divided into yes if they reported to have shift work with duration stated and no if they do not have shift work (dichotomized as yes and no). Respondents were determined to be part-time or full-time workers. In this study, full-time employment was considered when they work for 40 to 48 hours a week and less than 40 hours a week for part-time employment. Lastly, the type of job was classified as sedentary if they reported to lifting no more than 4.5 kg at a time, occasionally lifting, carrying small tools, and performing job while sitting or standing for 6 of the 8 hours in a workday.

Anthropometry measurement

Weight and height were self-reported. Instructions were given with figures to assist and assure the respondent to report their data (weight and height) accurately as possible. Based on World Health Organization (WHO), the Body Mass Index (BMI) was calculated using the respondent's height and weight. The formula is BMI = kg/m2 where kg is the respondents' weight in kilograms and m2 is their height in meters squared. Subsequently, the BMI classification was divided into two categories which are underweight/normal weight (BMI <25 kg/m2) and overweight/obesity (BMI >25 kg/m2) (1).

Statistical Analysis

The data collected in this study were reviewed for accuracy and completeness. This involved checking for missing or inconsistent responses, duplicate entries and ensuring that the data followed logical patterns. Incomplete data were excluded from the analysis to maintain the integrity of the dataset. The data were analyzed using IBM SPSS Statistical Software Version 27.0. Questionnaires with missing data were excluded from the analysis. Descriptive statistics was examined, and data were presented in mean, standard deviations (SD), frequency (n), and percentage (%). Univariate analysis was carried out using simple logistic regression and all variables with $p<0.25$ were included in the subsequent multiple logistic regression analysis to identify the associated factors and odds of overweight/obesity among working adults for each study factor. The adjusted odds ratio (OR) with 95% CI were presented. The level of significance of all tests was set at $p <0.05$.

RESULTS

Prevalence of overweight/obesity among working adults

Based on the WHO classification, 15.2% of subjects were underweight, 60% of normal weight, 18.6% of overweight and 6.2% of them were obese, in which 22.51 ± 4.31 kg/m2 was the mean BMI (Table I). Overall, the prevalence of being overweight/obesity among working adults in this study is 24.8%.

Table I: The body weight status of working adults (n=290)

Body Weight Status	n (%)
BMI (kg/m²)	**22.51 ± 4.311**
Underweight	44 (15.2)
Normal weight	174 (60.0)
Overweight	54 (18.6)
Obesity	18 (6.2)

Associated factors with overweight/obesity among working adults

Univariate analysis was carried out and all significant variables with p-value < 0.25 were selected for multiple logistic regression. Multivariate analysis showed no significant association between work-related factors and overweight/obesity among working adults in Kuala Lumpur. However, certain sociodemographic and lifestyle factors were significantly associated with overweight/obesity (Table II). These associations were further examined across three models (Table III). In Model 1, after adjusting for work-related factors, male workers had higher odds of being overweight or obese (aOR = 3.955; 95% CI: 2.115, 7.398), as well as married individuals (aOR = 3.447; 95% CI: 1.661, 7.157). In Model 2, shorter sleep duration (<7 hours) was associated with increased risk (aOR = 2.679; 95% CI: 1.400, 5.124), as it was not having breakfast every day (aOR = 2.017; 95% CI: 1.001, 4.023). Additionally, those who did not have brunch/lunch daily had higher odds (aOR = 2.281; 95% CI: 0.363–2.428), though this was not statistically significant. In the final model (Model 3), after adjusting for all variables, being male (aOR = 3.465; 95% CI: 1.723–6.968), married (aOR = 4.392; 95% CI: 1.853–10.410), having short sleep (aOR = 2.752; 95% CI: 1.350–5.611), and having breakfast less than 15 days per month (aOR = 2.460; 95% CI: 1.113–5.437) were significantly associated with higher odds of being overweight or obese.

Table II: Simple logistic regression of association between each variable and working adults with overweight/obesity (n=290)

Variables	Crude OR	95% CI lower	upper	p-value
Sex				
Male	3.648			
Female	1.000	2.095	6.352	<0.001*
Age (years old)				
18-34	1.000			0.156
35-49	1.696	0.557	5.169	0.352
50-64	2.073	0.925	4.647	0.077
Ethnicity				
Malay	1.000			0.003*
Chinese	0.426	0.0.27	0.800	0.008*
Indian	1.364	0.548	3.393	0.505
Education level				
Below tertiary[a]	1.000			
Tertiary	1.042	0.426	2.552	0.928
Marital Status				
Unmarried[b]	1.000			
Married	0.294	0.153	0.565	<0.001*
Household income[c]				
B40	1.882	0.876	4.034	0.105*
M40	0.651	0.282	1.504	0.315
T20	1.000			0.003*
Physical Activity				
Low intensity	0.503	0.268	0.944	0.033*
Moderate intensity	0.465	0.223	0.969	0.041*
High intensity	1.000			0.056*
Mode of Commute				
Active transport	<0.001	<0.001	<0.001	0.999
Public transport	0.528	0.235	1.189	0.123*
Motor vehicle	1.000			0.305
Sleeping Hours				
Short sleep (<7 h/night)	2.412			
Adequate sleep (7–9 h/night)	1.000	1.397	4.164	0.002*
Difficulty on Falling in Sleep				
Yes	1.401	0.793	2.474	0.246*
No	1.000			

CONTINUE

Table II: Simple logistic regression of association between each variable and working adults with overweight/ obesity (n=290) (CONT.)

Variables	Crude OR	95% CI lower	upper	p-value
Meal Pattern				
Breakfast				
No day to 14 days	1.496	0.834	2.684	0.176*
15 days to 27 days	0.676	0.305	1.499	0.335
Every day	1.000			0.116*
Mid-morning meal				
No day to 14 days	0.646	0.286	1.459	0.293
15 days to 27 days	0.750	0.264	2.129	0.589
Every day	1.000			0.563
Brunch/lunch				
No day to 14 days	2.086	1.064	4.092	0.032*
15 days to 27 days	0.994	0.456	2.164	0.987
Every day	1.000			0.090*
Teatime				
No day to 14 days	0.317	0.133	0.759	0.010*
15 days to 27 days	0.385	0.112	1.329	0.131*
Every day	1.000			0.036*
Dinner				
No day to 14 days	2.116	0.888	5.042	0.091*
15 days to 27 days	0.539	0.239	1.216	0.136*
Every day	1.000			0.053*
Supper				
No day to 14 days	0.359	0.164	0.790	0.011*
Every day	1.000			
Nocturnal eating				
No day to 14 days	0.365	0.118	1.124	0.079*
Everyday	1.000			
Type of Work				
Professionals and technicians	1.000			0.509
Service and sale workers	0.945	0.543	1.642	0.840
Manual labours	1.909	0.588	6.196	0.282
Working Hours (per week)				
≤ 40 hours	1.000			
> 40 hours	1.421	0.833	2.425	0.198*
Working Status				
Full time	1.337	0.664	2.693	0.416
Part time	1.000			
Work Shift				
Yes	1.733	0.561	5.350	0.339
No	1.000			
Type of Job				
Non-sedentary	1.000	0.500	1.686	0.784
Sedentary	0.918			

Note: [a]No formal education, primary, secondary education; [b]Single, divorced, widowed; [c]B40: <RM4,850, M40: RM4850-RM10,959, T20: >RM10,959; *All significant variables (p <0.25) from the univariable analysis were selected for multiple logistic regression.

Table III: Multiple logistic regression modelling of factors associated with overweight/obesity among overweight/obese working adults (n=290)

Variables	Crude OR	95% CI lower	95% CI upper	*p*-value
Model 1				
Sex				
Male	3.955			
Female	1.000	2.115	7.398	<0.001
Marital Status				
Unmarried[a]	1.000			
Married	3.447	1.661	7.157	<0.001
Model 2				
Sleeping Hours				
Short sleep (<7 h/night)	2.679			
Adequate sleep (7–9 h/night)	1.000	1.400	5.124	0.003
Meal Pattern				
Breakfast				
No day to 14 days	2.017	1.011	4.023	0.046
Every day	1.000			
Brunch/lunch				
No day to 14 days	2.281	0.363	2.428	0.034
Every day	1.000			
Model 3				
Sex				
Male	3.465			
Female	1.000	1.723	6.968	<0.001
Marital Status				
Unmarried[a]	1.000			
Married	4.392	1.853	10.410	<0.001
Sleeping Hours				
Short sleep (<7 h/night)	2.752			
Adequate sleep (7–9 h/night)	1.000	1.350	5.611	0.005
Meal Pattern				
Breakfast				
No day to 14 days	2.460	1.113	5.437	0.026
Every day	1.000			

Note: [a]Single, divorced, widowed.

Model 1 was sociodemographic characteristic adjusted for work related factors.

Model 2 was lifestyle factors adjusted for work related factors.

Model 3 was adjusted with sociodemographic characteristic, lifestyle, and work-related factors except for the targeted variable itself.

DISCUSSION

In the present study, overweight/obesity and its associated factors among working adults in Kuala Lumpur, Malaysia were assessed. Firstly, sociodemographic characteristics (sex, ethnicity, marital status, and household income) were found to be associated with the increased odds of being overweight/obese among working adults. In this study, males had higher BMI compared to females. This could be due to most of the respondents were young female adults in which they are more likely to have a healthy diet and better weight management. Women tend to have body dissatisfaction which may result in increased weight loss behaviors (20). Inversely, the latest studies reported that Malaysian female adults were more prone to being overweight/ obese than men (6,21). This might result from the fluctuation of female reproductive hormone that increased the risk of obesity by promoting fat accumulation, particularly around the abdomen during pregnancy, menstruation and menopause (22,23).

It was reported that older worker aged 50 to 64 years old tend to have higher risk of overweight/obesity when compared to young workers. However, the data did not show a significant result. This is because most of them were young workers aged 18 to 34 years old and having lower BMI. Based on NHMS 2020, adults aged 45 to 49 years had the highest prevalence of overweight and 35 to 39 years old had the highest prevalence of obesity. A study by Mohd-Sidik et al. also mentioned that adults aged 30 years and above, specifically 30-39 years, were more prone to overweight/obesity risk than a younger age (24). This could be explained by the amount of adipose tissue in our body that may increase as we grow older (25).

Furthermore, Chinese workers were found to have a lower risk of being overweight/obese when comparing with Malay workers. Current study supports the previous research as most of the studies found that the Chinese had a lower risk of being overweight/obese compared to Malay and Indians (26,27). In contrast, Indian workers tend to have 1.364 times odd risk of being overweight/ obese than Malay, but it was not significantly associated. NHMS 2020 reported that approximately 64% of overweight/obese were Indians and the rest were others ethnicity in Malaysia (28). One of the latest studies among adults in Selangor found that Indians are the most obese compared to others (24). After controlling other variables, no association was found between ethnicity and overweight/obesity regardless of the type of occupation. This can be due to higher participation of Chinese (69%) compared to other ethnicities in this study.

Marital status was found to be related to overweight/ obesity in which those workers who are married have a lower chance of being overweight/obese, significantly. Nonetheless, after controlling all other variables found that being married had 4.392 times odds of having increased BMI (95% CI: 1.853, 10.410) compared to unmarried workers. A similar result was reported by Liu et al. where BMI will increase after marriage (29). Many potential reasons could be explained for the finding, one of them is behavior influences. Cobb et al. revealed that the body weight status of a married individual will increase when the BMI of the spouse is increased (30). Moreover, they tend to eat more regularly as they have a confidant, and inconsistency in controlling weight gain because they are not seeking a partner actively (31). Those who are single may have a higher tendency to manage their weight by preventing weight gain to attract and get attention from their potential significant other.

Furthermore, low-income groups were reported to have association with a higher risk of overweight/ obesity among the workers compared to high-income groups. However, it was not a significant result. It could probably be explained that individuals in this study are from a lower household income group because they are mostly young adults with single household income. Lower income groups are usually more concerned about the price of the food and tend to get cheaper food which may not provide adequate nutrients, together with high caloric density food that leads to obesity (32,33). Yet, one of the studies in an urban poor community in Kuala Lumpur found that people with higher income tend to have lower body weight status (34).

The present study reported that low and moderate intensity of physical activity intensity has a lower risk of being overweight/obese workers. However, no association was found between physical activity intensity and the odds of being overweight/obese adults in this study. This could be due to other confounding factors such as diet quality, alcohol abuse, smoking and stress. Physical activity is one of the prominent factors that have association with BMI status in which extensive research had revealed that physically active aid in the reduction of overweight and obesity risk (35). One of the latest studies by Johnson et al. indicated that prevention of gain in adiposity and weight management required a minimum of 150 minutes to 300 minutes per week of at least moderate aerobic activity (36). Being physically active aids in weight maintenance, better mental health, and lowered disease risks like diabetes mellitus, hypertension, CVD, and stroke. Despite, doing regular exercise solely is not sufficient to lose weight, but along with a healthy balanced diet is vital (37). An imbalance of energy intake and expenditure will lead to the accumulation of excessive fat in the body causing an increased risk of being overweight/obese (38).

Inadequate hours of sleep (less than 7 hours) showed significant results after adjusting for other lifestyle and work-related factors (aOR: 2.752, 95% CI: 1.350, 5.611). The same scenario was shown in the latest study that

individuals will have an increased risk of overweight/obesity and diabetes when they have a shorter duration of sleep (39). The mechanism that links sleep duration and obesity is the change in energy intake and expenditure. When an individual loses their sleep partially, it will cause them to increase in hunger level and have a higher intake of caloric-dense food, higher glycemic index (GI) food, and high fat and carbohydrate (40,41). Not only that, but sleep deprivation also affects physical activity where people will be probably exhausted to carry out the exercise, thus decreasing the energy expenditures causing weight gain.

The results of this finding indicated that brunch/lunch and supper were significantly associated with overweight/obesity among the involved participants. Despite this, further analysis was carried out to find the odds of meals. It was reported that those who did not have breakfast (aOR: 2.017, 95% CI: 1.011, 4.023) and lunch (aOR: 2.281, 95% CI: 0.363, 2.428) exclusively were related to an increased likelihood of high body weight status. After controlling all the variables, having breakfast less than 2 weeks in a month was found to have 2.460 times the odd risk (95% CI: 1.113, 5.437) of being overweight/obese workers than those who had breakfast every day. The result was in line with previous studies where breakfast skippers were associated with rising obesity risk (42,43). Breakfast is important because in the morning the peak production of cortisol hormone occurs which can help in regulating our body and metabolism (44). Skipping breakfast not only led to reduced physical activity in the morning but also reduced total energy expenditure. The imbalance of energy between calories intake and calories expenditure will cause the body to store adipose tissue which was found to be the fundamental cause of obesity (45). Also, skipping breakfast may have a lower intake of micronutrients and not fulfilling the recommended nutrient intake resulting in low dietary quality (46). Although having higher meal frequency may contribute to lower BMI, but it will increase the intake of energy or high energy-dense food/meal (47).

Work-related factors including the type of work, working hours, working status, work shift, and type of job (sedentary or non-sedentary) were found to have no association with overweight/obesity among the studied workers. It contradicts most of the previous studies and what had been hypothesized. This present study showed no significant association between working hours and the risk of being overweight/obese workers. It could be due to the imprecise categorization of work hours in this study. A similar result was reported by Myers et al. found that obesity was not associated with work characteristics including long (>40 hours) or short (≤40 hours) working hours (4). However, most of the previous studies mentioned that working hours were positively associated with the risk of being overweight/obese (48,49). Additionally, Virtanen et al. mentioned that working more than 55 hours weekly had 1.17 odd risk of increasing their BMI (5). The inconsistency in previous findings could be depending on the type of work which may involve the level of physical job demand. For instance, the job such as construction worker is a more physically demanding occupation while office workers are with low physical activity demand due to long working hours and a long period of sitting time (50).

The strength of the current study identifies the modifiable lifestyle behaviors including insufficient sleep and skipping breakfast, that are significantly associated with being overweight and obesity, providing actionable insights for targeted interventions. However, there are several limitations of this study where the size of the sample is small which will be difficult to have a valid result and affects the reliability of the study. Additionally, the data collected was self-administered with a convenience sampling study design. This will increase the probability of biased results (under and over-reporting) and be unable to generalize to the population. As participants are asked to self-report their height and weight, there is a risk of inaccurate reporting, which can lead to misclassification particularly when calculating BMI categories.

Besides that, social media users are not representative of the general population as it favors younger and more tech-savvy individuals. This can limit the representativeness of the sample and reduce the generalizability of the findings to broader demographic groups, particularly those with limited access to or familiarity with digital technologies. To enhance the accuracy of obesity risk assessment, future studies should incorporate additional anthropometric measurements such as waist circumference, body circumferences, and skinfold thickness

to get more precise information for the identification of obesity risk factors. Moreover, the current study focus on meal patterns and overlooks other critical dietary components, such as the intake of fruits, vegetables, and other nutrient-rich or nutrient-poor foods that are necessary to better understand the role of nutrition in obesity risk. Lastly, lifestyle factors like stress levels, which are known to influence weight gain and metabolic health, should be considered in future research to provide a more holistic understanding of obesity development. This study highlights the need for targeted workplace interventions in Malaysia that address modifiable lifestyle and occupational factors contributing to overweight and obesity.

CONCLUSION

Although the majority of workers in this study had a lower body weight status, 24.8% of the working population in Kuala Lumpur were classified as overweight or obese. This prevalence raises significant public health concern, as nearly 3 in 10 workers fell into this category. Work-

related factors such as working hours, work status, work shift, type of occupation, and type of work (sedentary or non-sedentary) were found to have no association with overweight/obesity among working adults. Conversely, certain sociodemographic characteristics (sex and marital status) and lifestyle factors (sleeping hours and meal patterns) were associated with overweight/obesity. Male, married individuals who reported sleeping less than seven hours per night and consuming breakfast fewer than 15 days per month were found to have higher odds of being overweight or obese. It is crucial to reduce the prevalence of overweight and obesity among working adults to prevent negative health consequences that would affect their work productivity and quality of life over time.

Future research should go beyond individual meals to assess overall diet quality, nutrient intake, and eating behaviors, including snacking frequency, meal timing, and consumption of processed or high-calorie foods. This would provide a more comprehensive understanding of the dietary patterns contributing to obesity among workers. Additionally, employers and health authorities can utilize these findings by implementing workplace wellness programs that emphasize the importance of nutritious meals, healthy sleep habits, and implement stress management strategies among workers. These initiatives could include offering healthier meal options in the workplace, incorporating physical activity breaks, and providing educational workshops on nutrition that contribute to greater productivity and long-term well-being in the workforce.

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