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Occupational Health Problems and Lifestyle Changes Among Novice Working-From-Home Workers Amid the COVID-19 Pandemic

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ABSTRACT

Background: Social distancing by working-from-home is an effective measure to decrease the spread of COVID-19. However, this new work pattern could also affect the well-being of workers. Therefore, the aim of the study was to study the magnitude of occupational health problems and lifestyle changes among workers who have only recently started working from home.

Methods: A cross-sectional study was conducted using online self-administered questionnaires during the coronavirus disease 2019 pandemic in the Bangkok metropolitan area, Thailand. The participants were from any organization that allowed working from home. The demographic data including the analysis of the characteristics of working from home, the occurrence of occupational health problems, and the lifestyle changes caused by working from home were analyzed.

Results: A total of 869 workers were included as study participants. The highest prevalence of physical health problems among all workers was identified to be weight gain at a rate of 40.97% (95% confidence interval = 37.69–44.24), and the highest prevalence of psychosocial problems was identified to be cabin fever at a rate of 31.28% (95% confidence interval = 26.66–35.90%) among full-time working-from-home workers. The health effects that were significantly related to the intensity of working from home (p for trends <0.05), either positively or negatively, included body weight changes, ergonomic problems, indoor environmental problems, and psychosocial problems. Meanwhile, the lifestyle changes related to work intensity included eating pattern, sleep habits, and exercise.

Conclusions: Working from home can affect workers' well-being in various aspects. Hence, occupational health providers must prepare for risk prevention and health promotion in this "new normal" working life pattern and for future pandemics.

1. Introduction

Abrupt changes due to the swift effects of the coronavirus disease 2019 (COVID-19) pandemic hit all sectors in society worldwide, ranging from daily life activities to work formats. Before the "the new normal" became a popular catchphrase, workers spent most of their time at homes or at their workplaces. The phrase "at work" indicates a physical space, such as an office. Ongoing developments in information technology make communication more convenient and work more flexible. This new independence has transformed the role of technology at work. Furthermore, companies, communities, and organizations of all kinds have reconciled how to merge both places together by adjusting to working from home and using a work agreement with a single employer, which can be classified into two types: full-time means every weekday at home and part-time means working partly at home and partly at the office [1]. Working from home is beneficial for employees, employers, and society in terms of the economy and the environment [2,3]. Moreover, it is suitable in some unpredictable situations, such as natural disasters or epidemics [4,5].

In the first three months of 2020, the COVID-19 pandemic began. The worldwide public health policy implementation to prevent the spread of this disease in the community was social distancing or physical distancing [6]. Working from home is one measure of this prevention method, while still continuing to operate in a normal way for the benefit of businesses [7,8]. Thailand

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demonstrated good preparation and control of the public health system [9]. There were only reduced social interaction locations, without a lockdown in all cities, as in other countries, and the curfew was only enforced at night. Activities in the daytime remained the same, only with physical distancing. However, public transportation was still operational, and some places such as supermarkets in department stores, convenience stores, banks, hospitals, and so on remained open. Work systems still functioned continuously in terms of operation, but changed from a traditional work space in the office to the home. Some workplaces, such as universities, international companies, and so on, allowed employees to work from home on a full-time basis, whereas some workplaces allowed partial working from home, such as government organizations. Some jobs were not suitable for working from home, or for new- and rapid-onset changes to working from home, which were not adaptable [10], and could therefore cause health effects, result in lifestyle changes, and affect the worker's well-being [11]. However, the study of occupational health issues in terms of working from home has been rather scarce, regardless of limited studies and an interest in occupational health issues. The appearance of this unprecedented COVID-19 situation is an opportunity to investigate the health effects brought about by changing normal work life from typical workplaces to working from home. This work pattern situation may increase in the future. Therefore, the objectives of this study were as follows: (1) to identify the characteristics of working from home, the magnitude of health problems, and lifestyle or behavioral changes while working from home and (2) to study the dose–response relationship between each of the health effects and the various extents of working from home.

2. Materials and methods

This cross-sectional study was conducted during the COVID-19 outbreak in May and June 2020. The study was approved by the Srinakharinwirot University Ethical Committee (SWUEC-130-2563E) and conducted under the guidelines of the Declaration of Helsinki. An online link with an electronic form of an anonymous and self-administered questionnaire was sent to the various organizations in the Bangkok metropolitan area, Thailand, and it had the following specifications: (1) the work-from-home policy during the COVID-19 pandemic and (2) normal and regular workplaces that are conventional indoor locations, such as offices, universities, and nonmanufacturing factories. This study did not include any workers who worked in distance or carried out off-site work, those who carried out remote work, or the self-employed. Thus, the participants in the study were enrolled based on the following inclusion criteria: (1) any workers who normally worked in an office or in a building and recently changed to working from home and (2) those who responded to an invitation to take part in this study. The exclusion criteria were as follows: (1) any workers who did not continue to answer the questions after giving informed consent; (2) any workers whose workplace had a work-from-home policy, but still worked full-time in their usual workplace during the study period, for any reason; (3) the duplication of submitted data or nonreliable data, such as answering all questions in the affirmative (yes) or failing to answer any question; and (4) no new-onset working from home during the COVID-19 outbreak.

With regard to the occupational health of working-from-home project, an electronic self-administered questionnaire was developed after a review of the literature. The content validity was checked by five experts in the fields of occupational health, occupational medicine, and psychology. The item-objective congruence (IOC) of the content validity ranged from 0.8 to 1.0. After that, the test–retest reliability between the hard copy and the Google form was analyzed. The percentage of agreement ranged from 90 to 100%. The questionnaire was composed with various aspects of the study on working from home. The data used in this study were as follows: (1) demographic data, (2) the characteristics of working from home, (3) physical health and psychosocial effects, and (4) lifestyle changes while working from home. The hard copy of the questionnaire is provided in Appendix.

There were two major components in this study. First, the occupational health issues raised encompassed both physical and psychosocial health effects. The physical health effects were as follows: (1) ergonomic problems such as back, neck, or shoulder pain and upper extremity pain; (2) indoor environmental problems such as eye irritation, mucus membrane irritation, and respiratory, skin, or general neurological problems; and (3) other problems related to the working environment, working conditions, or behavior, such as body weight changes, migraine, allergy, insomnia, abdominal pain, cystitis, and presenteeism. The psychosocial health effects included isolation, anxiety from work, loss of concentration, depression, work exhaustion, burnout, family conflict, ambiguous boundaries between work and daily life, and cabin fever. All participants in this study were asked if the health effects in the questionnaire (excluding body weight changes and cabin fever) were specifically caused by new occurrences or aggravated while working at home. Furthermore, the occupational stresses while working from home and with previous working life were measured using a visual analog scale with ten scales. The satisfaction about intentions to choose working from home in the future was self-rated as a score out of five. The second aspect of the study focused on lifestyle changes, and the participating workers were asked to make a self-comparison between the working-from-home period and working at a regular workplace before the COVID-19 outbreak period. The lifestyle section was concerned with the following behavior: (1) eating patterns in quantitative and qualitative terms; (2) sleep patterns in terms of go-to-bed and wake-up times and the duration of sleep; (3) body movements, in terms of exercise and physical activity; and (4) other behaviors, such as family interactions and engaging the mind with activities, e.g., praying, meditation, and reading dharma book.

All analyses were performed using Statistical Package for Social Science version 22.0 (IBM Corp, Armonk, NY, USA). The descriptive statistics were presented as frequency, ratio, and proportion in percentage or mean $\pm$ standard deviation, depending on the characteristics of the data. In terms of the inferential statistics, the estimation of the magnitude of each of the health effects and lifestyle changes was presented as a prevalence rate with 95% confidence intervals (CIs). The trend comparisons between the occurrence of occupational health problems or lifestyle changes and working-from-home intensity were carried out using the Chi-square test for trends. The significance level was considered at a p-value <0.05.

3. Results

The total number of participants entered on the online Google form included 1,011 people, but only 989 people accepted the given information, yielding an acceptance rate of 97.8%. From the accepted data set, 4, 11, 84, and 21 data were excluded owing to duplication, unreliable or missing data, not working from home, and no new-onset working from home during the study period, respectively. Finally, 869 recent working-from-home workers were included for analysis in this study. In terms of work patterns of the participants in this study, “full-time” means working every weekday at home and “part-time” means working partly at home and partly at the office/usual workplace.

Most of the study participants were femalewomen, middle-aged with university education, and operational workers with <10 years work experience. They mostly lived with families of more than one generation, usually in single-occupancy housing. In terms of the characteristics of working from home, they mostly worked in the common room, starting work at the same time as required by their office hours and with break times at their preference. The major piece of equipment for working from home was a notebook. Various problems were found while working from home, such as approximately one-fifth of them did not work on a table and chair, two-fifths lacked a private work station, 60% had Internet problems, and 9% took care of their children while working. The ratio of work intensity between working from home full-time and part-time was 45:55, with an average of 3.78 ± 1.31 days per week. The details of the demographic data and the working-from-home characteristics of the participants in this study are shown in Table 1.

The most common occupational health problems that occurred while working from home are as follows: the top three most prevalent physical health problems were weight gain, neck and shoulder pain, and back pain. The most prevalent psychosocial health problem is cabin fever, characterized by distressing and claustrophobic irritability, or restlessness experienced when working and staying at home all week [12], ambiguity between work and daily life, and anxiety from work.

The occurrence of the health problem pattern was mostly new onset rather than due to aggravation while working from home. The health effects had significantly similar responses with regard to the intensity of working from home as follows: body weight changes, such as weight gain ($p = 0.013$) and weight loss ($p = 0.001$); ergonomic problems, such as back ($p = 0.016$) and neck and shoulder pain ($p = 0.001$); indoor environmental problems, such as eye symptoms ($p = 0.035$) and general neurological symptoms ($p = 0.015$); and psychosocial problems, such as isolation ($p = 0.016$), depression ($p = 0.001$), work exhaustion ($p = 0.015$), and burnout ($p = 0026$). The details with regard to these patterns, the prevalence of health effects, and the dose–response relationship with the intensity of working from home are shown in Table 2. Moreover, when categorizing intensity of working from home into

Table 1
The demographic data and the working-from-home characteristics of the study participants who had recently started working from home (n = 869)

Characteristics	n (%)	Characteristics	n (%)
Gender		**Type of accommodation**	
Male	252 (29.0)	Single house	407 (46.8)
Female	617 (71.0)	Townhouse, commercial building	219 (25.2)
Age group (years), $\overline{X}$ ± SD = 39.73 ± 9.82		Condominium	140 (16.1)
<30	149 (17.2)	Apartment, flat	103 (11.9)
30–40	328 (37.7)	**Working areas**	
41–50	251 (28.9)	Common room	448 (51.5)
>50	141 (16.2)	Working room	79 (9.1)
Educational level		Bedroom	277 (31.9)
Less than a bachelor's degree	24 (2.8)	Dining room, kitchen, others	65 (7.5)
Bachelor's degree	404 (46.5)	**Starting work time**	
Higher than a bachelor's degree	441 (50.7)	The same as office hours	464 (53.4)
Marital status		Different from office hours	405 (46.6)
Single	508 (58.5)	**Break time**	
Married or living together	329 (37.8)	Regular breaks	146 (16.8)
Divorced or widowed	32 (3.7)	At their convenience	493 (56.7)
Workplace setting		After work	230 (26.5)
Government	496 (57.1)	**Work station: table and chair**	
Private sector	331 (38.1)	Yes	712 (81.9)
State enterprise	42 (4.8)	No	157 (18.1)
Position		**Privacy of the work station**	
Operation level	556 (64.0)	Yes	540 (62.1)
Head of unit, department	195 (22.4)	No	329 (37.9)
Administrator	118 (13.6)	**Mainly work equipment**	
Type of work		Desktop computer	120 (13.8)
Clerk, administrator, service, marketing	199 (22.9)	Notebook	673 (77.5)
Academic, professional	317 (36.5)	I-pad, mobile phone, others	76 (8.7)
IT work, programmer, graphic designer	123 (14.2)	**Internet problems during work**	
Finance, accounting, procurement	79 (9.1)	Yes	514 (59.1)
Human resources	62 (7.1)	No	355 (40.9)
Administrative work	89 (10.2)	**Take care of children during work**	
Duration of work (years), $\overline{X}$ ± SD = 11.28 ± 9.60		Yes	78 (9.0)
<10	477 (54.9)	No	791 (91.0)
10–20	231 (26.6)	**Work-from-home intensity (days per week)**	
>20	161 (18.5)	**$\overline{X}$ ± SD** = 3.78 ± 1.31	
Living status		5–6	390 (44.9)
With family of more than one generation	419 (48.2)	4	130 (15.0)
With couple and/or child	243 (27.9)	3	166 (19.1)
With others and no child	30 (3.5)	2	135 (15.5)
Living alone	177 (20.4)	1	48 (5.5)

SD, standard deviation.

"full-time" and "part-time," the significant health effects related to working from home shared the same results as the trend analysis. These results are not shown. Despite this, the mean occupational stress score while working from home was 3.79 ± 2.69 from 10 which less than regular work in a conventional workplace that was 5.13 ± 2.55. The average satisfaction (as a score out of five) about intentions to choose working from home in the future was 3.39 ± 1.19.

For the lifestyles of all of the individuals who recently worked from home compared with regular work during the workplace period, the top three prevalent lifestyles that changed while working from home were family interaction (65.36%; 95% CI = 62.19–68.53), food consumption (63.87%; 95% CI = 60.67–67.07), and delayed time to wake up (61.57%; 95% CI = 58.32–64.81). The trends of changed lifestyles related to work intensity in positive ways include increased duration of sleep ($p < 0.001$) and exercise ($p = 0.007$). On the other hand, the trends of changed lifestyles that had negative impacts on workers' well-being include irregular eating ($p = 0.039$), delaying time until sleeping ($p < 0.001$) or wake-up ($p < 0.001$), and decreased sleep duration ($p = 0.010$). The details of the proportion of changed lifestyle patterns of workers while working from home, compared with their regular workplace duties, the ratio of changed directions, and trend comparisons with working-from-home intensity are shown in Fig. 1.

4. Discussion

Nowadays, working from home is a modern work-life practice and an increasing trend that may become a major working condition in some jobs and during critical events, such as the COVID-19 outbreak. However, questions and ambiguities about working-from-home practices need to be investigated; these include working systems in various dimensions, such as occupational health issues, work–life balance, and so on. Working from home not only may revolutionize the traditional concept of the workplace but also may result in occupational health risks [13]. The COVID-19 crisis and disruption provided a real-life opportunity to test workers who had never worked from home and had to deal with this sudden shift in the workplace and whether or not it was suitable for a modern economy. The phenomenon of working from home during COVID-19 is a worst-case scenario, in which workers have to live and work in the same place; this "new work arrangement" has brought with it various occupational health challenges, as explored in this study.

The findings of this study provide evidence that physical distancing by working from home may affect workers in terms of risks and benefits. The occupational health problems identified in this study occurred because of the various effects from work conditions, environments, or behaviors, which followed the same pattern in conventional workplaces, such as ergonomic problems [14–16], indoor environmental problems [17–19], and working conditions related to physical health problems and psychosocial problems, such as isolation due to nonsocialization and interference with work and family life [20–22]. Moreover, some occupational health problems were related to work intensity; these included body weight changes, and the proportion of weight loss among full-time workers working from home was higher than weight gain, musculoskeletal pain, indoor environmental

Table 2
The frequency of physical and psychosocial health effect occurrence patterns, a prevalence rate with a 95% confidence interval (CI), and trend comparisons on working-from-home intensity

Health effects (n = 869)	Frequency of the occurrence pattern			Overall prevalence rate (95% CI)	*P* for trend
	New onset during work from home	Aggravated during work from home	Total		
Physical health effects					
Body weight changes					
Weight gain*	—	—	356	40.97% (37.69–44.24)	0.013
Weight loss*	—	—	123	14.15% (11.83–16.48)	0.001
Musculoskeletal problems					
Back pain	170	145	315	36.25% (33.05 - 39.45)	0.016
Neck and shoulder pain	178	177	355	40.85% (37.58 - 44.13)	0.001
Upper extremity pain	133	114	247	28.42% (25.42 - 31.43)	0.058
Indoor environmental problems					
Eye symptoms	134	111	245	28.19% (25.20–31.19)	0.035
Nose symptoms	17	20	37	4.26% (2.91–5.60)	0.889
Throat symptoms	49	27	76	8.75% (6.86–10.63)	0.152
Skin symptoms	64	42	106	12.20% (10.02–14.38)	0.261
Respiratory symptoms	21	20	41	4.72% (3.31–6.13)	0.544
General neurological symptoms	119	65	184	21.17% (18.45–23.90)	0.015
Other health problems					
Migraine headache	66	64	130	14.96% (12.58–17.34)	0.918
Allergic symptoms	40	52	92	10.59% (8.54–12.64)	0.394
Insomnia	118	65	183	21.06% (18.34–23.77)	0.750
Abdominal pain	29	23	52	5.98% (4.40–7.56)	0.404
Cystitis	25	16	41	4.72% (3.31–6.13)	0.538
Presenteeism	50	32	82	9.44% (7.49–11.38)	0.290
Psychosocial health effects					
Cabin fever†	122	—	122	31.28% (26.66–35.90)	—
Isolation	136	17	153	17.61% (15.07–20.14)	0.016
Anxiety from work	138	53	191	21.98% (19.22–24.74)	0.563
Loss of concentration	115	30	145	16.69% (14.20–19.17)	0.692
Depression	93	33	126	14.50% (12.15–16.85)	0.001
Work exhaustion	90	64	154	17.72% (15.18 - 20.27)	0.015
Burnout	93	62	155	17.84% (15.29–20.39)	0.026
Family conflict	39	20	59	6.79% (5.11–8.47)	0.765
Ambiguity between work and daily life	173	60	233	26.81% (23.86–29.76)	0.115

* These variables are present in total numbers owing to difficulty differentiating between new-onset and the aggravated pattern.
† Cabin fever analyses only included full-time workers who were working from home.

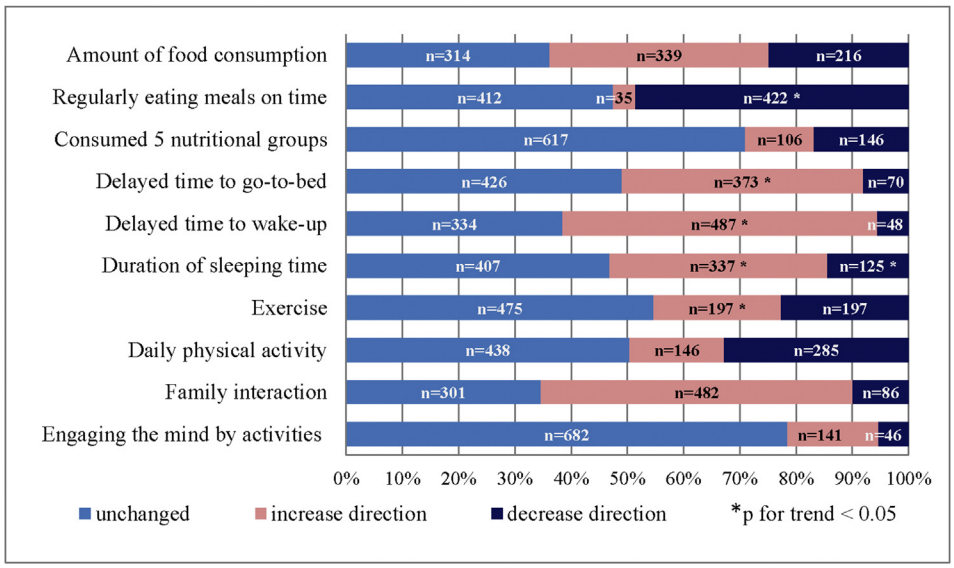

Fig. 1. Changing lifestyle patterns while working from home compared with regular work in a conventional workplace and trend comparisons on work-from-home intensity.

problems, isolation, depression, work exhaustion, and burnout. Inappropriate reactions to these extreme circumstances may hinder the ability of workers to do their jobs. Therefore, occupational health surveillance should be applied to these issues. Occupational health problems not only occurred among those working from home and were similar to those while working from office [23,24] but also affected their daily lifestyles in terms of changes in eating behaviors, sleep habits, physical activity, family interaction, and mental activity.

Owing to the social distancing measures during COVID-19, working from home has decreased the boundaries between work and home. Working outside the office creates an alternate daily work pattern and work style, such as increased and inappropriate work hours instead of commuting; an unsuitable home environment for work, as found in this study, such as a work area; a work station; work equipment; and a poor indoor environmental quality that exhausts workers and causes occupational health problems, with both physical and psychosocial health impacts. This new way of working can interfere with the biological and social rhythms of both lifestyle and environmental interaction [25], leaving workers vulnerable to health problems. Despite this fact, working from home is a temporary measure, or there is an organizational exception to the rule for work, but this work style may also cause psychosocial health problems, particularly among workers who live alone. Loneliness is a subjectively unpleasant experience and refers to dissatisfaction with the discrepancy between preferred and actual social relationships that aggravate psychosocial problems, such as cabin fever, which was first reported by Rosenblatt et al. [12], and isolation. On the other hand, the ability to work away from the usual workplace, such as from office to home, enables an uncertain work–life balance. There was a harmonious blend between work and daily life, which engendered changes to positive and negative well-being. The workers who had family members living with them had increased interaction, but the boundaries between work and family life were blurred; in particular, children could be an interruption [2,11] and a distraction to their work life, and this situation aggravated psychosocial problems [2,3].

While the lifestyle factors may have changed, the encroachment of work from home into spaces and times normally reserved for personal life can interfere with the work–life balance and caused lifestyle changes in terms of various behaviors, such as eating, sleeping, physical activity, and so on, particularly during the COVID-19 period, as most public areas were closed at the beginning of the pandemic, as a social distancing measure. As a result of the decreased time to travel outside the home, the changes in behavior started contributing to workers being at risk of development of future chronic and noncommunicable conditions. On the other hand, the workers in this study had a high level of preference for working at home, which allowed a wider variety of daily activities, less work stressors, flexible relaxation, and the ability to spend more time with family, conduct a healthy lifestyle, and have a happy life.

However, this study had some limitations that needed careful interpretation, such as the fact that it was conducted in the early stages of the COVID-19 pandemic, just few months after changing work practices from the workplace to the home. The changes or effects in this study may be underestimated owing to shorter periods of working from home, which the workers could tolerate, but which after longer periods may have caused more physical and psychological problems and cumulative chronic effects [26]. Furthermore, a number of factors, social, economic, and organizational, may also affect those working from home. The causation and long-term health outcomes should also be investigated in future research in the form of a longitudinal study. Moreover, the COVID-19 outbreak may lead to psychological effects from COVID-19 or national health prevention measures, such as staying at home, which may influence lifestyle changes and psychosocial health outcomes that are unavoidable. Nevertheless, this study can be considered to be a good experiment for self-comparison or to ask specifically about health outcomes that could confirm the real effects brought about by changes due to working from home, except for body weight changes. Most participants did not even notice these changes. It is difficult to establish whether or not their weight changes were new onset or caused by aggravation from work.

In terms of implementation, an understanding of these occupational and behavioral health risks and some forethought on how to mitigate them could certainly be beneficial for the workforce, given an envisaged future wherein many more people will work

from home. However, in practical terms, working from home or full-time work is not feasible for everybody. Working from home can be appropriate for some work sectors, such as education, information technology, financial services and administration, and so on [26]. Once the circumstances of the COVID-19 pandemic pass, workers will have plenty of experience and more confidence in working from home. The current pandemic can be seen as a good opportunity for organizations to promote, to implement, or to accomplish "work-from-home" policies by planning occupational health issues to protect the health of workers, promote a good work environment and a healthy lifestyle, and minimize the unintended health consequences of preventive measures to increase work performance and productivity.

5. Conclusions

Working from home is the "new normal" work style that can be considered both important and suitable for the workplace. Good working conditions and environments minimize negative health effects, and there is a decreased negative influence on workers' well-being and work productivity. The employer and employee must be concerned with both the positive and negative aspects. Therefore, occupational health providers should be concerned with preparing and establishing "new normal" working conditions and environments that can lead to healthy lifestyles of workers by means of a suitable holistic "total worker health" concept for implementation.

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Conflicts of interest

The authors declare no conflict of interest.

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Appendix A. Supplementary data

The questionnaire of this article can be found online at https://doi.org/10.1016/j.shaw.2021.01.010.

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