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Immediate Effect of Working From Home During the COVID-19 Pandemic on the Incidence of Non-Specific Neck and Low Back Pain: A Prospective Cohort Study

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Introduction

The end of 2019 witnessed the emergence of an infectious coronavirus disease (COVID-19), and Thailand has published guidelines to deal with this pandemic, including social distancing and working from home. The adverse effects of working from home on a number of biopsychosocial conditions may contribute to the development of musculoskeletal symptoms.[1-3] At the time of the pandemic, a 3-arm cluster-randomized controlled trial with 12-month follow-up was being conducted among office workers in Bangkok[4] and some participants were asked to work from home. This study aimed to compare the incidence of neck and low back pain during the period of working from home to the normal working situation as well as to explore working-from-home-related risk factors for neck and low-back pain.

Methods

This study is a prospective cohort study in a convenience sample of healthy workers. Detailed descriptions of the research methodology are published elsewhere.[4] The study was approved by the University Human Ethics Committee (COA No. 148/2562).

At the start of the 3-arm cluster-randomized controlled trial (June 2019), a self-administered questionnaire was used to gather all measurements and a diary was used to record the incidence of neck and low back pain during follow-up. The COVID-19 outbreak occurred in March 2020. Workplaces asked their employees to work from home till the end of June 2020. An electronic questionnaire to gather data on work-from-home-related factors was sent to participants to fill out during the period of March to June 2020.

Statistical Analyses

There was no missing data in the present study. The person-time incidence of neck and low back pain, defined as the number of new cases of neck and low back pain over a specified time interval divided by the total number of person-years of observation over that time frame, were calculated to compare the incidences between the periods.

To examine the effects of working-from-home-related risk factors on neck and low back pain, 2 regression models were performed for the outcomes of 4-month incidence of neck and low back pain, respectively. Adjusted ORs and 95% confidence intervals (CIs) for the final models were reported. All statistical analyses were performed using SPSS for Windows, version 23.0 (SPSS Inc., Chicago, IL, USA). The level of statistical significance was set at the 5%.

Results

At the start of the COVID-19 outbreak (March 2020), 180 office workers were contacted. Most participants (123 from

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Table 1. Person-Year Incidence of Neck and Low Back Pain During Pre-COVID-19 and COVID-19 Periods, With Reported Severity and Disability Levels.

Body regions	Incidence Cases/ 100 person-year	VAS M (SD)	NDI/RMDQ M (SD)
Neck pain			
Pre-COVID-19 period	29.5	4.3 (1.4)	6.9 (3.6)
COVID-19 period	19.7	3.8 (1.4)	6.6 (2.9)
P value		.198	.707
Back pain			
Pre-COVID-19 period	20.2	4.4 (1.8)	2.3 (1.9)
COVID-19 period	12.7	4.2 (1.3)	2.1 (2.3)
P value		.668	.800

Abbreviations: NDI, Neck Disability Index; RMDQ, Roland-Morris Disability Questionnaire; VAS, visual analogue scale.

180; 68%) worked from home during the outbreak (March-June 2020). Those reported working from home was mostly middle-aged females with average body mass index (BMI) typical for Asians. Most participants (78%) reported that they worked from home ≤3 days per week. Participants reported slightly longer working duration when working from home (8.2 ± 1.5 hours per day) compared to when working at the office (7.9 ± 0.8 hours per day).

The person-year incidence of neck and low back pain during the COVID-19 period was less than that during the pre-COVID-19 period (Table 1). Pain severity and disability level did not differ significantly between the pre-COVID-19 and COVID-19 periods ($P > .05$).

Number of days working from home was significantly associated with the incidence of neck pain. Group assignment and number of days working from home were significantly associated with the incidence of low back pain (Table 2).

Discussion

This study is the first study to prospectively follow healthy workers and examine the impact of working from home during the COVID-19 pandemic on the incidence of neck and low back pain. The results showed that the person-year incidence rates of neck and low back pain during the COVID-19 outbreak were lower than in the pre-outbreak period. One possible explanation may relate to the distinctive advantage of working from home, that is, creating the sense of comfort and relaxation for workers. Our sample reported a more flexible schedule during the day and no need to commute between home and office (about 1.5 hours per day). Full-time Swedish workers had longer duration of sleep while working from home than during the period of working at the office, and this behavioral change may have health benefits.[5]

The number of days working from home was significantly and positively correlated to the 4-month incidence of neck and low back pain. About half of our participants working from home reported their workstations at home as being inappropriate for work. A makeshift workstation at home has been found to be inappropriate with respect to ergonomics and participants reported increased discomfort level in various body parts.[6] Working from home during the outbreak also relates to a significant reduction in the amount of performed physical activity compared to before the outbreak.[7,8] Working with a poorly designed workstation at home and having less physical active behavior for an extended period of time may lead to cumulative trauma exposure, later leading to neck and low back pain.

Our findings suggest that prevention of neck and low back pain among those who work from home should at least focus on advising workers to balance the number of days working from home and office. Reducing the number of days working from home by returning to work at the office for some other days during the week, if possible, may decrease the risk of neck and low back pain.

Two methodological limitations are noted. First, the present study was conducted in a convenience sample of healthy office workers and this restricts the external validity of this study. Second, the association between work-from-home-related risk factors and musculoskeletal pain was based on cross-sectional data. It is impossible to establish a causal relationship between exposure and outcome.

Conclusion

New onset neck and low back pain during the outbreak period decreased compared to the pre-outbreak period. The number of days working from home was positively associated with the incidence of neck and low back pain. Shifting to work from home for a short period seems to have health benefits, but a prolonged period of working from home may lead to the occurrence of neck and low back pain.

Table 2. 4-Month Incidence and Adjusted Odds Ratio (OR_{adj}) With 95% Confidence Intervals (95% CI) of Neck and Low Back Pain With Respect to Working From Home Related Risk Factors in the Final Model.

Factors	*n*	4-month incidence *n* (%)	OR_{adj}	95% CI	*P* value
Neck pain[a]					
Age	81		1.03	[0.92, 1.15]	.58
Gender					
Female	62	12 (19)	1.00		
Male	19	4 (21)	0.93	[0.20, 4.22]	.92
Group assignment					
Control group	39	10 (26)	1.00		
Intervention group	42	6 (14)	0.30	[0.07, 1.22]	.09
Number of days working from home per week	81		1.84	[1.04, 3.26]	.03*
Working hours per day (a comparison between home and office)					
Same	52	8 (15)	1.00		
Different	29	8 (27)	2.90	[0.71, 11.87]	.14
Workload (a comparison between home and office)					
Same	32	6 (19)	1.00		
Different	49	10 (20)	0.96	[0.27, 3.45]	.95
Traveling time from home to office	81		1.00	[0.99, 1.01]	.61
Ergonomics of workstation (a comparison between home and office)					
Same	13	1 (8)	1.00		
Different	68	15 (22)	2.95	[0.31, 28.35]	.35
Psychological stress (a comparison between home and office)					
Same	65	12 (18)	1.00		
Different	16	4 (25)	1.00	[0.18, 6.05]	.97
Taking care of someone while working from home					
No	51	9 (18)	1.00		
Yes	30	7 (23)	0.80	[0.19, 3.40]	.76
Low back pain[a]					
Age	94		0.98	[0.85, 1.13]	.78
Gender					
Female	68	10 (15)	1.00		
Male	26	2 (8)	0.21	[0.03, 1.53]	.12
Group assignment					
Control group	49	10 (20)	1.00		
Intervention group	45	2 (4)	0.03	[0.00, .39]	0.01*
Number of days working from home per week	94		3.44	[1.23, 9.62]	0.02*
Working hours per day (a comparison between home and office)					
Same	60	8 (13)	1.00		
Different	34	4 (12)	0.70	[0.13, 3.68]	0.67
Workload (a comparison between home and office)					
Same	37	5 (14)	1.00		
Different	57	7 (12)	1.06	[0.23, 4.81]	0.94
Commuting time from home to office	94		1.00	[0.99, 1.01]	0.73
Ergonomics of workstation (a comparison between home and office)					
Same	16	1 (6)	1.00		
Different	78	11 (14)	6.05	[0.49, 75.50]	0.16
Psychological stress (a comparison between home and office)					
Same	74	10 (14)	1.00		
Different	20	2 (10)	0.05	[0.00, 1.43]	0.08
Taking care of someone while working from home					
No	59	6 (10)	1.00		
Yes	35	6 (17)	4.22	[0.71, 25.23]	0.11

[a]Factors included in the statistical modeling were: age, gender, control vs intervention group, and work from home related risk factors.

Author Contributions

The authors have contributed in the following ways: P.W. provided the concept/research design, data collection, data analysis and manuscript writing. N.A. contributed to the concept/research design and data collection. AvdB and P.J. contributed to the concept/research design, data analysis, and manuscript writing. All authors read and approved the final manuscript.

Declaration of Conflicting Interests

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Ethical Approval

The study was approved by the Chulalongkorn University Human Ethics Committee, Thailand (COA No. 148/2562).

Informed Consent

Informed consent was obtained from all participants.

Registry and the Registration No. of The Study/Trial.

The trial was also registered in the Thai Clinical Trials Registry (TCTR20190111002).

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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