PHYSICAL EXERCISE IN REMOTE EMPLOYEES DURING COVID-19

EXERCÍCIO FÍSICO NOS COLABORADORES REMOTOS DURANTE A COVID-19

EJERCICIO FÍSICO DE LOS EMPLEADOS A DISTANCIA DURANTE EL COVID-19

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ABSTRACT

Introduction: During COVID-19, home office activity increased significantly for professionals, especially high-tech companies dominated by information production. Physical health problems attracted great attention from departments responsible for exercise prescriptions. Objective: Discuss the positive and negative effects of home exercise behavior on the health of people working from home, and propose countermeasures to prevent and improve physical health during the epidemic. Methods: Survey questionnaires and mathematical statistics were used to analyze the factors influencing home exercise behavior on the physical health of remote employees. Results: Mathematical statistics from the questionnaire showed that among all investigated factors, more than 90% showed that home exercise behavior positively impacted remote employees' physical health, and less than 10% showed that home exercise behavior did not correlate with physical health. Conclusion: Under the significance level of α= 0.05, it is believed that home exercise behavior can effectively improve physical health. Therefore, if the epidemic control policy cannot be changed, it is recommended to further promote home exercise. ***Level of evidence II; Therapeutic studies - investigation of treatment outcomes.***

Keywords: Exercise; Delivery of Health Care; Teleworking; COVID-19.

RESUMO

Introdução: Durante a COVID-19, a atividade em escritório doméstico aumentou significantemente aos profissionais, especialmente empresas de alta tecnologia dominadas pela produção de informações. Os problemas de saúde física atraíram grande atenção dos departamentos responsáveis pela prescrição de exercícios físicos. Objetivo: Compreender os efeitos positivos e negativos do comportamento de exercícios domésticos relacionados à saúde de pessoas que trabalham desde suas casas, propondo contramedidas de intervenção direcionadas à prevenção e melhora na saúde física durante a epidemia. Métodos: Foram utilizados questionários de pesquisa e estatísticas matemáticas para analisar os fatores que influenciam o comportamento do exercício em casa na saúde física dos colaboradores remotos. Resultados: Os resultados estatísticos matemáticos do questionário mostraram que entre todos os fatores investigados, mais de 90% mostraram que o comportamento do exercício em casa teve um impacto positivo na saúde física dos colaboradores remotos, e menos de 10% mostraram que o comportamento do exercício em casa não teve correlação com a saúde física. Conclusão: Sob o nível de significância de α= 0,05, acredita-se que o comportamento de exercício em casa pode efetivamente melhorar a saúde física. Portanto, se a política de controle de epidemias não puder ser alterada, recomenda-se promover ainda mais o exercício físico em casa. ***Nível de evidência II; Estudos terapêuticos - investigação dos resultados do tratamento.***

Descritores: *Exercício físico on-line; Atenção à Saúde; Teletrabalho; COVID-19.*

RESUMEN

Introducción: Durante el COVID-19, la actividad del home office aumentó significativamente para los profesionales, especialmente para las empresas de alta tecnología dominadas por la producción de información. Los problemas de salud física atrajeron una gran atención de los departamentos responsables de la prescripción del ejercicio. Objetivo: Comprender los efectos positivos y negativos de la conducta de ejercicio en el hogar relacionados con la salud de las personas que trabajan desde casa, proponiendo contramedidas de intervención dirigidas a la prevención y mejora de la salud física durante la epidemia. Métodos: Se utilizaron cuestionarios de encuesta y estadísticas matemáticas para analizar los factores que influyen en el comportamiento de ejercicio en casa sobre la salud física de los empleados a distancia. Resultados: Los resultados de la estadística matemática del cuestionario mostraron que, entre todos los factores investigados, más del 90% mostraba que el comportamiento de ejercicio en casa tenía un impacto positivo en la salud física de los empleados a distancia, y menos del 10% mostraba que el comportamiento de ejercicio en casa no tenía ninguna correlación con la salud física. Conclusión: Bajo el nivel de significación de α= 0,05, se cree que el comportamiento de ejercicio en casa puede mejorar efectivamente la salud física. Por lo tanto, si no se puede cambiar la política de control de la epidemia, se recomienda promover más el ejercicio en casa. ***Nivel de evidencia II; Estudios terapéuticos - investigación de los resultados del tratamiento.***

Descriptores: *Ejercicio Físico; Atención a la Salud; Teletrabajo; COVID-19.*

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INTRODUCTION

In the context of COVID-19 epidemic, online physical exercise to improve the mental and physical health of knowledge workers at home office has a positive impact can not be ignored.Knowledge workers under the control of the epidemic are mainly working from home, and when they are removed from their daily commute, they are more likely to adopt a sedentary and sedentary lifestyle. Many studies have shown that sedentary behavior may lead to an increased risk of cardiovascular disease, musculoskeletal disorders, and psychological disorders (depression and anxiety).[1,2] In addition, because knowledge workers need to work, prolonged screen exposure caused by prolonged computer use can lead to fatigue, tiredness, headaches and adverse eye symptoms.[3] Studies have also shown that a lack of typical daily activities can lead to serious health problems and an increased risk of coronary heart disease.[4] In summary, after the COVID-19 outbreak, research on physical exercise at home increased dramatically, for knowledge workers working from home, online physical exercise is flexible, varied and easy to operate, which can effectively alleviate the physical and mental health of COVID-19[5,6]. In addition, in the special period of the epidemic, home sports can also play an effective role in prevention and control.

Research methodology

Questionnaire design

According to the characteristics of COVID-19 working from home and knowledge workers, the questionnaire is divided into two parts: basic information survey and self-rated physical and mental health survey. The basic information questionnaire consists of 11 multiple-choice questions, all of which are single-choice questions. At the same time, the discrimination question was designed to distinguish whether knowledge workers did online physical exercise while working from home. In this paper, we select two dimensions of the SRHMS self-rating checklist to evaluate the physical and mental health of the respondents.The study is Purely observational studies which no need to registry ID of ICMJE.

Questionnaire implementation

Considering the feasibility of this survey, the questionnaire was distributed to knowledge workers in China by online and offline methods. The survey is divided into two stages of pre-research and formal research. Problems are found in the questionnaire analysis and timely correction, then formal research is carried out. Pre-survey begins on July 2, 2022 and ends on July 10. The formal investigation began on July 12 and ended on August 7. A random sampling of respondents conducted in-depth interviews from August 13 to August 18.

Questionnaires returned

A total of 210 questionnaires were distributed in this formal investigation, and the collected questionnaires were imported into SPSS software to get the data in Table 1. From Table 1, it can be concluded that 204 questionnaires were collected, the recovery rate is 97%. After the recovery of the questionnaire "COVID-19 working from home, have you done any online exercise?" Finally, 197 valid questionnaires were obtained, and the effective rate was 94.6%.

RESEARCH RESULTS AND DISCUSSION

Attributes of Respondents

Through the frequency analysis of the attribute variables of the questionnaire, the data in Table 2 are sorted out. Table 2 shows that

Table 1. Summary of Case Handling.

	Number of cases	%
Number of cases	197	94.6
Excluded a	7	5.4
Total	204	100.0

Table 2. Frequency analysis table of attribute variables.

Subject	Choices	Frequency	Percentage (%)	Cumulative percentage (%)
Your age	18-25years	45	22.06	22.06
	26-35 years	75	36.76	58.82
	36-45 years	69	33.82	92.64
	45 and over	15	7.36	100
Your gender	Male	111	54.41	54.41
	Female	93	45.59	100
Have you ever been exercising online while working from home?	Yes	197	96.57	96.57
	No	7	3.43	100
Total		204	100	100

36.76 percent of respondents were aged 26-35, 33.82 percent were aged 36-45, 22.06 percent 18-25 and only 7.36 percent over 45; Among them, 54.41% of the respondents were male, slightly higher than the number of women 45.59%; Finally, 96.57% of the respondents said that COVID-19 did online physical exercise while working from home, and only 7 respondents said they never did. Because this article mainly studies the effect of online physical exercise on the physical and mental health of knowledge workers. Therefore, in the follow-up study, the data of 7 respondents who had never done online physical exercise were removed, and only 194 respondents who did online exercise were analyzed.

After screening and eliminating the data of 7 invalid respondents, the questionnaire data of 197 respondents were sorted out. The frequency analysis of descriptive variables in Table 3 was obtained to understand the respondents' thoughts on online physical exercise during COVID-19 work at home. As can be seen from Table 5, 33.33% of the respondents carried out online physical exercise through live streaming. The number of knowledge workers trained in this way is more than that of other knowledge workers, which is closely related to the rapid development of the Internet in recent years and is in line with the trend of social development. 57.35% of the respondents said that during the COVID-19 working from home, 3-5 times a week online physical exercise; 44.12% of the respondents said that the duration of each exercise was 20-35 minutes. Among them, 93.14% of the respondents said that online physical exercise can improve their physical and mental health; 40.20% of the respondents said that there is a problem of unskilled exercise skills in home online physical exercise. Through in-depth interviews, we learned that even if they follow the online live coach, it is not as good as offline teaching, and their mastery of exercise skills is very low.

The purpose of online physical exercise

Combined with Table 4 and Figure 1, it can be seen that during the COVID-19 working from home, the main purpose of knowledge workers online exercise is to maintain mental health or improve physical fitness. The proportion of any one of them is far more than the sum of the two items of learning sports skills and relaxing after work, which also shows the significance of this survey.

Descriptive Analysis of Physical and Mental Health of Respondents

According to the selection of self-assessment options in the SRHMS scale, there are 5 self-assessment options for physical health and mental health, all of which are positive options, and the option score is 1-10 points, with the increase of the score, it represents the physical or psychological health of the respondent, and finally the average score is calculated to represent the number of physical and mental health self-scores of the respondents. Through the mathematical statistical

analysis of the data of the recycled questionnaire, the collation results can be obtained in Table 5, as shown in the following table.

Combined with the determination of SRHMS self-rating checklist and the results of table 6, the average of the indicators of physical health are more than 8.0 and the overall average of health is 8.33, It shows that the knowledge workers surveyed basically think that online physical exercise is good for their health when they are working from home. The average of all indicators of mental health is above 8.2 and the overall average of mental well-being is 8.45, indicating that the respondents believe that online physical exercise is conducive to maintaining mental health.

Linear regression model

This article mainly studies the impact of online physical exercise on the physical and mental health of home office knowledge workers under the

Table 3. Frequency analysis table of descriptive variables.

Subject	Choices	Frequency	Percentage (%)	Cumulative percentage (%)
How do you choose to exercise online?	Live Online	68	33.33	36.76
	Online recording	44	21.57	58.33
	An exercise program prescribed by the coach	56	27.45	85.78
	QQ, WeChat and other information received, video, etc.	29	14.22	100
What form of online exercise do you choose?	Follow the coach	58	28.43	31.86
	Autonomic exercise	64	31.37	63.24
	Follow the coach+ Autonomic exercise	75	36.76	100
How often do you exercise online each week?	Up to 3	44	21.57	25
	3-5 sessions	117	57.35	82.35
	More than 5	36	17.65	100
How long do you exercise online?	Less than 20 minutes	30	14.71	18.14
	20-35 minutes	90	44.12	62.25
	35-50 minutes	65	31.86	94.12
	More than 50 minutes	12	5.88	100
What does your online physical activity focus on?	Sports-related skills	53	25.98	29.41
	Martial arts	34	16.67	46.08
	Yoga	49	24.02	70.10
	Dance	38	18.63	88.73
	Apparatus exercise	23	11.27	100
What is the purpose of your online exercise?	Enhance physical fitness	92	45.10	48.53
	Learning physical skills	13	6.37	54.90
	Maintain mental health	86	42.16	97.06
	Relax after work	6	2.94	100
Can online physical activity improve your physical and mental health?	YES	190	93.14	96.57
	No significant change	7	3.43	100
What do you think is wrong with online physical exercise?	Neglect of safety	33	16.18	19.61
	Unskilled in exercise skills	82	40.20	59.80
	The home environment is closed and small.	75	36.76	96.57
	Contingent factors	7	3.43	100
Total		197	100	100

Table 4. Descriptive statistics of SRHMS physical and mental health.

	Subject	Sample size	Minimum	Maximum	Mean	Standard deviation	Median
Physical health indicators	How is your sleep quality?	197	1	10	8.3333	1.8587	9
	How is your appetite?	197	1	10	8.0637	1.4692	8
	How is your memory?	197	1	10	8.5	1.7005	9
	Is your body in a relaxed state?	197	2	10	8.6127	1.4862	9
	Are you comfortable with housework?	197	1	10	8.1422	1.5487	8
Mental health indicators	Are you optimistic about the future?	197	1	10	8.5343	1.5131	9
	Do you have confidence in yourself?	197	1	10	8.2157	1.4324	8
	Do you feel happy?	197	1	10	8.652	1.4423	9
	Do you easily concentrate on one thing?	197	3	10	8.5392	1.2451	9
	Are you satisfied with the current situation?	197	1	10	8.3333	1.367	9

Table 5. Results of linear regression analysis.

	Unstandardized coefficients		standardized coefficient	t	p	VIF	R^2	Adjusted R^2	F
	B	Standard error	Beta						
Constant	-0.071	0.0854	-	-0.8311	0.4069	-	0.4823	0.4772	F(2,201)=93.6352 p=0.0000
X_1	0.3671	0.0593	0.4882	6.1923	0.0000**	2.4133			
X_2	0.1632	0.0524	0.2457	3.1168	0.0021**	2.4133			

Dependent variable Y: Whether online physical exercise can improve physical and mental health. **P<0.01.D-W=2.1555.

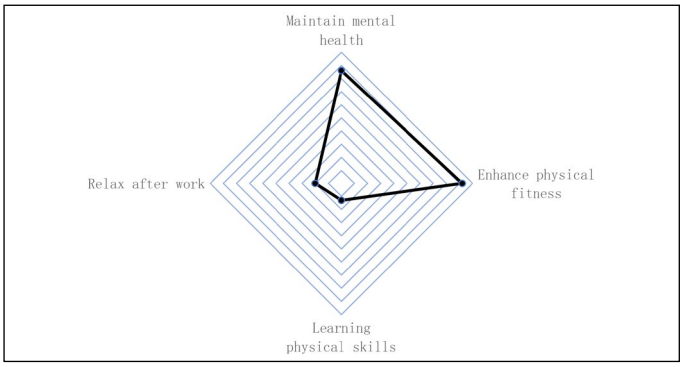

Figure 1. The purpose of physical exercise online.

COVID-19, and asks respondents to self-evaluate their physical and mental health after online physical exercise. Therefore, combining the two parts of the questionnaire data, the respondents in the questionnaire frequency of online physical exercise (X_1) and each time online exercise time (X_2) as independent variables, Whether online physical exercise can improve physical and mental health (Y) as a dependent variable, three related data into the SPSS for linear regression analysis, the results obtained in Table 5, as follows.

From Table5, The frequency of online physical exercise (X_1) and the duration of each online physical activity (X_2) were used as independent variables. The linear regression model with online physical activity improving physical and mental health (Y) as a dependent variable is:

$$Y=-0.071+0.3671*X_1+0.1632*X_2 \quad (1)$$

Model R^2 is 0.4823, which means that X_1 and X_2 can explain 48.23% of the variation of Y. The model passed the F test ($F = 93.635$, $P = 0.000 < 0.05$), which also indicates that at least one of X_1 and X_2 has an effect on Y. Finally, for the multicollinearity of the model, we find that the VIF in the model are all less than 5, which means that there is no multicolarity; And the value of D-W is near the number 2, which shows that the model does not exist autocorrelation, there is no relational model between samples, indicating that this model is suitable. Specific analysis of the linear regression model formula can be seen: The coefficient of regression of X_1 was 0.3671 ($t = 6.192$, $P = 0.000 < 0.01$), which indicated that X_1 had significant positive effect on Y. The coefficient of regression of X_2 was 0.1632 ($t=3.1168$, $P=0.0021<0.01$), which indicated that X_2 also had significant positive effect on Y. And the constant term of the linear regression model is $-0.071 < 0$, indicating that even if X_1 and X_2 have a positive impact on Y. It is also necessary for X_1 and X_2 to be large enough to make Y greater than 0, indicating that knowledge workers must adhere to a certain degree of frequency and duration of online physical exercise in order to improve their physical and mental health.

In summary, through the mathematical statistics of the questionnaire, at the significance level of α=0.05, knowledge workers believe that online physical exercise can effectively improve the physical and mental health of knowledge workers working from home. At the same time, the linear regression model shows that online physical exercise has a positive effect on improving the physical and mental health of knowledge workers working from home.

Suggestions on physical exercise for knowledge workers working from home on COVID-19

The government gives full play to the macro guidance ability

Make full use of various publicity platforms such as television and mobile APPS to further provide diversified and personalized services, innovate and develop sports activities, organize online physical exercise activities, actively guide knowledge workers to participate in physical exercise, and maintain physical exercise habits after the end of the epidemic, forming a good sports culture atmosphere.

Sports workers contribute to the development of sports at home

Knowledge workers due to the characteristics of the work, less concern for physical exercise knowledge[7,8], sports knowledge is relatively weak, rushing to carry out home physical exercise may be due to lack of movement or different sports foundation resulting in injury. Sports workers can provide different home physical exercise programs for home office knowledge workers, and provide diversified programs and suggestions for knowledge workers with different physical qualities. Provide detailed guidance on exercise time, exercise intensity and exercise environment, and provide different exercise methods for different sports foundations and different ages.

Establishing Correct Concept of Sports Consciousness

Any physical exercise activities are achieved through the participation of the subject, knowledge workers as the main body of practical activities[9], their consciousness determines the quality of online physical exercise. Knowledge workers will produce positive and pleasant emotions and emotional experiences[10], exercise body and mind in a good situation, and cultivate knowledge workers' long-term enthusiasm for participation, and improve the effect of online physical exercise teaching.

CONCLUSION

Under the COVID-19 epidemic Prevention and Control System, the main purpose for knowledge workers to do online physical exercise while working from home is to maintain mental health and improve physical fitness. Online physical exercise has a positive effect on improving the physical and mental health of knowledge workers working from home. In addition, some knowledge workers working from home said that online physical exercise has certain disadvantages, compared with offline physical exercise, the effect is not satisfactory. It shows that there is still room for development in the field of online physical exercise, and the government and sports workers can correctly guide and safe and healthy online physical training knowledge.

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