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# Effect of Health Education Program on Promoting Physical Activity among Diabetic Women in Mashhad, Iran: Applying Social Cognitive Theory

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**ABSTRACT**

**Background:** Physical activity regularly is one of the important aspects of healthy life-style, which has an essential role in reducing the burden of disease and death. Diabetes is a typical general health problem. The aim of this study to determine the effect of education based on social cognitive theory on promoting physical activity among women with diabetes II in Iran.

**Methods:** In this randomized control study, 82 diabetic females were randomly selected then were assigned into two groups: intervention (n=41) and control (n=41). Educational intervention was planned then performed during 7 sessions of 60-min in accordance with social-cognitive theory (SCT). The participants were asked to fill in the questionnaires in educational evaluation before and immediately after intervention and the follow up (10 weeks later). The data were analyzed through Repeated Measures ANOVA, Friedman, independence *t* and Mann-Whitney tests.

**Results:** The mean age among the participants was 48.37±5.67 yr also the body mass index was 28.69±3.95. In the intervention group, light physical activity and sedentary behavior reduced from 56.1% (23 individuals) to 14.6% (6 individuals) in the following up stage. There was significant improvement across time in the mean of minute's physical activity ($P$=0.042). There were significant differences in the mean's constructs of the Social-cognitive theory (SCT) ($P$<0.05).

**Discussion:** Design and execution of training program based on social cognitive theory can lead to promote physical activity among women with diabetes II through changes in the theoretical constructs.

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## Introduction

Diabetes is one of the non-infectious diseases around the world and classified as a worldwide epidemic disease [1]. It is estimated to be 285 million adults with diabetes in 2010 of which 90 to 95 percent have type-2 diabetes. This number will continue to increase globally due to an aging population, population growth, urbanization and the high prevalence of obesity and sedentary lifestyles. Iran is one of the Middle Eastern countries affected by this condition. Considering Iran's growing elderly population, a rapid increase in the prevalence of this disease is expected [2].

Today, exercise can be regarded as a suitable cure in medicine problems and insufficiencies also as a good and especial therapy in physical and mental disorders [3]. However physical activity is a recommended cure in diabetes, but these patients are mostly lack of it [4] and over 80% people suffering from diabetes [5] especially females who are overweighed could not have enough physical activities [6]. In contrast to the total population, likely to recur in

this group of people is more sedentary lifestyle [5]. The initial objective to cure diabetes would be control of blood sugar. To do it the professionals recommend adjusting the lifestyle behaviors such as diet change and doing physical activity as the first cure for diabetes which for most of them performing and maintenance such behaviors could be the most difficult aspect in self- Care [6]. Diabetic women's participation in physical activity is very low and is often further reduced with increasing age. Low levels of physical activity in diabetic patients may be a function of individual, social and psychological factors[2]. Physical activity is a complex behavior influenced by multiple factors within the environmental, social, cultural, psychological, and cognitive domains [7].

Training is one of the most essential methods in chronic diseases prevention, cure and control as in diabetes. It would be so important among those who are unwilling to be active, and then training is very vital to recover these people [8]. Theory-based interventions are more effective in health-related behavior compared to approaches without theoretical framework, since they are a mean to development of interventions as well as guide the evaluation of these interventions [9].

Social-cognitive theory (SCT) is well recognized as a useful framework for design of physical activity interventions [10] but has not been studied adequately among diabetes patients in Iran. Social-cognitive theory proposes that personal, environmental, and behavioral factors operate as reciprocal, interacting determinants of each other. Thus, physical activity behavior is considered within a dynamic, interacting causal system. Within the causal system, SCT identifies cognitive processes as key mediators between external stimuli, such as an intervention, and behaviors, such as physical activity. Cognitive processes presumably influence an individual's ability to control physical activity and its determinants (i.e., personal, environmental, and behavioral factors) [11]. Personal factors influencing physical activity include the demographic variables, as well as potentially malleable psychosocial variables such as self-efficacy, outcome expectations (OE), and self-regulation (SR). Environmental factors key to adherence to physical activity involve social support [12].

The aim of present study was to evaluate the educational intervention based on social cognitive theory on physical activity promoting among women with diabetes II in Mashhad City, Iran.

## Methods

This research was a randomized controlled trial study. The collection consists of the study population included all diabetic II females referred to health centers in Mashhad City, the east of Iran. The sampling method was the Multi-stage cluster method. In the first step, different areas of the city were classified based on the division of the geographical region, next for each social class two health centers were randomly selected (six health centers from among 15 health centers). Then, among the patients referred to the health centers for taking health care, 300 cases were randomly chosen according to the inclusion and exclusion criteria in this study. Questionnaires were completed via structured interviews (15-20 min). Doing the initial investigation and statistical analysis considering the predictive constructs for the design training sessions, then, 2 centers were randomly selected among 6 as intervention and control groups. The sample size was estimated in 95% significant level and 80% potential according to the results of a previous study[5], 35 people for each group: intervention and control, however considering the amount of probable leaving out there were contemplated 42 people for each group. During the study one person was omitted in each group and finally the study went on with 41 individuals in each group (n=82).

### *The qualification criteria for entering the study*

One must be diabetic II, between 35-60 years of age, no complication of diabetes, willing to participate in the research, being literate and doing exercise, should attend all of the sessions of educational intervention; should complete the pre-intervention and post-intervention questionnaires, not treated with insulin.

### *Data collection tool*

The data were collected using two questionnaires. Demographic information questionnaire included questions regarding participants; age, education, occupation, family's housing status, and family's average monthly income, high, weight, fasting blood sugar, duration of illness. Another was social-cognitive theory elements measurement questionnaire which included:

(a) Task Efficacy scale: this measure (4 questions) was developed to determine participants' self-efficacy to continued physical activity over a one month time period, such as: I am able to do physical activity 3 times per week with intensity medium for about 40 minutes each time for the next week[13]. Each question has 5 choices based on lickert five-item scale from 1 to 5 (Absolutely not, little, to some extent, Relatively Highly, and Very highly), Cronbach's alpha value for this scale was 0.96.

(b) Barrier efficacy scale: was a 10-item scale designed to measure participant's perceived capabilities to engage in physical activity in the face of commonly identified barrier to participation13 such as; I believe that I can get physical activity 3 times per week at least 40 minutes, if the weather is very bad. Each question has 5 choices based on lickert five-item scale (1 to 5) and it internal consistency was (α=0.87).

(c) Modeling scale: was a 15-item instrument created by dunlop [13], for this study was used 10-iteme one. Each question has 5 choices based on lickert five-item scale and each respond gains a score in the range of 1-5, one of the questions was in this scale: seeing my family being

active makes me want to become active. Cronbach's alpha was 0.89 for this scale,

(d) Social Support and Exercise Survey (SSES): The SSES[14] was 13-item instrument; for this study was used 10-item 13. This scale was asked in the following manner: my family or friend changed their schedule so we could exercise together. Participants indicated the frequency of the support from other by responding to questions on the 5-point scale ranging from 1 to 5, Cronbach's alpha value was 0.91 for this scale.

(e) Neighborhood Environment Walk ability Scale (NEWS): The NEWS [15] was a brief, two section question that probes participants about their neighborhood (i.e., traffic, aesthetics, and pathways) and facilities. In section one, participants were asked to rate her responses on a 5-point scale to 7 statements about her home environment [13], for example; there are sidewalks on most of the streets in my neighborhood. Internal consistency was 0.76 for this study.

(f) Outcome Expectations: The Outcome Expectations for physical activity was assessed by 4-items that comprise the exercise sub-scale from a 20-item outcome expectation scale. Participants were asked to rate their level of agreement or disagreement on a 5-point scale on two positively-worded and two negatively-worded statements about outcomes in engaging in physical activity [16], such as, physical activity regularly will reduce my chances of developing chronic. Cronbach's alpha was 0.72 for this scale.

Self-regulation was assessed by the exercise goal setting scale and the action planning. Action planning questioner was used in a study by Bonner [17]. For this study was assessed with four response items rated on a 4-point scale, ranging from (1) not at all true to (4) exactly true, and were asked in the following manner: I have made a detailed plan regarding when to do my physical activity, ($\alpha$=0.91).

Goal setting questionnaire included six items used in the Nehl's study [18], rated on a 5-point scale from (1) "Does not describe" to (5) "Describes completely". One of the questions was: I often set physical activity goal, ($\alpha$=0.92). Knowledge questioner was an 11-item instrument and responses of 4 options that created specifically for this study, Cronbach's alpha was 0.84 for this scale.

The International Physical Activity Questionnaire (IPAQ) - Short Form: This questionnaire includes seven questions about intense physical activity, moderate physical activity, walking, and sitting in the previous seven days. The physical activity for each activity was calculated based on Metabolite Equivalent (MET) per minutes/week based on the IPAQ's scoring protocol; the intensity of physical activities can be reported in two ways [19]:

The total amount of physical activities of individuals in the previous week based on Met-min/week: MET is a unit used for estimating the consumed energy required for physical activities. All kinds of physical activities can be classified as a multiple of the amount of energy consumption at rest. In this questionnaire, walking measures 3.3 MET, moderate physical activity 4, and intense physical activity 8. In order to calculate the intensity of physical activity during a week, the following formula was used:

Walking MET-min/week = 3.3 × time of walking in minutes × days of walking.

Moderate physical activity MET-min/week = 4 × time of moderate physical activity in minutes × days of performing physical activity.

Intense physical activity MET-min/week = 8 × time of intense physical activity in minutes × days of performing intense physical activity.

Total amount of physical activity in the previous weeks = Walking MET-min/week + Moderate physical activity MET-min/week + Intense physical activity MET-min/week.

In case the combination of the intense physical activity, moderate physical activity, and walking has reached to the minimum of 600 MET-min/weeks in the previous five days at least, the intensity of the physical activity was regarded as moderate. We consider the activity as intense if one of the following conditions is met: 1) the total consumed energy for the physical activity in at least the three previous days has reached to 1500 MET-min/week, 2) the total consumed energy during seven previous days for performing a combination of intense physical activity, moderate physical activity, and walking has reached to at least 3000 MET-min/week. If no activity is reported or the above conditions are not met, the activity is classified in the group of little or light physical activity. The activities less than 10 minutes were not considered [19].

These questionnaires' validity and consistency have already defined during internal [20] study. For this questioner Test–retest reliability was r=0.81 in the current study.

To use the social-cognitive questionnaires and make them local, two translators did translate them again (Back-Translate). The context validity was confirmed through receiving ten experts views, the reliability of questionnaires were administered to 90 diabetes females using alpha cronbach coefficient for each SCT construct, besides to assign the external stability we utilized correlation coefficient during re-test in a 10-day interval for 15 diabetes females. Collecting data was done in three steps to evaluate training interference, before and as soon after interference and follow-up (10 weeks after intervention) step was done in self-reporting by the primitive questionnaire. The data were analyzed by SPSS 11.5 versions, then, their conditions regarding their normality or abnormality were examined by Kolmogorov–Smirnov test. The

difference between the groups was analyzed by the chi-square test, independent *t* test, Mann Whitney test and Repeated Measures analysis of variance (ANOVA test for interaction has been reported separately for each group). Friedman test were used to examine change over time. For all analyses, alpha levels were set at $P<0.05$.

At the initial step of intervention, the both group were compared in accordance with demographic variables considering their types and distribution through independent-*t* test, chi- square test and Fisher exact test.

***Intervention***

The educational interference was designed and performed noticing the primitive study based on social-cognitive theory and besides considering the importance of self-regulation, self-efficiency strategies and strengthens the social support to promote physical activity in diabetes (II) females. The training program was introduced during 7 sessions (4 theory and 3 practical sessions) in a month (each session ≈60 min). Given that all participants were adults, during theoretical sessions were used brainstorming method, group discussion and lecturing plus asking questions and answering them. To amplify learning we utilized posters, educational pamphlets, fact notes, slides, physical activity training DVDs. Moreover there were prepared some check lists to assign aims, physical activity planning and evaluate their behavior in the form of weekly sport contest also self monitoring cards were used to control diabetes (fast blood sugar) and weight. The training sessions' topics included:

*Introduction session:* in which the necessary rules and conditions to enter in interference group, the aims of study and all participants' duties were announced, then a pamphlet and a poster were prepared to make sense and take the participants' attentions.

The first session: having a discussion about healthy lifestyle and physical activity and how to do it, the advantages of physical activity using Brainstorming also emphasizing the awareness increase and taking attention, based on the constructs of the SCT and using slides.

The second session: to debate about in problems and find the alternatives to overcome barrier, attempts were made to increase self-efficiency to fight against obstacles through verbal persuasion, performance experiences, modeling and discuss about how to receive social support to strengthen our behavior exploiting ideas precipitation and giving homework to adjust life routine program.

The third session: assigning aim and its importance to get favorite results. The participants were divided into four groups in order for discuss about short term and long term objectives in self-regulation strategies, debate in behavior self-evaluation also using self- monitoring cards to measure physical activity, blood sugar and weight.

The fourth session: talk over having a regular program, planning for physical activity and goal setting and what are the characteristics of an ideal plan. Reviewing learners aims to help them or introducing individual consultant to investigate their achievable objectives.

The fifth, sixth and seventh sessions: a walking program and practical training course in physical activity by a sport coach insisting on skill behaviors, modeling and being strong to get the aims. This intervention component was included to provide role modeling from other diabetic for the participants and to help support the participants reach their physical activity goals. These lessons had family interaction with participants. The focus of the curricular components that targeted other constructs all included a component of the assignment that required the patients to interact with either a peer or a family member to accomplish the in-class and or homework assignment. Thus communication with peers and family members regarding what they were doing in class was a necessary component of the curriculum. For example, in targeting self-regulation patients were required to write an exercise goal and verify it was adhered to with written support of a family member.

Participants in the control group received their training outline and did not receive any educational or counseling sessions but did receive the educational pamphlets and physical activity training DVD after the final follow-up questionnaires were administered.

This study was approved by the Ethic Research Committee of the university and ethical principals were considered in all phases of the research such as taking informed consent from all participants and ensuring the confidentiality of information.

## Results

The age mean of the participants in the study was 48.37 yr (SD=5.67), also the body mass index was 28.69 (SD=3.95) and the duration of disease average was 65.04 months (SD=53.52). There was no significant statistical difference between two groups ($P>0.05$). At the baseline, subjects in the intervention group (n=41) reported engaging in physical activity for an average of 41.90 minutes per week (SD=31.40) compared to an average of 40.00 minutes per week (SD=30.47) in control group (n=41). There was no significant difference between the two groups in the mean of minute's physical activity per-week ($t=0.278$; $P=0.781$), but at the follow up there was difference between the two groups in the mean of minute's physical activity per-week ($t=2.68$; $P=0.009$). In the intervention group minutes-per week variable revealed that by the follow up (after 10 week end of intervention), there was significant improvement across time (F=3.30; df=2; $P=0.042$), in the control group there was no significant improvement across time (F=0.5186; df=2; $P=0.831$) in the mean of minute's physical activity per-week (Table 1). Before intervention, a great number of the study subjects (56.1% in the intervention group and 75.6% in the control group) were light or no physical activity.

**Table1:** Minutes of physical activity per week between intervention and control groups during the research (n=41)

| | Before intervention | | Immediately after intervention | | 10 weeks after intervention | | ANOVA | | |
|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | **F** | **df** | ***P* value** |
| Intervention (n=41) | 41.90 | 31.40 | 58.90 | 48.04 | 61.09 | 43.46 | 3.309 | 2 | 0.042 |
| Control (n=41) | 40.00 | 30.47 | 41.95 | 22.82 | 39.75 | 26.33 | 0.185 | 2 | 0.831 |
| *t* test | 0.278 | | 2.040 | | 2.680 | | | | |
| *P* value | 0.781 | | 0.450 | | 0.009 | | | | |

As for the level of physical activity before the execution of the training intervention, there was not significant statistical difference between the two groups ($P$=0.144). With regard to Friedman test results the reduction of individuals with light or no physical activity in the intervention group from 56.1% (23 individuals) to 14.6% (6 individuals) with light physical activity ($P$<0.001). There was no significant difference in the control group at the level of physical activities, and pre and after intervention and follow up stages ($P$=0.160). Further, 31.7% of the participants in the intervention group were at moderate level of physical activity before the execution of the training program which, the figure rose to 68.3% (n=28) after the program (Table 2).

The determination and comparison of the constructs of the SCT in doing physical activities in the intervention and control groups indicated that there was no significant difference between the two groups before the execution of the intervention regarding ($P$>0.05) but there was statistical difference significantly between the groups in the mean of scores in self-regulation ($t$=3.67), social support (t=5.40), modeling ($t$=4.05), barrier efficacy ($t$=5.01), acknowledge ($t$=4.79) at follow up ($P$<0.001). There was significant increase in experimental group in the average scores of self-regulation (F=9.08; df=2), social support (F=7.99, df=2), acknowledge (F=20.51; df=2), Barrier self-efficacy (F=10.09; df=2), modeling (F=16.46; df=2), environment perception (F=9.13; df=2), end of intervention (follow up) in contrast to pre-intervention ($P$<0.001). The mean barrier efficacy score decreased significantly in control group in following up compared to before the intervention which indicated beliefs of participations about overcoming barrier of physical activity increased in the same group during the time (Table 3).

**Table 2:** Comparison of the levels of physical activity between intervention and control groups at the during research

| | Intervention | | Control | |
|---|---|---|---|---|
| **Variables** | **Number** | **Percent** | **Number** | **Percent** |
| **Before intervention** | | | | |
| Light | 23 | 56.1 | 31 | 75.6 |
| Moderate | 13 | 31.7 | 6 | 14.6 |
| Intensive | 5 | 12.2 | 4 | 9.8 |
| **Immediately after Intervention** | | | | |
| Light | 15 | 36.6 | 27 | 65.9 |
| Moderate | 21 | 51.2 | 11 | 26.8 |
| Intensive | 5 | 12.2 | 3 | 7.3 |
| **10 weeks after Intervention** | | | | |
| Light | 6 | 14.6 | 25 | 61.0 |
| Moderate | 28 | 68.3 | 13 | 31.7 |
| Intensive | 7 | 17.1 | 3 | 7.3 |
| **Friedman test** | | | | |
| Statistics | 13.35 | | 3.59 | |
| df | 2 | | 2 | |
| *P* value | 0.001 | | 0.160 | |

**Table 3:** Comparison of mean score of Knowledge, self- Regulation, social support, Barrier self –efficacy, Modeling, Environment Perception between the two study groups before - after intervention and flow up (after 10 weeks)

| | Before intervention | | Immediately after intervention | | 10 weeks after intervention | | ANOVA | | |
|---|---|---|---|---|---|---|---|---|---|
| **Variables** | **Mean** | **SD** | **Mean** | **SD** | **Mean** | **SD** | **F** | **df** | ***P* value** |
| **Acknowledge** | | | | | | | | | |
| Intervention (n=41) | 10.21 | 3.50 | 14.68 | 3.07 | 13.75 | 3.69 | 20.515 | 2 | 0.001 |
| Control (n=41) | 10.65 | 3.83 | 10.36 | 3.12 | 10.34 | 2.63 | 0.210 | 2 | 0.811 |
| **Self regulation** | | | | | | | | | |
| Intervention (n=41) | 31.46 | 9.71 | 37.92 | 5.94 | 35.63 | 7.76 | 9.085 | 2 | 0.001 |
| Control (n=41) | 29.90 | 5.95 | 29.19 | 7.68 | 29.34 | 7.72 | 0.150 | 2 | 0.861 |
| **Social support** | | | | | | | | | |
| Intervention (n=41) | 24.04 | 9.97 | 28.43 | 8.72 | 31.34 | 9.83 | 7.998 | 2 | 0.001 |
| Control (n=41) | 21.24 | 7.34 | 20.29 | 6.25 | 20.68 | 7.90 | 0.222 | 2 | 0.741 |
| **Modeling** | | | | | | | | | |
| Intervention (n=41) | 33.80 | 7.00 | 38.68 | 5.47 | 40.60 | 5.58 | 16.467 | 2 | 0.001 |
| Control (n=41) | 36.12 | 7.77 | 34.82 | 6.70 | 35.26 | 6.33 | 0.425 | 2 | 0.622 |
| **Barrier efficacy** | | | | | | | | | |
| Intervention (n=41) | 30.04 | 9.41 | 37.09 | 8.80 | 35.53 | 8.59 | 10.090 | 2 | 0.001 |
| Control (n=41) | 30.78 | 7.36 | 30.14 | 8.75 | 25.09 | 0.18 | 10.931 | 2 | 0.001 |
| **Environment perception** | | | | | | | | | |
| Intervention (n=41) | 21.07 | 6.10 | 24.65 | 3.46 | 24.78 | 4.05 | 9.133 | 2 | 0.001 |
| Control (n=41) | 23.21 | 4.79 | 24.23 | 77.30 | 23.04 | 4.91 | 0.031 | 2 | 0.969 |

In intervention group, there was a significant increase considering the median of scores difference in task self-efficiency (F=6.62; df=2; *P*=0.037), outcome expectancies (F=6.98; df=2; *P*=0.030), in following up comparison with pre-intervention, while in the control group the median of scores difference were no significant during educational program evaluation (*P*>0.05). There was no significant variation between the two groups in the median of task self-efficiency score (z=-0.55; *P*=0.582) and outcome expectancies score (z=-1.13, *P*=0.258) before interference. Nevertheless, the median score of the task self-efficacy (z=-2.98; *P*=0.003), outcome expectancies (z=-2.53; *P*=0.011) had significant difference in the intervention and control groups in following up (Table 3).

## Discussion

The purpose of this study was to indentify the effect of training intervention according to social-cognitive theory on promoting physical activity among the diabetes II women. In the current study, the reduction of individuals with light or no physical activity in the intervention group in comparison with the control group indicated the positive effect of the training intervention based on the SCT. Examination of the social cognitions assessed in this study can offer potential reasons as to why this intervention may have helped diabetic women engage in more physical activity after intervention. For example, participants reported increases in all construct of SCT including SR (goal setting and planning), task self efficacy, outcome expectation, social support, modeling, behavioral capability (Knowledge related to physical activity), over time as compared to baseline.

Participants were repeatedly given the opportunity to master goal-setting, planning and overcome barriers to physical activity in accordance with social cognitive theory, confidence to engage in these skills increased [11]. Enhancements in SR may be considered particularly positive because previous research has shown that SR partially mediates physical activity behavior in adults [21]. Furthermore, the findings that OE remained high immediately post- and 10 weeks post intervention could be interpreted to mean that the intervention was successful at helping participants feel they were achieving social, physical and psychological outcomes. Bandura (1986) suggest [11], if people achieve the outcomes they expected to when they set out to change their behavior, they are likely to feel satisfied with their persistence for the newly acquired behavior. This interpretation fits with social cognitive theory [22], which suggests that there is a triadic reciprocal relationship between cognitions, the environment and behaviors.

One way that future diabetic women interventions may help participants feel satisfied with their efforts could be to include components that encourage participants to reflect regularly on the achievements they have made during the program. For example, through the social support approach, participants regularly set, work towards and reflect on physical activity goals. Allen during a study revealed that physical activity was increased after intervention among diabetes, moreover reclining activity or doing it lightly after intervention decreased significantly rather than before [23]. Norouzi et Al., investigated that with passing time, there was significant change in the minuet of moderate physical activity in intervention group[5]. Shamsi et Al., found out a meaningful difference between walking scores among women diabetes II before and after intervention[8]. The general findings from these studies are in accordance with the recent study. In addition, it was shown which had been caused for educational intervention so that it could positively affect the participants' knowledge levels in intervention group to different aspects of physical activity, its advantages and flaws on metabolic control that was in accordance with the previous results[24]. Bandura reported that being aware of the perils and the habit advantages related to lifestyle is a precondition to alter behavior, therefore if the people do not have enough information about them, they cannot find enough reasons to tolerate the problems relate to change their previous behaviors [25]. As it was reported by Rengert, training intervention would increase self-regulation average in the intervention group, however they brought change was not significant which was against to the present findings [26]. One cues difference existed perhaps it might be for performing procedure or the following up period (a month).

In accordance with the present findings, Ayotte [27] revealed that self-regulation is in a positive correlation relation with different levels of physical activity among the participants. In Rengert's study there was no significant change in self-efficiency average for training intervention in post-test and follow-up period (a month later) among the intervention group[26] which was against the present findings. Lack of effectiveness of educational intervention in Rengert's study in self-efficiency improvement could be for this fact that he used less interactive methods, besides the participants did not actively take part in doing the task, on the other hand, the allocated training time might not be as enough. The self-efficiency is related to the personal beliefs to do the tasks which is originated from personal successes and failures or watching the others' that are similar to his/hers also oral encouragement and controlling excitements [28]. Higher levels of efficacy and favorable outcome expectation lead individuals to set goals for and plan and monitor their healthier behaviors. Allen et Al., during an experimental study investigated the effect of education intrusion according to self-efficiency theory in physical activity improvement among the diabetes II. They showed that in intervention group there was seen a significant difference between self-efficiency averages before and after intervention (8 weeks later) compared with the control group [23]. Springer showed that social support could be an important factor to adapt and do physical activities. Being encouraged and persuaded by friends and relatives in sport programs were of aspects social support which are important to do and

continue physical activities[7]. Environmental factors key to adherence to physical activity involve social support such as modeling by family and friends, support from exercise partners, and feedback from exercise leaders [12].

In the current study, an increased commitment to barrier self-efficacy for physical activity was found to mediate changes in physical activity in intervention group. Beliefs about overcoming barriers should predict exercise adoption [12].

In the present survey, it was not possible to observe concretely all the participants, therefore during study their performances were identified and compared according to self-reported questionnaires which was one of the limitations in the survey, on the other hand, the training intervention was designed according to one of theories in healthy behavior change (SCT) which it was strength.

## Conclusion

It is feasible and beneficial to use of behavioral strategies such as self regulation and self efficacy to change physical activity behavior. Social-Cognitive theory is a useful framework for promoting physical activity and can be a base for educational intervention among individuals with type 2 diabetes. Thus, the utilization of this theory is recommended in order to increase the time and intensity of performing physical activities.

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## Conflict of interest statement

The authors declare that they have no conflict of interest.

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