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ORIGINAL ARTICLE

Sedentary Behavior, Physical Activity, and Health Behavior During The Covid-19 Pandemic In Bangkok's Office Workers

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ABSTRACT

Background. The spread of COVID-19 has several impacts on health behavior. **Objectives.** This study was to study changes in health behaviors and factors influencing the health behaviors of office workers (OW) living in Bangkok during the Covid-19 pandemic. **Methods.** The online survey was designed to collect data on physical activity (PA), sedentary behavior (SB), stress, healthy food consumption, and sleep quality from 494 OW. Multinomial logistic regression was used to determine the factors influencing health behaviors due to the pandemic. **Results.** During the pandemic, OW reported having good health, healthy food consumption, good sleep quality, and moderate PA ($p < 0.05$); but their stress and SB were increased ($p < 0.05$). Undergraduate OW reported being 4 times healthier than those with postgraduate education (OR = 4.30). Those with bachelor's degrees reported 3 times less stress than OW with postgraduate degrees (OR = 3.54). The PA of OW who earn 20,000-30,000 Baht/month was 3 times lower compared to higher earners (OR = 3.11). Younger and female OW had 2 times increase in SB (OR = 2.01 and 2.30, respectively). If returned to normal, OW wants to work as a hybrid, be more physically active, eat a nutritious diet, put greater emphasis on sleep and reduce SB. **Conclusions.** Changes in health behaviors as a result of an epidemic depend on several factors, including age, education, and accommodation. After the pandemic, Bangkok OW increased its desire to take care of its health.

KEYWORDS: ***Sedentary Behavior, Physical Activity, Health Behavior, Office Workers, COVID-19.***

INTRODUCTION

To prevent the spread of COVID-19, the World Health Organization has encouraged people to reduce their exposure to risk factors (1). However, it has several negative health consequences, including lack of physical activity (PA) and increased sedentary behavior (SB) (2). People who lived in townhouses had lower levels of PA and took fewer steps than those who lived in single-family homes (3). They tended to consume more food than usual, by eating more snacks and unhealthy meals (4). However, people tended to consume more vegetables, fruits, herbs, and vitamins (5). The COVID-19 pandemic also affected people's sleep as people experienced anxiety and depression (6). Young workers experienced more stress, anxiety, and depression than the elderly (7). Pieces of evidence suggest that single people had more PA than married

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people (6); but, single and more educated persons were more sedentary than married or less educated people (8). Married women who lived in urban areas, had a high level of education, had several family members, and used social media had higher stress, anxiety, and depression (9). People with low incomes, females, and minorities seemed to be affected by the spread of the disease, whether due to the impact on the economy, mental health problems, or the fact that there were more infections in these groups than in people with higher incomes (10).

In general, office workers had health issues from the nature of their profession, which causes them to exhibit excessive SB, do insufficient PA (11), and experience stress that could affect food intake and sleep quality (12). When the outbreak began, actions taken by the government to combat the pandemic had a significant impact on aspects of the health of office workers (13). The pandemic and quarantine might influence how individuals behaved, they did more activities through online platforms and less traveled away from home (14). People created work-life balance (15). However, changing health behaviors after the pandemic also has an impact on people's health due to the increased risk of developing health problems (16). Therefore, preparing for future behavioral changes is vital, and it is critical for the sectors engaged in establishing appropriate health-promoting policies or arrangements to accommodate a new lifestyle that will be adopted in the future effectively. For this reason, this study was to study changes in health behaviors and factors influencing the health behaviors of office workers (OW) living in Bangkok during the Covid-19 pandemic.

MATERIALS AND METHODS

Study design, and participants. This study used the survey research method by selecting a specific sample group (Purposive sampling) and using a developed questionnaire on the health behavior changes in entering a new lifestyle era. The data was collected online by using a Google Form from February-April 2022, which was the period when Thailand had the highest number of infected people since the first outbreak.

The participants were 494 office workers living in Bangkok. The number was calculated using Cochran's formula (17) with a confidence level of 95 percent and the error level of 5 percent. The number of the sample, as calculated, was 385 people; however, that number was increased by 30% to 494 people to account for incomplete survey responses. The participants were required to meet the following inclusion criteria: (a) be an office worker aged between 22 to 45 years over, (b) work at least eight hours a day, five days a week, and (c) live in Bangkok. This research protocol was approved by The Ethics Review Committee for Research Involving Human Research Subjects, Health Science Group, Chulalongkorn University (CoA No. 043/2022)

Instruments and Procedures. The questionnaire, developed by the researchers, was used on office workers in the online collection. The closed-ended questions, consisting of checklist questions (CLQ) and rating scale (RS) questions in four parts as follows: general information, health information, health behavior changes due to the spread of COVID-19, and the tendency to do PA and SB in entering a new lifestyle era. There were a total of 45 items. For example, how healthy were you during the epidemic compared to normal? During the epidemic, how much PA did you do compare with normal? If the situation returns to normal, how much PA will you do? The questionnaire had a Cronbach's Alpha value of 0.70. The results of the content validity analysis of the whole questionnaire were 60% or higher, and the consistency was between 0.66 and 1.00.

Data analysis. The statistical data were analyzed by using the Statistical Package for Social Sciences: SPSS for Windows 28.0.1. Descriptive statistics and a dependent samples t-test were used. Multinomial logistic regression was used to determine which factors were associated with changing health behaviors due to the pandemic. The fully adjusted models were mutually adjusted for the other factors (gender, age, education, income, marital status, type of residence, and the number of people living together). P-value was set at <0.05 and the odds ratio (OR) was reported.

RESULTS

Participants aged 28.82 (±6.4) years, weight 57.65 (±11.99) kg., height 166.85 (±8.54) cm., and other participant's characteristics and the changes of body weight and waist circumference during the COVID-19 pandemic are shown in Table 1 and 2.

Table 1. Participant characteristics among a sample of office workers residing in Bangkok during the COVID-19 pandemic.

Characteristic	N (%)
Total	494 (100)
Gender	
Male	199 (40.3)
Female	295 (59.7)
Status	
Single	328 (66.4)
Married	69 (14.0)
Living together	59 (11.9)
separated	19 (3.8)
Widowed/ Divorce	7 (1.4)
Missing	12 (2.4)
Educational status	
Under bachelor's degree	87 (17.6)
Bachelor's degree	349 (70.6)
Postgraduate	58 (11.7)
Income	
١٠,٢٠ – ٠٠١, ٠٠٠Bath	198 (40.1)
20,001 – 30,000 Bath	197 (39.9)
30,001 – 40,000 Bath	61 (12.3)
40,001 – 50,000 Bath	15 (3.0)
50,001 Bath or more	23 (4.7)
Residence types	
Single-family house	183 (37.0)
Townhouse	77 (15.6)
Condominium/Apartment	122 (24.7)
Dormitory	112 (22.7)
Living member	
Alone	105 (21.3)
2 -4 person	306 (61.9)
5 people or more	60 (12.1)
Missing	23 (4.7)
Disease	
None	314 (63.6)
Yes (i.e., hypertension, diabetes, allergy, migraine)	180 (36.4)

Table 2. Changes in weight and waist circumference.

Body weight	n (%)	Mean±SD (kg.)
Stayed the same	286 (57.9)	
Decreased	62 (12.6)	6.87±15.13
Increased	110 (22.3)	5.87±9.95
Don't know	36 (7.3)	
Waist circumference		
Stayed the same	211 (42.7)	
Decreased	41 (8.3)	3.93±6.39
Increased	76 (15.4)	4.70±4.14
Don't know	166 (33.6)	

Abbreviation: SD, standard deviation.

Changes in health behaviors from the COVID-19 pandemic. Compared to normal, office workers reported that their overall health was at a good level. They took care of their health by eating healthily, exercising, or doing PA. However, they experienced high levels of stress. They had moderate levels of PA. Workers increased their PA because of their health concerns. They exercised by following videos on online media such as YouTube, Facebook, and TikTok. However, a high level of SB was reported by office workers. The main reason was that they had to work in front of the screen all day. Office workers also reported that they had a healthier diet by eating more fruits and vegetables. They cooked for themselves and ordered ready-to-eat food online from restaurants. Most office workers had good sleep quality although some reported sleep problems, such as insomnia.

Changes in health behaviors during the COVID-19 epidemic. Changes in overall health during the COVID-19 epidemic were related to age, education, type of residence, and the number of people living together. Office workers aged 18-35 (young adults) reported overall health which was twice as good as that of those aged 36-55 years (OR = 2.40). Those with an undergraduate education reported overall health which was four times better than that of those with postgraduate education (OR = 4.30). People who lived in detached houses (OR = 2.13) and townhouses (OR = 2.43) both reported their health was twice as bad as that of those who lived in dorms. Additionally, office workers who lived with 2-4 people reported bad health twice as much as those who lived with five or more people (OR = 2.40).

Changes in stress during the COVID-19 epidemic were also related to education level and status ($p < 0.05$). Office workers with a bachelor's degree reported having three times less stress than those with a qualification higher than a bachelor's degree (OR = 3.54). Single people, married people, and couples living together were reported to have 5, 7, and 8 times less stress, respectively, than those who were widowed or divorced (OR = -5.22), (OR = -. 7.93), (OR = -6.84).

Income and type of residence were found to be related to PA changes during the COVID- 19 pandemic. Office workers whose income was in the range of 20,000-30,000 baht reported a three-fold decrease in PA compared to office workers earning 50,001 baht or more (OR = 3.11). Those who lived in single-family homes and townhouses both reported a two-fold decrease in PA compared to those who lived in dorms (OR = 2.50) and OR = 2.14).

There was a correlation between changes in SB due to the occurrence of COVID-19 and sex and age. Female office workers reported a two-fold increase in SB compared with males (OR = 2.01), and a statistically significant two-fold increase in SB compared with office workers aged 36-55 years (OR = 2.30).

Healthy food consumption during the COVID-19 pandemic seems to be influenced by the type of accommodation. Office workers living in single-family homes and apartments reported consuming three times less and twice as many healthy foods, respectively, as those who lived in dorms (OR = 2.57) and OR = 2.40).

The level of education and type of residence was noted to be the causing factor of the changes in sleep quality. Office workers with a bachelor's degree reported having better sleep quality than those with a postgraduate degree (OR = 2.16). Office workers living in single-family homes (OR = 2.16) and townhouses (OR = 4.71) reported two and four times worse sleep quality, respectively, compared to dorm residents (Table 3).

Trends in health behavior change in entering a new lifestyle era. If the COVID-19 situation is resolved, most office workers reported that they will live a new lifestyle such as working in a hybrid. The top 3 activities that workers expected to remain were spending time online for entertainment, shopping, learning; exercising at home by themselves, and using sanitizing gel all the time. Most workers wanted to go out for activities and would like to have a high level of PA and a moderate level of SB. Most workers preferred to exercise at home by using exercise videos or online media. They also would like to consume healthier food by cooking for themselves. They would pay more attention to sleep by going to bed early.

The differences in health behavior between the COVID-19 pandemic era and the new lifestyle era. If the situation returned to normal, office workers would like to do more PA (5.89±1.97 vs. 7.22±1.69), consume healthy food (6.52±1.77 vs. 7.17±1.66), increase their sleep quality (6.57±1.80 vs. 5.38±1.89), and decrease SB (6.23±1.90 vs. 7.40±1.78) in a statistically significant manner, at a p-value = 0.01.

DISCUSSION

Office workers changed their health behaviors due to the spread of COVID-19. Overall health during the pandemic was good compared to normal due to taking care of diet, exercise, or PA. In particular, office workers aged 18-35 years with a level of education below a bachelor's degree, and living in a dormitory, reported better health; this was predicted by the higher number of problems they had to handle at work along with living a normal life, compared with older people who have a higher education or accommodation that is more comfortable to live. Bangkok is a city with traffic congestion, flooding, and PM2.5 dust pollution as well as problems with the high cost of living, and other problems (18) that could affect the health of people living in the area. The decrease in the number of office workers leaving the house and the increase in the time such workers spend at home and online may allow office workers to increase the work-life balance in their lives (15). Office workers with a postgraduate education or widowed or divorced experienced more stress than other groups. This could be because many families or individuals have to balance working from home with added responsibilities.

Table 3. Relative odds of changing health behaviors from the COVID-١٩epidemic compared to age, sex, education level, income, status, type of residence, and the number of members living together among a sample of Thailand office workers living in Bangkok.

	Relative Odds of Changing Health Behavior, OR (95% CI).											
	General Health		Stressed		PA		Sedentary behavior		Eating healthy food		Sleep Quality	
	Poor	Good	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase	Decrease	Increase
Gender												
Female	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Male	0.73 (0.47-1.32)	1.36 (0.88-2.11)	-0.84 (0.48 - 1.47)	1.19 (0.68-2.06)	1.01 (.67-1.52)	-0.99 (0.66 - 1.48)	- 0.50* (0.32-0.76)	2.01* (1.30-3.11)	1.11 (0.70-1.74)	-0.90 (0.57 - 1.41)	1.19 (0.78-1.82)	-0.84 (0.55 - 1.28)

Age												
36-55	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
18–35	0.42* (0.20-0.87)	2.40* (1.14-4.91)	-0.34 (0.11 - 1.12)	2.90 (0.90-9.41)	-0.88 (0.47-1.65)	1.13 (0.60 - 2.11)	- 0.43* (0.21-0.90)	2.30* (1.11-4.73)	-0.48 (0.23-1.02)	2.09 (0.98 - 4.42)	-0.92 (0.47-1.79)	1.08 (0.56 - 2.11)
Education												
Postgraduate	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Under bachelor's degree	- 0.23* (.90-0.61)	4.30* (1.62-11.22)	-0.99 (0.35 - 2.75)	1.01 (0.36-2.82)	-0.56 (0.24-1.31)	1.79 (0.76 - 4.19)	-0.73 (0.28-1.86)	1.36 (0.53-3.49)	-0.61 (0.52-1.52)	1.61 (0.66 - 3.97)	1.08 (0.45-2.59)	-0.92 (0.39 - 2.21)
Bachelor's degree	-0.68 (0.67-0.38)	1.48 (0.67-3.25)	3.54* (1.50 - 8.38)	- 0.28* (0.12-0.70)	1.33 (0.68-2.60)	-0.75 (0.38 - 1.47)	1.40 (0.64-3.03)	-0.71 (0.33-1.54)	1.93 (0.94-3.99)	-0.52 (0.25 - 1.06)	2.16* (1.08-4.31)	- 0.46* (0.23 - 0.93)
Income												
50,001 Bath or more	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
10,001 – 20,000 Bath	1.11 (0.31-3.94)	-0.90 (0.25-3.20)	-0.39 (0.07 - 2.28)	2.56 (0.44-15.03)	2.38 (0.78-7.20)	-0.42 (0.14 - 1.27)	-0.39 (0.07-2.06)	2.54 (0.48-13.34)	1.23 (0.36-4.22)	-0.81 (0.24 - 2.78)	-0.73 (0.23-2.36)	1.35 (0.42 - 4.29)
20,001 – 30,000 Bath	1.10 (0.32-3.56)	-0.93 (0.28-3.10)	-0.56 (0.10 - 3.11)	1.78 (0.32-9.85)	3.11* (1.09-8.88)	- 0.32* (0.11 -0.91	-0.38 (0.07-1.93)	2.58 (0.52-12.84)	1.35 (0.42-4.33)	-0.74 (0.23 - 2.38)	1.10 (0.37-3.31)	-0.90 (0.30 - 2.69)
30,001 – 40,000 Bath	-0.85 (0.24-3.04)	1.17 (0.32-4.17)	-0.60 (0.09 - 3.58)	1.72 (0.28-10.64)	2.06 (0.68-6.21)	-0.48 (0.16 - 1.46)	-0.47 (0.09-2.48)	2.10 (0.40-10.99)	-0.98 (0.29-3.32)	1.02 (0.30 - 3.48)	1.39 (0.44-4.40)	-0.72 (0.23 - 2.29)
40,001 – 50,000 Bath	3.40 (0.31-36.75)	-0.29 (0.32-4.17)	-0.24 (0.02 - 2.48)	4.24 (0.40-44.78)	3.83 (0.70-20.89)	-0.26 (0.04 - 1.41)	-0.80 (0.08-7.30)	1.24 (0.13-11.38)	1.39 (0.20-9.45)	-0.71 (0.10 - 5.00)	1.81 (0.32-10.35)	-0.55 (0.10 - 3.16)
Status												
Widowed/ Divorce	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
Single	1.80 (0.27-11.90)	-0.53 (0.84-3.64)	- 5.22* (6.25 - 4.36)	7.30 (6.89-7.31)	1.24 (0.21-7.28)	-0.80 (0.13 - 4.76)	2.20 (0.30-15.76)	-0.43 (0.06-3.27)	3.53 (0.59-21.04)	-0.28 (0.05 - 1.69)	2.93 (0.46-18.65)	-0.34 (0.05 - 2.17)
Married	-0.90 (0.13-6.21)	1.11 (0.16-7.66)	-7.93 * (7.93 - 7.93)	1.85 (7.17-7.95)	1.00 (0.16-6.14)	-1.00 (0.16 - 6.11)	-0.99 (0.13-7.40)	1.01 (0.13-7.55)	2.92 (0.46-18.36)	-0.34 (0.05 - 2.15)	1.93 (0.29-12.71)	-0.52 (0.08 - 3.42)
Together	-0.50 (0.70-3.34)	2.08 (0.30-14.53)	-6.84 * (6.91 - 6.76)	1.31 (7.36-8.30)	-0.74 (0. 12-4.67)	1.34 (0.21 - 8.43)	-0.91 (0.12-6.94)	1.09 (0.14-8.32)	1.61 (0.25-10.28)	-0.62 (0.10 - 3.95)	1.25 (0.18-8.41)	-0.80 (0.12 - 5.39)
Separated	5.06 (0.54-56.45)	-0.97 (0.18-2.20)	-1.73 (1.73 - 1.73)	1.50 (7.36-8.30)	2.44 (0.30-20.10)	-0.40 (0.50 - 3.35)	-0.53 (0.06-4.79)	1.87 (0.20-16.69)	3.69 (0.44-31.18)	-0.27 (0.03 - 2.28)	5.77 (0.60-55.47)	-0.17 (0.02 - 1.66)
Living types												
Dormitory	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
House	2.13* (1.12-4.08)	- 0.47* (0.24-0.90)	-0.54 (0.23 - 1.27)	1.83 (0.79-4.28)	2.50* (1.36-4.61)	- 0.39* (0.21 - 8.43)	1.07 (0.56-2.03)	-0.93 (0.50-1.77)	2.57* (1.34-4.93)	- 0.39* (0.20 --.74)	2.16* (1.16-3.99)	- 0.46* (0.25 - 0.86)
Townhouse/Townhome	2.43* (1.08-5.50)	- 0.41* (0.18-0.92)	-0.68 (0.23 - 1.96)	1.47 (0.51-4.25)	2.14* (1.03-4.43)	- 0.46* (0.22 - 0.96)	1.76 (0.79-3.91)	-0.57 (0.26-1.26)	2.17 (0.99-4.78)	-0.46 (0.02 - 1.00)	4.71* (2.10-10.58)	- 0.21* (0.09 - 0.48)
Condominium/Apartment	1.04 (0.55-2.00)	-0.95 (0.50-1.81)	-0.62 (0.26	1.60 (0.67-3.83)	1.44 (0.80-2.64)	-0.70 (0.38	1.47 (0.75-2.89)	-0.68 (0.35-1.33)	*2.40 (1.24-4.65)	- 0.42* (0.21	1.56 (0.84-2.92)	- 0.64 (0.34

			- 1.50)			- 1.28)				- 0.80)		- 1.19)
Living member												
5 or more	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.	ref.
1	1.21 (0.54- 2.80)	-0.82 (0.40- 1.90)	-0.46 (0.15 - 1.47)	2.16 (0.68- 6.83)	1.56 (0.71- 3.41)	0.64 (0.29 - 1.40)	-0.57 (0.23- 1.42)	1.74 (0.70- 4.33)	-0.72 (0.30- 1.72)	1.38 (0.58 - 3.29)	1.29 (0.57- 2.90)	-0.77 (0.34 - 1.74)
2-4	2.40* (1.23- 4.54)	- 0.42* (0.22- 0.81)	-0.57 (0.23 - 1.42)	1.74 (0.70- 4.33)	1.56 (0.85- 2.86)	0.64 (0.35 - 1.17)	-0.62 (0.30- 1.27)	1.60 (0.79- 3.27)	1.04 (0.52- 2.08)	-0.95 (0.48 - 1.89)	1.14 (0.61- 2.16)	-0.87 (0.46 - 1.64)

Abbreviation: CI, confidence interval; OR, odds ratio; * significant at the .05 level.

The PA of office workers during the epidemic was moderate. Workers with high salaries and who lived in dormitories were more physically active than other groups due to taking care of their health, doing housework, and having more free time to exercise. This result is supported by a previous study (19). Office workers exhibited more SB during the pandemic which is consistent with other studies (2, 20). The increase in SB is associated with an increase in social distancing (21), especially among female office workers and office workers aged 18-35 years. They had to work in front of a screen all day, spent more time online entertainment, and felt stressed and tired which made them not want to move.

Office workers had a healthy diet during the epidemic. Workers who live in dormitories eat more fruits and vegetables, took dietary supplements, and purchased healthier food. This is similar to other studies (5, 22). They had good sleep quality, but office workers with bachelor's degrees living in single houses and townhouses were found to have worse sleep quality for many reasons such as insomnia, stress, and anxiety. This is consistent with a previous study (22).

Office workers wanted to live a new way of life. They want to work at home and in the workplace (hybrid). Because of the pandemic, people created a work-life balance (15). Also, office workers want to do more PA by doing many kinds of exercises. Video exercises and online media and an online fitness consultant were exercise tools. In addition, they desired to consume more healthy food and wanted to pay more attention to sleep by going to bed early and reducing their SB.

CONCLUSION

The COVID-19 pandemic has affected the health behaviors of office workers in many aspects, such as overall health, stress, PA, SB, food intake, and sleep. They made positive and negative changes in their health behaviors. Overall health, PA, healthy food consumption, and sleep quality were improved, compared to before the pandemic. However, office workers experienced increased levels of stress and SB. If the situation returns to normal, they want to live a new way of life.

The study limitation is the data of this study were collected from office workers living in Bangkok during the period of the highest pandemic in Thailand. Therefore, the data cannot be referenced national population.

APPLICABLE REMARKS

- During the pandemic, officer workers improved overall health, PA, healthy food consumption, and sleep quality, compared to before the pandemic. However, office workers experienced increased levels of stress and SB.
- The pandemic of COVID-19 provided office workers with more time to focus on and care about their health. Therefore, it is a good opportunity to encourage agencies or stakeholders to support and promote both health policy and a health-friendly environment to facilitate better health among returning office workers than during or before the pandemic of COVID-19.

AUTHORS' CONTRIBUTIONS

Study Concept and Design: Raweewan Maphong. *Acquisition of data:* Raweewan Maphong. *Analysis and interpretation of data:* Raweewan Maphong. *Drafting of the manuscript:* Raweewan Maphong. *Critical revision of the manuscript for important information*: Sonthaya Sriramatr. *Statistical analysis:* Raweewan Maphong and Sonthaya Sriramatr. *Administrative, technical, and material support:* Sonthaya Sriramatr. *Study supervision:* Sonthaya Sriramatr.

CONFLICT OF INTEREST

This manuscript contains no material that could be considered a conflict of interest by the authors.

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REFERENCES

1. World Health Organization. Listings of WHO's response to COVID-19 2020 [updated 28 December 2020. Available from: https://www.who.int/news/item/29-06-2020-covidtimeline.
2. Sallis R, Young DR, Tartof SY, Sallis JF, Sall J, Li Q, et al. Physical inactivity is associated with a higher risk for severe COVID-19 outcomes: a study in 48 440 adult patients. British journal of sports medicine. 2021. [doi:10.2139/ssrn.3770671]
3. Browne RAV, Cabral LLP, Freire YA, Macêdo GAD, Oliveira GTA, Vivas A, et al. Housing type is associated with objectively measured changes in movement behavior during the COVID-19 pandemic in older adults with hypertension: An exploratory study. Archives of gerontology and geriatrics. 2021;94:104354. [doi:10.1016/j.archger.2021.104354] [pmid:33516977]
4. Dey S, Dey I. Health concerns during lockdown: an observational study among adults of West Bengal. Int J Commun Med Public Health. 2020;7(9):3674-8. [doi:10.18203/2394-6040.ijcmph20203942]
5. Narayanan L, Pandit M, Basu S, Karmakar A, Bidhan V, Kumar H, et al. Impact of lockdown due to COVID-19 outbreak: lifestyle changes and public health concerns in India. 2020. [doi:10.20944/preprints202006.0129.v1]
6. Puciato D, Rozpara M. Physical activity and socio-economic status of single and married urban adults: a cross-sectional study. PeerJ. 2021;9:e12466. [doi:10.7717/peerj.12466] [pmid:34820193]
7. Huang Y, Zhao N. Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. Psychiatry research. 2020;288:112954. [doi:10.1016/j.psychres.2020.112954] [pmid:32325383]
8. Kitayama A, Koohsari MJ, Ishii K, Shibata A, Oka K. Sedentary time in a nationally representative sample of adults in Japan: Prevalence and sociodemographic correlates. Preventive Medicine Reports. 2021:101439. [doi:10.1016/j.pmedr.2021.101439] [pmid:34178590]
9. Sagar SK, Nusrat F, Rashid MU, Ghosh P, Sultana M, Ahsan A, et al. Mental health status of married women during COVID-19 pandemic in Bangladesh: A cross-sectional study. Heliyon. 2022:e08785. [doi:10.1016/j.heliyon.2022.e08785] [pmid:35071804]
10. Little C, Alsen M, Barlow J, Naymagon L, Tremblay D, Genden E, et al. The impact of socioeconomic status on the clinical outcomes of COVID-19; a retrospective cohort study. Journal of community health. 2021:1-9. [doi:10.1007/s10900-020-00944-3] [pmid:33387149]
11. Owen N, Sparling PB, Healy GN, Dunstan DW, Matthews CE, editors. Sedentary behavior: emerging evidence for a new health risk. Mayo Clinic Proceedings; 2010: Elsevier. [doi:10.4065/mcp.2010.0444] [pmid:21123641]
12. Park S, Sung E. 'You gotta have something to chew on': perceptions of stress-induced eating and weight gain among office workers in South Korea. Public Health Nutrition. 2021;24(3):499-511. [doi:10.1017/S1368980020000890] [pmid:32624055]
13. Ammar A, Brach M, Trabelsi K, Chtourou H, Boukhris O, Masmoudi L, et al. Effects of COVID-19 home confinement on eating behaviour and physical activity: results of the ECLB-COVID19 international online survey. Nutrients. 2020;12(6):1583. [doi:10.3390/nu12061583] [pmid:32481594]
14. Kohli S, Timelin B, Fabius V, Veranen SM. How COVID-19 is changing consumer behavior-now and forever. McKinsey&Company; 2020.
15. Kane P. The Great Resignation Is Here, and It's RealPeople are quitting their jobs at a higher than usual rate. What can businesses do to keep their workers? 2021 [Available from: https://www.inc.com/phillip-kane/the-great-resignation-is-here-its-real.html.
16. Word Health Organization. Physical activity 2020 [Available from: https://www.who.int/news-room/fact-sheets/detail/physical-activity.
17. Cochran WG. Sampling techniques: John Wiley & Sons; 2007.
18. Salika. 10 problems in Bangkok that the people want the new governor to urgently solve 2022 [Available from: https://www.salika.co/2022/04/28/10-problems-bangkok-tdri/.

19. Gimenez-Nadal JI, Molina JA, Velilla J. The commuting behavior of workers in the United States: differences between the employed and the self-employed. Journal of transport geography. 2018;66:19-29. [**doi**:10.1016/j.jtrangeo.2017.10.011]
20. Chen P, Mao L, Nassis GP, Harmer P, Ainsworth BE, Li F. Coronavirus disease (COVID-19): The need to maintain regular physical activity while taking precautions. Journal of sport and health science. 2020;9(2):103. [**doi**:10.1016/j.jshs.2020.02.001] [**pmid**:32099716]
21. Elovainio M, Hakulinen C, Pulkki-Råback L, Virtanen M, Josefsson K, Jokela M, et al. Contribution of risk factors to excess mortality in isolated and lonely individuals: an analysis of data from the UK Biobank cohort study. The Lancet Public Health. 2017;2(6):e260-e6. [**doi**:10.1016/S2468-2667(17)30075-0] [**pmid**:28626828]
22. Paul G, Sharma S, Singh G, Singh G, Sharma S, Paul BS, et al. Assessment of knowledge gaps and perceptions about COVID-19 among health care workers and general public-national cross-sectional study. Journal of Anaesthesiology, Clinical Pharmacology. 2020;36(3):337. [**doi**:10.4103/joacp.JOACP_326_20] [**pmid**:33487900]