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Original Article

The Effect of Educational Intervention Based on the Theory of Planned Behavior on Physical Activities Among Employees

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Abstract

Background: Office workers are high-risk populations for their sedentary behavior and its related diseases. This study examined the structured intervention on physical activities in employees.

Methods: In this quasi-experimental study, 189 participants were allocated to two experimental and control groups using the multistage random sampling method. Data were collected through the short form of an international physical activity questionnaire, and a structured researcher-made questionnaire containing demographic and questions related to the constructs of the theory of planned behavior (TPB). The experimental group contributed to four training sessions and four practical walking meetings. Data were analyzed by SPSS software (version 19) using independent *t* test, chi-square, and linear regression tests at the significance level of 0.05.

Results: There was no significant difference between the two groups before the intervention regarding the mean score of attitude, subjective norms, perceived behavioral control, behavioral intention, physical activity, and demographic variables ($P>0.05$). After the intervention, the mean score of attitude, subjective norms, perceived behavior control, behavioral intention, and physical activity in the experimental group was significantly higher than the control group ($P<0.05$).

Conclusion: The finding of this study suggests that TPB is a suitable framework for designing physical activity interventions among office workers.

Keywords: Employees, Physical Activity, Cardiovascular Disease, Sedentary Behavior

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Introduction

Sedentary behavior is common in employees and is responsible for causing cardiovascular diseases, osteoporosis, diabetes, chronic respiratory diseases, and depression (1,2). Likewise, non-communicable diseases (NCDs) are responsible for 70% and 60% of death and the global burden of disease, respectively. More than 80% of these diseases happen in underdeveloped countries (3,4). Sedentary behavior is one of the causes of NCDs that is estimated to account for 9% of early mortality in the world (1).

The prevalence of inactivity among adults in the world is different (5-7). According to the World Health Organization, 60%-85% of the global population performs insufficient physical activities (1). In addition, 43% of the population in the Americas countries and the Eastern Mediterranean region and 17% of the population in Southeast Asia have insufficient physical activities (1,5). In Iran, inactivity in adults is common, and a study in 23 countries showed that 40% of adults were physically inactive, ranging from 21.9% in Kyrgyzstan to 80.6% in Pakistan (6,7).

Physical activity is recognized as any bodily motion made by muscles that need energy consumption, including a wide range of playing, working at home or on the farm, walking, and running (8). Further, there is a preventive agent related to cardiovascular disease, cancer, and stroke, which are the main foremost causes of death among those over 18 years old and higher (9,10). Likewise, physical activity is known as an important healthful behavior, while inadequate physical activities are responsible for disability and its severity (10,11).

A large proportion of employees in the world have a sedentary lifestyle and are naturally faced with adverse health outcomes causing mortality (12). Furthermore, most of the employees do not meet health-related guidelines for physical activities. As a result, inactivity must be considered the main health problem for societies (12). Workplace health promotion has generally focused on promoting employees' health through the decrease of individual risk-related behaviors (12,13). Therefore, employees seem to be vital a population to promote the

maintenance of adequate physical activities.

Based on the evidence, physical activity is influenced by individual, socio-cultural, and environmental factors (12,13). Consequently, health interventions for behavioral changes, including physical activity, must be designed based on theories and behavior change models (14,15). Theories are needed to illustrate and forecast the behaviors to design and assess interventions (15,16).

It has been proven that theory-based interventions, compared to non-theory-based interventions, generate more maintainable changes in behaviors such as physical activities. In the same way, the theory of planned behavior (TPB) has been used in educational interventions for promoting a varied range of behaviors, including physical activities, walking promoting, exclusive breastfeeding, and smoking cessation (15,17-19).

TPB assumes that attitude or individual opinions about the behavior, opinions of others about the behavior or subjective norms, and the resources and opportunities available to people that state the possibility level of behavioral achievement or perceived behavioral control are predicting the behavioral intention, and the individual intention is the most important predictor of the recommended behavior (18-20).

Therefore, considering that a large number of adults and employees who are naturally faced with adverse health outcomes, have a sedentary lifestyle (6,12), a theoretical intervention was planned based on the TPB to evaluate its efficacy to improve physical activities among office employees.

Materials and Methods

This was a quasi-experimental study conducted on office employees in the Sistan region of Sistan and Baluchestan province in 2019. At least 91 participants were estimated for each group considering the previous study (21) and the standard deviation of the behavior scores of experimental (8.4) and control (8.5) groups after the intervention, $\alpha = 0.05$, and $\beta = 0.2$, as well as anticipating a minimum mean difference of 3.5 points after the educational intervention based on the following statistical formula. However, considering the higher validity of the results, and about 10% possibility of sample loss, 100 people in each group were included in the study. Finally, after the education, 95 and 94 employees remained in experimental and control groups, respectively, and participated in the study.

First, from five cities of Zabol, two cities (i.e., Zahak and Hirmand) were selected using the simple random sampling method. Next, they were allocated into experimental and control groups by tossing. Then, in the experimental and control groups, the individuals of each office, based on the employees' numbers to the total sample size, were entered into the study using simple random sampling based on the sampling frame. It must be mentioned that in the control group, subjects were matched with the experimental group based on age and gender. Voluntary participation in the study and physical well-being consideration, particularly cardiovascular health, were the inclusion criteria. On the other hand, dissatisfaction with continuing the study and absence in 50% of the educational programs and exercises were the exclusion criteria.

The data were collected inside the research offices in appropriate places where employees had the necessary comfort to complete the questionnaires. Two self-administered questionnaires were applied in this study. The self-administered short form of the International Physical Activity Questionnaire (IPAQ) with seven queries was applied in this study, along with a special self-administered researcher-made questionnaire, including nine demographic and 31 specific questions that were designed based on the constructs of the TPB. Variables such as age, gender, educational level, family number, marital status, and job were surveyed in the demographic questions. The validity and reliability of the physical activity questionnaire were surveyed and confirmed in numerous past studies (21,22). However, considering cultural differences, especially language differences, the reliability of the short form of IPAQ by the test-retest method was surveyed, and the findings showed that all seven items had over 0.7 correlation (questions 1-7: 0.94, 0.97, 0.84, 0.80, 0.91, and 0.72, respectively) after two months.

The content validity of the specific questionnaire via a 10 expert panel was recognized after receiving the comments of the expert panel, and the content validity ratio (CVR) and content validity index (CVI) were calculated as well. The results demonstrated that the CVI of the questionnaire in terms of attitude, subjective norms, perceived behavioral control and behavioral intention were 0.8, 0.8, 1, and 0.8, respectively. In addition, the CVR of the questionnaire was 0.8, 0.9, 0.8, and 0.9 for attitude, subjective norms, perceived behavioral control, and behavioral intention, respectively. To quantify the reliability of the questionnaire, a pilot study was conducted, and 30 same employees completed the questions. The reliability of each construct was calculated, and Cronbach's alpha coefficient was obtained for subjective norms (0.69), attitude (0.71), perceived behavioral control (0.84), and behavioral intention (0.73).

The awareness queries were measured by 9 items (e.g., *Do physical activities prevent cardiovascular diseases?*) and scored based on the 3-point scale (accurate = 2, improper = 0, and I don't know = 1). The attitude and subjective norms were measured by 10 (e.g., *In my opinion, physical activity prevents high blood pressure*) and 6 (e.g., *My coworkers, expect me, do physical activities*) items, respectively. Moreover, perceived behavioral control (e.g., *Doing physical activity is easy for me*) and behavioral intention (e.g., *I have decided to walk three days a week*) were measured by 8 and 7 items, respectively, which were rated on a 5-point scale ranging from 1 (strongly disagree) to 5 (strongly agree).

The IPAQ questionnaire (short form, seven items)

assesses physical activities among adults aged 15-69 years. A self-administered short form requests three specific types of activities (vigorous physical activities such as heavy lifting, moderate physical activities such as cycling at a regular pace, and walking for at least 10 minutes at a time) (23). The data can be stated as a continuous measure. Likewise, the activities are calculated by their energy requirements as a MET-minute relating to resting metabolism (23). The MET level for vigorous and moderate physical activities and walking are 8, 4, and 3.3, respectively. Total physical activity MET-min/wk equals the sum of walking + moderate + vigorous MET-min/wk scores (23,24).

After attaining the permission of the study ethics committee, the investigators explained the aims of the study, and informed consent was obtained from every subject. First, the aims of the study were explained, and then the participants were asked to complete the questionnaires through the self-administration method. In the cases of necessity, required explanations were provided for completing the questionnaires. After analyzing the data, the educational needs of the contributors were determined, and an educational program was planned accordingly.

All the members of the experimental group participated in four theoretical training and practical walking meetings. Considering the assumptions of the educational framework, subjective norms, perceived behavioral control, and attitude have a strong impact on intention as the strongest determinative variable of behavior. Therefore, researchers designed some educational strategies for its promotion. To promote the attitude of the study subjects, at the end of each session, a focus group discussion was held about the role of physical activities in the prevention of NCDs, especially cardiovascular diseases. To promote subjective norms, after identifying of the individuals, peers, and other social groups who were important to subjects, they were chosen. Then, they were asked to participate in an educational session, encouraging participants to take part in physical activities (Table 1).

To reinforce the perceived behavioral control, the study subjects were asked to join sports groups or enroll in sports clubs. Meanwhile, simple sports exercises were taught for practice at home or gym.

Likewise, some examples of direct and indirect physical activities were provided for the experimental group, and they were supported with verbal persuasion. The experimental group was divided into five smaller groups and asked to attend at least three times a week. Every subject participated in six to eight fast group walking sessions

The collected data were analyzed by SPSS software (version 19) using an independent *t* test, chi-square, and linear regression at a significance level of less than 0.05.

Results

In general, 194 office employees in two research groups were investigated in this study. The average ages of the participants in the experimental and control groups were 37.23 ± 5.90 and 37.29 ± 4.78, respectively, and among the age groups, the age group of 35-39 years old was the largest one. Additionally, most participants of the study were men. There were no meaningful differences between research groups in terms of demographic characteristics ($P > 0.05$, Table 2).

Findings revealed that the mean scores of all constructs and physical activity in the experimental group improved after the intervention, and significant differences were observed among them ($P < 0.001$, Table 3).

The regression linear test was used to survey the predictability of the TPB. The summary of the model was significant at $P = 0.001$, which was adjusted as R-square = 0.13. Meanwhile, the construct of perceived behavior control was the predictor of physical activity (Table 4).

Discussion

Generally, the results represented that TPB was a suitable framework for designing and implementing an educational intervention to increase the rate of physical

Table 1. Details of the Educational Program on Promoting the Physical Activities in the Experimental Group

Sessions	Constructs	A Summary of Topic and Activities	Session Objectives	Behavioural Goals	Educational Time (min)
First	Knowledge	Group education, lecture	Employees are familiarized with the concept of physical activities and their role in the prevention of non-communicable and cardiovascular diseases	Employees can express the concept of physical activities, non-communicable and cardiovascular diseases in the presence of other employees	45
Second	Attitude	Focused group discussion and movie presentation	Employees should believe that a sedentary lifestyle promotes the risks of non-communicable and cardiovascular diseases such as myocardial infarction	Employees have a positive belief about the benefits of physical activities	45
Third	Subjective norms	Creation of the environment and family support	Employees should believe that environmental and social factors such as their families and office managers will support their physical activities to maintain their health	The socio-cultural factors such as families and office managers supported the physical activity among employees.	45
Fourth	Perceived behavior control	Verbal persuasion and skills training	Employees understand that physical activities are completely under their control	Employees realized that physical activities are easier and more feasible than in the past	45

activities among office workers. Shafieinia et al (12) and Ghaffari (15) found the positive effect of TPB-based education on promoting physical activities (25). Therefore, inactivity should be considered a major problem in public health because the majority of adults in industrialized and undeveloped countries do not meet health-related guidelines for physical activity (6,12). Workplace health promotion programs are effective means for the promotion of healthy behaviors (13).

This study was accomplished to determine the effect of an educational intervention to promote physical activities among employees. Previous results showed that employees were at risk for obesity, cardiovascular disease, and osteoporosis. According to previous studies, health interventions for promoting physical activities are an essential priority for employees (12,13).

It was also found that after the intervention, there was a significant difference between the mean scores of subjective norms in the two groups. Subjective norms demonstrate the person's perception about a behavior that is influenced by the judgment of important others, including friends, religious leaders, parents, peers, teachers, and ethnic leaders (12,17).

These results suggested that individuals who were in the experimental group felt and revealed more social pressure for having physical activities after the education. This finding is in line with the results of Mazloomy-Mahmoodabad (25), but different from the finding of Shafieinia et al, representing no significant improvement in the experimental and control groups after their education (12).

In addition, the finding indicated that after the education, the mean score of the attitude of the experimental group was significantly increased compared to the control group.

Table 2. Description of Demographic Variables in the Intervention and Control Groups

Variables	Characteristics	Experimantal No. (%)	Control No. (%)	*P* Value
Age	<30	5 (5.6)	5 (5.6)	0.826
	30-34	27 (30)	25 (27.8)	
	35-39	28 (31.1)	25 (27.8)	
	40-44	23 (25.6)	30 (33.3)	
	>45	7 (7.8)	5 (5.6)	
Education	Secondary school and diploma	7 (7.7)	8 (8.8)	0.385
	Associate degree	25 (27.8)	34 (37.8)	
	Bachelor degree	33(36.7)	28 (31.1)	
	Master of science	25 (27.8)	20 (22.3)	
Gender	Male	82 (91.1)	87 (96.7)	0.121
	Female	8 (8.9)	3 (3.3)	
Family number	1, 2	15 (16.6)	16 (17.8)	0.359
	3	51 (56.7)	42 (46.7)	
	≥4	24 (26.7)	3 (35.6)	
Partner's education	Primary and secondary	11 (12.2)	18 (20)	0.228
	Diploma and higher	79 (87.8)	72 (80)	

Table 4. The Linear Regression Analysis Between the Mean Scores of Physical Activity and Those of TPB Constructs

TPB Constructs	B	Standard Error	95% CI		*P* Value
			Lower	Upper	
Construct	-358.48	767.6	-1878.72	1161.75	0.640
Subjective Norms	14.97	18.06	-20.94	50.89	0.409
Attitude	-.3134	11.41	-.22.82	.22.55	0.991
Perceived Behavior Control	49.196	12.770	23.806	74.85	0.001
Behavioral Intention	-16.435	15.15	-46.56	13.69	0.281

Note. TPB: Theory of planned behavior; CI: Confidence interval.

Table 3. Evaluation of the Mean Scores of the Constructs of the Theory of Planned Behavior Before and After Intervention Stages

Construct	Groups	Before Intervention (Mean ± SD)	After Intervention (Mean ± SD)	Mean Difference (Mean ± SD)
Attitude	Experimental	51.6 ± 6.3	57 ± 14.7	5.43 ± 4.3
	Control	51.2 ± 3.5	54.2 ± 3.3	2.93 ± 2.2.1
	P value*	0.606	<0.001	<0.001
Subjective norms	Experimental	29 ± 4.1	34.7 ± 3.2	5.76 ± 2.95
	Control	29.6 ± 4.3	30.9 ± 4.4	1.32 ± 1.98
	P value*	0.33	<0.001	<0.001
Perceived behavior control	Experimental	37 ± 5	42.5 ± 5	5.5 ± 4.1
	Control	35.6 ± 5.4	37 ± 5.6	1.4 ± 2.6
	P value*	0.71	<0.001	<0.001
Behavioural intention	Experimental	34.9 ± 4.5	38.6 ± 4.4	3.74 ± 3.5
	Control	35.52 ± 3.2	36.5 ± 3.3	1.06 ± 2
	P value*	0.31	<0.001	<0.001
Physical activity	Experimental	391.3 ± 355.3	850.1 ± 513.7	458.143 ± 359.7
	Control	344 ± 329.6	395.9 ± 354.6	51.910 ± 140.1
	P value*	0.35	<0.001	<0.001

Note. SD: Standard deviation.
*Independent sample t test.

As a result, after the intervention, participants in the experimental group had more positive attitudes regarding physical activities and participated more in physical activity programs. Consistent with our results, Shafieini et al (12) and Ghaffari et al (15) demonstrated that after training, the mean score of the attitude related to physical activities significantly increased among participants in the experimental groups.

Furthermore, due to the educational intervention, the mean score of the perceived behavior control of the experimental group, unlike that of the control group meaningfully increased after education, indicating a mean difference between the two groups. This implies that individuals perceived more availability of required resources and opportunities to perform physical activities (15,16).

This finding conforms to those of Shafieinia et al (12) and Mazloomy-Mahmoodabad et al (26), demonstrating that the mean score of perceived behavior control in the experimental group significantly increased after education. Armitage (27) and Shafieinia et al (12) found that more perceived behavior had a positive effect on contributing behavioral intention and physical activities.

Moreover, after the intervention, the mean score of the behavioral intention in the experimental group, compared with the control group, was increased, and a noteworthy difference was observed between the two groups. Based on the evidence, behavioral intention is influenced by attitude, perceived behavior control, and subjective norms. likewise, the behavioral intention is a strong mediator predictor of the recommended health behavior (16,17). A strong intention has an excellent effect on promoting healthy behavior (17). In line with the study results, Shafieinia et al (12) and Mazloomy-Mahmoodabad et al(26) reported that behavioral intention in the experimental group was enhanced after the intervention compared to the control group. Comparing the results, based on gender, revealed that women had greater mean differences than men. According evidence women were more teachable and had a greater behavioral intention for recommended health behaviors than men, although men were slightly more active than women (28).

Finally, our results demonstrated that after education, the physical activity based on the MET-minute in the experimental group significantly increased in comparison to the control group, and a mean difference appeared among participants in the two groups. Consistent with this finding, Shafieinia et al (12), Mazloomy-Mahmoodabad et al (26), and Rasoli et al (19) found that the recommended health behaviors were meaningfully improved after the intervention.

Based on the analysis of the findings of the correlation test, behavior had a direct positive statistical correlation with attitude, subjective norms, and perceived behavior control. As a result, following the assumptions of TPB, we can calculate that if the mean scores of attitude, subjective norms, and perceived behavior control increase after education, the mean score of behavior should increase as well (17).

The linear regression test conducted on post-intervention data in the experimental group showed that perceived behavioral control was the only predictor for physical activities. It seems that any effort in the reinforcement of perceived behavior control has a direct positive impact on behavior. In comparison with this finding, Rasoli et al (19) revealed that behavioral intention was the predictor construct of health behavior, which was different from our results. However, the findings of Shafieinia et al (12) represented that after the intervention, the perceived behavior control had a positive effect on participating in physical activities, which is in conformity with the findings of the present study.

Self-reporting and lack of sufficient time to participate in the educational sessions and sports exercises were the most important limitations of the study. According to the poll, the educational sessions and sports exercises were planned for the afternoon and night, when the weather conditions were more suitable.

Conclusion

Considering the increase in the mean age of the population in the world and Iranian people, chronic diseases such as cardiovascular diseases, osteoporosis, stroke, high blood pressure, and diabetes have become more common. Therefore, preventive strategies and healthy lifestyles such as activities, smoking cessation, and appropriate nutrition play important roles in public health. Health-promoting workplace interventions are an effective means for encouraging healthy behaviors through group and individual education. In this study, the sedentary employees participated in a structured educational intervention, and the findings revealed that the mean scores of attitude, perceived behavior control, behavioral intention, subjective norms, and behavioral intention regarding activity were improved, indicating that conducting a structured educational intervention for behavior change is an appropriate strategy for health promotion in the society.

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Authors' Contribution

Conceptualization: JS; Methodologist/Data Analysis: HA; Instrument Validation: HO; Original Draft Preparation and Review and Editing: GM.

Conflict of Interests

Authors declare that they have no conflict of interests.

Ethical Permissions

Ethical approval for this study was obtained from the Deputy of the Research Office at Zahedan University of Medical Sciences (Ethical number IR.ARUMS.REC.1397.462). The study objectives were

explained to all study participants, and informed consent was taken from all of them.

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