

The Impact of Educational Intervention by Theory of Planned Behavior for Promoting Physical Activity among Middle-Aged Women Referring to Karaj Health Centers

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Research

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Abstract

Aims Physical activity is the most critical determinant of physical health which reduces the health risks during life. This designed study aims to evaluate the effect of educational intervention based on the theory of planned behavior on promoting physical activity among middle-aged women attending the health centers in Karaj city during 2017-2018.

Methods This research was a quasi-experimental controlled trial, and the study incorporated 140 Middle-Aged Women Referring to Karaj Health Centers assigned randomly to a control and intervention group (70 each group). Participants enrolling in the survey were asked to complete the International Physical Activity Questionnaire and also the theory of planned behavior measures at the baseline and the end of the study. The study applied Nonparametric Wilcoxon and Mann-Whitney tests and ANCOVA to interpret the results.

Results The results revealed participants' age range between 30 to 50 years with the mean and standard deviation scores 40.07 (8.750) in training and 45.81 (8.513) at the control group. The intervention improved the theory of planned behavior measures and the physical activities of participants. The results showed a significant difference in the attitude score, the perceived behavioral control score, and the level of subjective norms between two training and non-training groups ($P < 0.001$). The followed-up physical activity score also showed an improvement in the IPAQ score of participants in the training group ($p < 0.001$).

Conclusions The findings suggested the effectiveness of training based on the theory of planned behavior in the promotion of physical activity among middle-aged women.

Background

The World Health Organization has identified physical activity as the first health index of a community [1]. Evidence suggests that a little promotion in physical activity can have many beneficial effects on the health of individuals. Recent studies have presented that quality of life can increase with increasing physical activity of all ages and with any level of fitness and health [2]. Typically, sports activities are an essential determinant of healthy physical well-being, which prepares the body in terms of flexibility, resistance, and strength for a healthy lifelong life [3]. Exercise is effective in promoting health, preventing diseases, and maintaining health [3]. The effect of physical activity is not solely physical activity; however, it can have a positive impact on other dimensions of health, including psychological and social aspects. There is a need for designing sports programs to enhance physical activities and different features of well-being [4, 5].

Today, changes in lifestyles and reduced physical activities are among the factors in the prevalence of the cardiovascular disease. Low mobility, in addition to a health threat, threatens the country with the risk of an epidemic of non-communicable diseases such as cardiovascular disease, diabetes, osteoporosis, psychological disorders and malignancy [4]. As one of the indispensable dimensions of a healthy

lifestyle, regular physical activity can reduce the risk of the mentioned diseases as well as their burden [5]. Despite the numerous advantages of physical activity in many countries, including Iran, many people do not have regular physical activity. The previous works conducted in the country have shown that more than 70% of people do not have enough physical activity [6].

According to the World Health Organization (WHO), inactivity is one of the ten major causes of death and disability, and that 2.3% of deaths per year are due to lack of physical activities [7]. Women have more inclination to suffer from a disease or disability than men for physiological reasons such as pregnancy, lactation, and menopause [8, 9]. Women also suffer from illnesses that are related to physical inactivity [10]. On the other hand, women's physical activity is lower than that of men in most areas [11]. Therefore, one of the most critical concerns in women's health is the continuation of physical activity, so that their motivation for continuing training sessions is maintained and at least 2–3 sessions per week. Since patterns and behavioral theories can be an excellent guide to the interventional efforts of physical activity plans, researchers have used different models and approaches in physical activity [12].

One such theory is the theory of planned behavior, which was introduced in 1885 and developed and used by Azen and Fishbin in 1991. This theory consists of structures such as individual attitude, behavioral intention, subjective norms, and perceived behavioral control. According to planned behavior theory, the primary determinant of action is “behavioral intention,” which is the individual's motivation to adopt a human-behavior [13]. Based on this theory, behavioral intention is the outcome of an individual's attitude toward behavior, an individual's perception of the social norms of the people surrounding them, and the environment, and individual perception of the amount of control that he or she has to do or not to do the behavior [14]. Various scholars have widely used the theory of planned behavior for measuring health behaviors, for instance, diet, contraceptive pills, exercise, drug use, and participation in health screening programs. This theory can, on average, explain about 40% of the relationship between intention and health behavior. As a result, there is the claim that this theory has the potential to develop behavioral change interventions [15]. Given the standing of physical activity in maintaining and improving the health of individuals, the authors conducted this study by using the theory of planned behavior as a theoretical framework of the study, for designing, implementing and evaluating a training program to promote physical activity among middle-aged women.

Methods

Study design

This study is a quasi-experimental controlled interventional study. The research population in this study consisted of middle-aged women referring to Karaj health centers. The designed research estimated the sample size by using the results of the survey by Nikpour et al. [16]. The sampling was carried out using a cluster sampling technique. The study randomly identified overweight or obese women who referred to the Karaj health center, and we asked about their willingness to participate in the study. After agreeing to participate in the study, the authors randomly assigned respondents to one of the intervention or control

groups. Accordingly, this survey incorporated a total of 140 women (70 in the control group and 70 in the intervention group) and entered into the study. The inclusion criteria in the study were lack of any defect that prevented exercise and willingness from participating to join this study. The authors explained study objectives to observe the ethics of the research, and they trained and educated respondents of the survey. The authors ensured participants of the study that all the data received in this study is strictly confidential.

This survey used an instrument to collect the desired data from the selected population, adjusted the questionnaire according to the requirement of the research, and gathered the desired data through a self-administered questionnaire. The authors collected the information two times, which was before and after two months of the intervention. The questionnaire used in this study contained three parts. It contained nine questions on the information of the respondents such as age, height, weight, level of education, occupation, history of participation in physical activity, and history of smoking. This study adopted items of the questionnaire to measure the constructs of the theory of planned behavior, from the existing literature [17, 18]. The developed questionnaires used a Likert-scale of a 5-point response for the questions of attitude, subjective norms, perceived behavioral control, and was previously designed and used in Iran [19]. The authors executed a pilot study on thirty respondents to examine and determine the reliability of this data collection instrument. Cronbach's alpha coefficient test presented the reliability of the questionnaire equivalent to 0.92.

This questionnaire identifies the amount of physical activity in the participants. It was proposed in 1998 by the World Health Organization and the Center for Disease Control for the age group of 15–69 years old [20]. The questionnaire determines physical activity in the last seven days. The physical exercises, for instance, aerobics, high-speed biking, climbing, and basketball, which require more than six calories per minute, are called intense physical activity. These activities such as volleyball, badminton, and room cleaners, which need 3 to 6 calories per minute are considered the moderate physical activity. Besides, any exercise or event with a duration of fewer than 10 minutes will not find and delete. The International Physical Activity Questionnaire calculates the energy intensity of the total activity in the last seven days performed according to the instructions of IPAQ. If the total energy derived during the week is less than 600/met/min/ week, the intensity of physical activity goes under the rubric of the weak category. If the total energy consumed for physical activity is between 600–3000/met/min/week, it is in a group classified as the middle. If it is more than 3000/met/min/week, it presents a classification of a severe category [21]. In this questionnaire, one-minute walking is equal to 3.3 met, moderate physical activity is similar to 4 met, and one minute of intense physical activity is equivalent to 8 met. Therefore, authors calculated the total amount of physical activity per week, the amount of walking (met × min × day) with moderate physical activity (met × min × day) should be summed up with severe physical activity (met × min × day) last week [20]. Previous studies also used this questionnaire in the country, and the results have confirmed its validity and reliability [21, 22].

First stage:

In the early stage, the authors conducted the pre-test, and the two groups completed the pre-test questionnaires at this stage.

Second stage: Training intervention was carried out for the intervention group at this stage

Third stage: The two groups completed the post-test questionnaires at this stage

In the first stage, authors were intervening to get acquainted with the goals of the training program to pay attention to educational programs and the role of physical activity on physical and mental health. The authors arranged a meeting in the presence of all participants, both intervention and control groups to receive comments from participants on the extent and possible barriers of their participation in sports activities. In the meeting, after the project executor explained the objectives of the plan and obtained the consent form from the participants, he asked them to fill in the questionnaires on demographic information, the surveys on the theory of planned behavior, and the physical activity questionnaire. Then a session was followed up to provide participants with feedback on their physical activity and the possible needs and obstacles on the physical movement of house-wives and provide practical solutions for them. The authors randomly divided the population into two groups of 70 respondents, and it was decided to discuss the most critical needs and obstacles over the physical activity of the housewives, and list the priority of practical solutions in order. The meeting, which lasted about 60 minutes, addressed the needs and issues faced by women in physical activity at home or elsewhere as well as practical solutions. Then the list of each group was received and at the subsequent meetings, which was formed only with the presence of the intervention group, discussed in the form of brainstorming of possible solutions. Some of the most critical barriers to physical activity provided by these groups included, (1.) Lack of time for sports activities; (2.) Lack of a proper living environment for sports activities; 3. much work and tiredness after work; 4. Shortage of necessary equipment for sports activities; and 5. Shame for doing sports in public.

This research designed the training intervention according to the information obtained in the first stage, examining the related studies and suggestions of scientific sources about the effectiveness of the structures of the theory of planned behavior as well as considering the characteristics of the audience, the conditions and facilities of the community under study. In the first stage, the authors explained respondents the objectives of the project, the confidentiality of the information, and the purpose of this project. The women of the two intervention and control groups filled out the questionnaires, and the authors analyzed the results of this stage. Based on the needs assessment and analysis, the results of the first phase of the training program were prepared and applied to the intervention group, which authors designed as two groups of 17 and two groups of 18 persons in person in 4 sessions of 45 minutes. Two months after the intervention, the questionnaires were completed again by the two groups and analyzed. The training sessions included:

Session 1: Introduction to educational objectives, emphasis on attitudes and health priorities

Session 2: The benefits of desirable physical activity and low-mobility complications and illnesses associated with it

Session 3: The study emphasized on the effect of physical activity and a balanced, as well as the suitable diet in preventing overweight and perceived a controlled construct.

Session 4: The study illustrated the ways to avoid obesity and to highlight the structure of subjective norms, sports exercises in practice.

Results presented as mean \pm SD, where appropriated, and analysis results showed frequency tables for categorical variables. This study applied the Shapiro-Wilk non-parametric test to verify the normality distribution of the theory of planned behavior constructs within experimental groups. Using a baseline score of attitude, subjective norms, perceived behavioral control, and IPAQ, an ANCOVA model was employed to compare the differences between control and treated groups.

Results

The participants were in the age range of 30–50 years old. The mean scores and standard deviation of the age of the intervention and control group were 40.07 (8.750) and 45.81 (8.513), respectively. The participants' demographic information is summarized in Table 1, below, which shows the mean age in both groups was almost the same, as the results have not provided statistically significant differences between the findings.

Table 1
Demographic information in the intervention and control group

Variables		Intervention		Control	
		Number	Percentage	Number	Percentage
Frequency of age	29 to 40 years	35	50%	33	47.14
	40 to 50 years	25	71/35%	23	32.8
	50 to 59 years	10	28/14%	14	20
Level of education	Illiterate	8	42/11%	21	30
	Under diploma	38	28/54%	38	4.285
	Diploma	17	28/24%	7	10
	University	7	10%	4	7.15
Occupation	Housewife	68	14/97%	70	100
	Employed	2	85/2%	0	0
History of registration in sport activity	Yes	6	57/8%	2	2.8
	No	64	42/91%	68	97.14
History of membership in sport clubs	Yes	7	10%	2	2.85
	No	63	90%	68	97.14
Membership in sports clubs for now	Yes	2	85/2%	1	1.42
	No	68	14/97%	69	98.57

Table 1 presents the results, and the highest percentages of patients in the intervention and control group were in the age group of 29–40 years old, which was 50% and 47.14%, respectively. Also, the highest percentage of respondents in terms of educational level in the intervention and control group was under diploma, i.e., 54.28% and 54.28% respectively. The highest percentage of respondents in terms of occupation status in the intervention and control group belonged to house-wives, who were 97.1% and 100%, respectively. Regarding the history of sports registration, in the intervention and control groups, they did not have a registration record of 91.49% and 14.97% in the sports club. The results indicated that there was no significant difference between the two intervention and control groups before the intervention in terms of demographic information.

The total score of attitude decreased significantly in control group, from 45.37 ± 4.90 at baseline to 41.64 ± 3.93 at endpoint ($p < 0.0001$, Wilcoxon test) and increased significantly from 47.31 ± 6.49 to 47.60 ± 4.40 at training group ($p < 0.0001$, Wilcoxon test). By ANCOVA analysis, after adjusting for attitude score at baseline, the difference between the two groups was statistically significant ($F(1,137) = 69.824$, $p < 0.001$) (Fig. 1A). The findings revealed and observed a similar trend as attitude score with subjective norm score; a significant decrease in the subjective norm score at the control group but a significant increase at training score from baseline to endpoint. The difference between groups wasn't significant at baseline; however, it was significant at the endpoint ($p < 0.0001$, Mann-Whitney test). By ANCOVA, the level of subjective norms at baseline wasn't related to its level after intervention ($F(1,137) = 1.14$, $p = 0.29$), but after controlling for the subjective norm at baseline, its difference between two groups was significant ($F(1,137) = 58.41$, $p < 0.001$) (Fig. 1B).

Discussion

Findings of this specific present survey indicated that the mean score attitude in the intervention group toward the pursuit of physical activity after the educational intervention was significant, this change stated the effectiveness of the training program implemented to enhance the positive attitude of women in physical activity. Earlier studies have shown that people who have a more positive attitude toward physical activity are generally better off in terms of frequency and severity of doing the exercise [23]. The literature review of the related material indicates that with the improvement of individual attitudes and social influences and self-efficacy of individuals towards a subject or behavior, their participation rate increases [24]. It is consistent with the result of the studies carried out by [25, 26]. In the country, as well as with reviews by [27, 28, 29, 30, 31, 32]. However, they are not consistent with the results of [33], which, of course, has been the most recent case among congenital heart patients. This difference in outcome seems to be due to the same issue.

Also, the results of the subjective norms score indicated a significant increase in the subjective-norm score of the women in the intervention group. In a study to investigate the generalizability of the theory of planned behavior among different cultures in the field of physical activity, [34] examined various constructs of the theory of planned behavior. The outcomes of this research study are not consistent with the results of their research, probably due to the age differences and social and cultural characteristics of the participants in the study.

In a study by Martin et al., the aim of predicting physical activity in Mexican children, subjective norms played an important role in predicting physical activity in children [35, 36], which is consistent with the results of the present study.

On the other hand, in the earlier studies conducted with the target population of patients [32, 35, 37, 38], typically, subjective norms have shown a more significant role in predicting intention. Usually, human behavior gets influence by nearby people such as medical staff, than healthy people. Despite the substantial increase in the level of physical activity among the participants in the research, the

significance of the subjective norms scores among them could indicate that house-wives get influenced by the people around them. Besides, the findings showed an increase in the perceived behavioral control score after the intervention.

Another study conducted by Boudreau et al. (2009), was a randomized clinical trial study to evaluate the theory-based health promotion intervention on people over the age of 65. The intervention group scores in terms of perceived behavioral control, intention, and behavior in both parts of the intervention (nutrition and physical activity), it showed a significant and higher than the control group. It was similar to the results of this study. Studies carried out by Martin and Armitage [18], demonstrated a positive role of perceived behavioral control in addressing physical activity. The theory of planned behavior recommends that perceived behavioral control is a reference point for intention, and it seems that the intention is likely to be increased through the success of the behavior. Therefore, this theory is an essential predictor of intentions for physical activity and behavior [39]. The findings indicated that the impact of controlling perceived behavior on the behavior of house-wives physical activity was likely by adopting the correct methods. The approaches, including the use of behavioral factors, incentives, reducing barriers to practice, eliminating barriers, breaking behavior into small stages, and increasing the level of physical activity among participants.

The results of physical activity scores have also increased significantly after the intervention. Therefore, the primary concern of health education and health professionals is the issue of the continuation of health behaviors because in many cases interventions to change behavior and health behaviors and changes in behavior occur. However, these changes are not permanent, and after a while it declines, and the person returns to his previous behaviors. Duangpumat et al. [32], in their study, presented a curriculum based on the theory of planned behavior that promoted perceived attitude and control, and as a result of intention and practice of walking in the participants were investigated. Also, Jennings and colleagues [40], in a 12-week intervention using the Internet, concluded that it increased the behavior of physical activity in the participants. Besides, it is notable that the results of these studies are consistent with the present study. Ahmadi Tabatabai's research, using the theory of planned behavior of physical activity of Kerman health center staff, showed that educational intervention based on the theory of planned behavior with a significant increase in intention score did not affect the physical activity of individuals. These results are consistent with the results of this study. In the present study, the use of practical demonstration of women willing to cooperate in providing education to their cohort women has been able to positively influence the behavior of physical activity, and as the results indicate, this change has been statistically significant[41].

Unfortunately, most of the studies conducted in this field, both within and outside the country, have shown short-term interventions of 2 to 3 months, which cannot support as a continuation of the effect of intervention on the behavior of the physical activity. Given that half of people who start physical activity decline in physical activity during the next six months, the variables that affect the acceptance and continuation of physical activity are not recognized [42]. There is lack of studies specifically on the

continuity of physical activity. The determination of such variables can help advance effective interventions, both for the acceptance and continuation of physical activity [43–45].

Conclusion

The results of this specific study support the effectiveness of the theory of planned behavior for promoting the physical activity of women, and findings suggest that behavioral approaches appropriate implementation in the training and physical activities programs are useful and provide insightful results. Based on the results of this current research, individuals' attitudes development, subjective norms, and perceived behavioral control help increase physical activity. The findings of this ongoing research have contributed to the existing body of health knowledge among women by view the relationship between support the effectiveness of the theory of planned behavior. It promotes the physical activity of women, and findings suggest that behavioral approaches appropriate implementation in the training and physical activities programs are useful and provide insightful results. Physical activity and the theory of planned behavior help conduct future research studies to explore how physical activities and theories of behavior help in promoting sports and physical training programs.

Declarations

Abbreviations

EI: Educational Intervention; PB: Planned Behavior; PPHA: Promoting Physical Activity

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Authors'contributions

MM, NAA, MQ and EM conceived and designed the study and finalized themethodology and tools used. FEFA, JA, and AZ collected the data andanalyzed and drafted the manuscript. All the authors made significantcontributions in the manuscript writing and finalizing of the manuscript. Thefinal manuscript has been read and approved by all the authors.

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Availability of data and materials

Authors report that the data supporting their findings can be publicly shared.

Ethics approval and consent to participate

This study sought ethical permission attained from the ethics committee of the university. The authors assured respondents that all information collected from this study would remain strictly confidential. All the research procedures in this study followed the ethical standards of the university research and ethics committee. The respondents of this study provided their consent to participate in the research and they actively involved in the survey.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests

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Figures

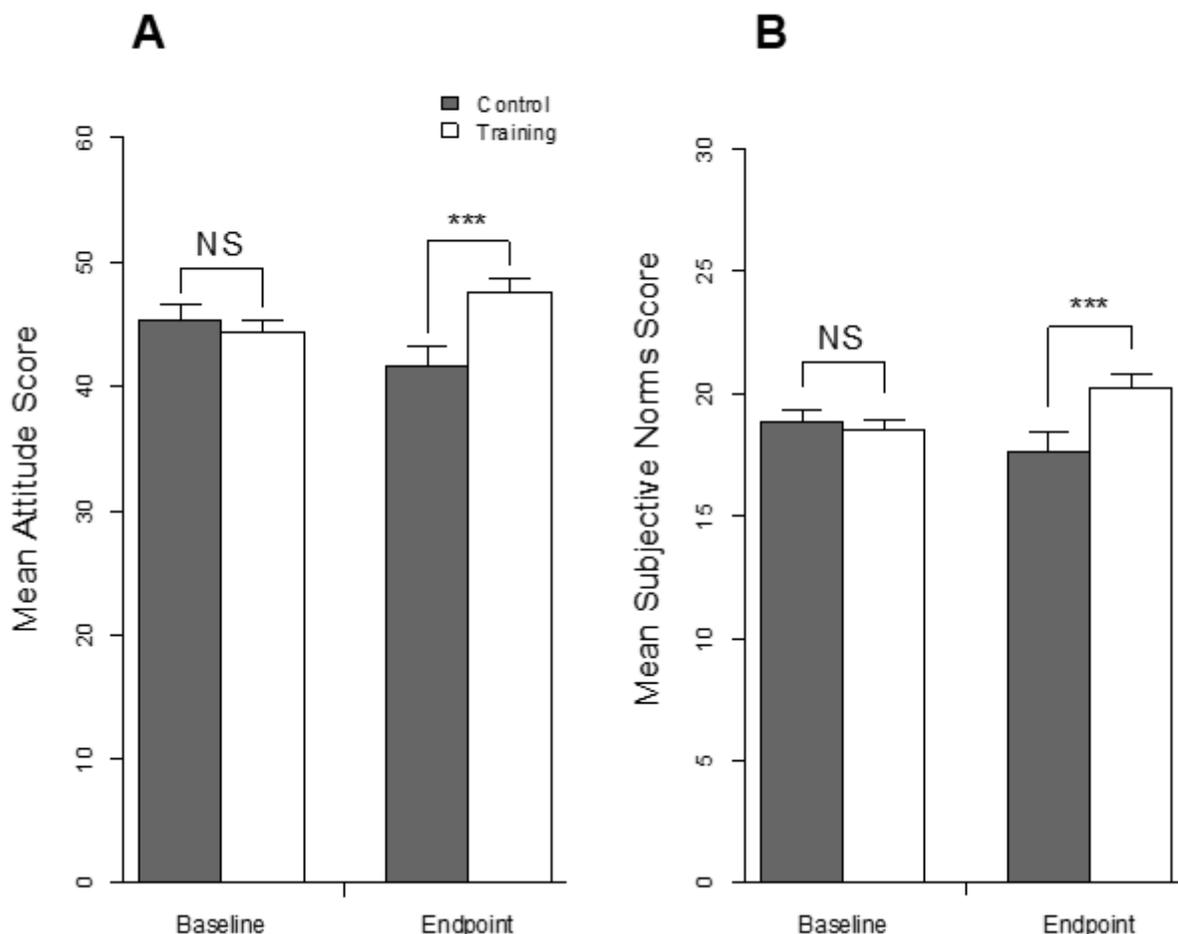


Figure 1

Mean scores for the attitude component (A) and subjective norm component (B) of the participants at the control group (n=70) and training group (n=70) measured at baseline and the end of the study. Error bars represent 2 × standard errors (SEs). Asterisks represent statistically significant differences at the 0.001 level between the two groups. The total score of perceived behavioral control (PBC) is given by Fig 2. In both groups, the total PBC score increased progressively. The overall difference at the control group was -0.54 ± 4.29 , and a training group was -5.0 ± 5.41 . For both groups, the Wilcoxon signed-rank test showed a highly significant change. By ANCOVA analysis, the PBC score at the baseline wasn't related to the PBC of participants at the end of the study ($F_{1,137} = 0.054, p = 0.82$). After controlling for the effect of PBC at baseline, the impact of the intervention was significant on the PBC score between two groups ($F_{1,137} = 69.824, p < 0.001$).

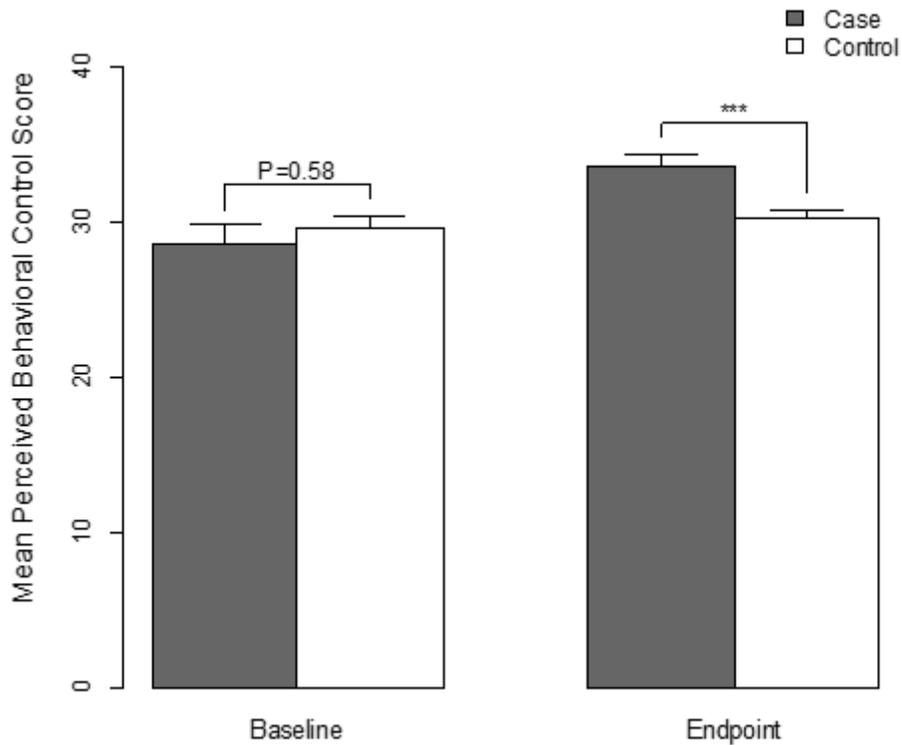


Figure 2

Mean scores for the perceived behavioral control score of the participants at the control group (n=70) and training group (n=70) measured at baseline and the end of the study. Error bars represent 95% confidence interval for the mean. Asterisks denote statistical significance at the 0.001 level. In terms of physical activities, the study expected at the control group the IPAQ mean difference between baseline and endpoint was trivial. It was only -0.76 ± 4.58 which wasn't significant ($p = 0.24$, Wilcoxon test). The difference between IPAQ score at baseline and the end of study in training group was noticeable; 21.63 ± 48.71 ($p < 0.001$) (Fig. 3). The large standard deviations indicate the violations of normality assumption of IPAQ scores in both groups which legitimate the use of the Wilcoxon non-parametric test.

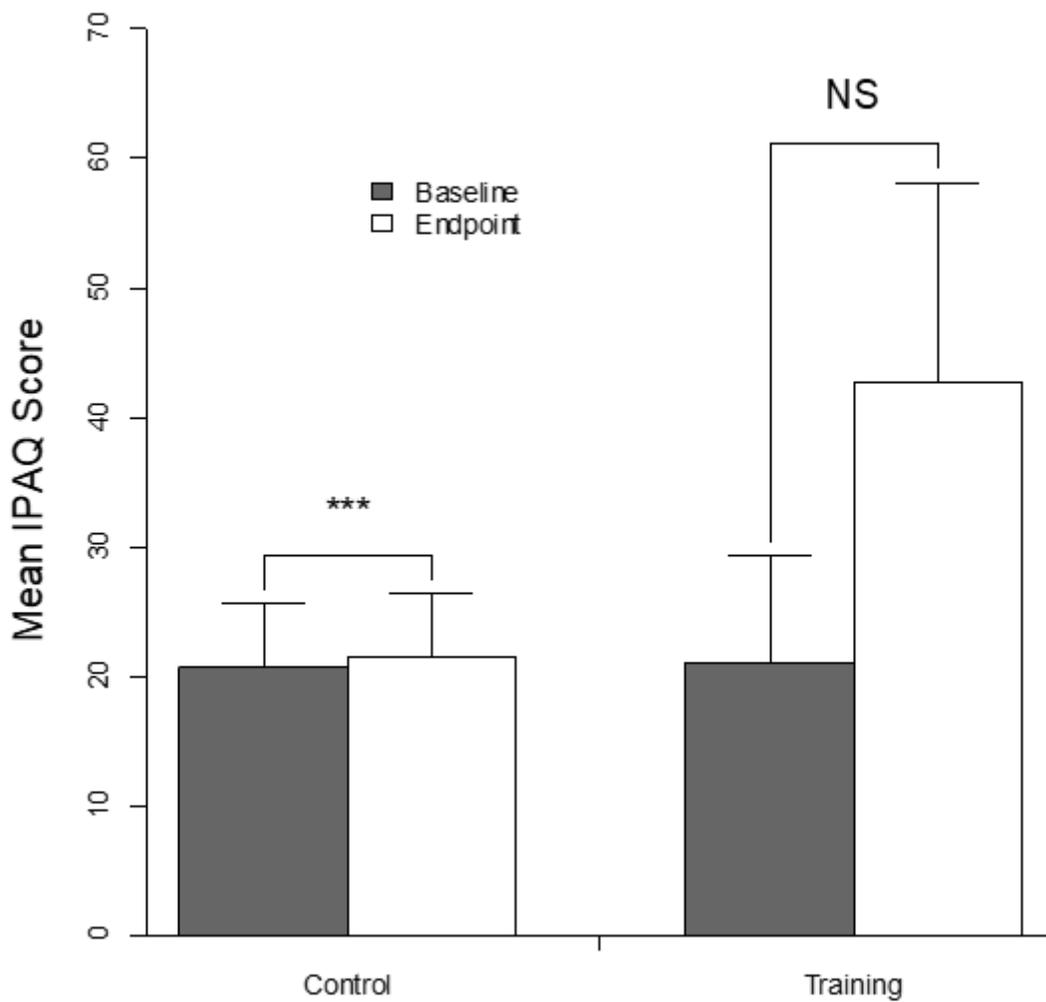


Figure 3

Mean scores for the physical activity (IPAQ score) of the participants at the control group (n=70) and training group (n=70) measured at baseline and the end of study. Error bars represent 95% confidence interval for the mean. Asterisks denote statistical significance at the 0.001 level.