



Iran Diabetes Research Roadmap (IDRR) Study; Diabetes and Exercise: A Review Article

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Abstract

Background: This study aimed to provide comprehensive analysis of research output in the field of diabetes and exercise in Iran.

Method: Search process of the present study was a part of search strategy of Iran Diabetes Research Roadmap (IDRR) study. All publications of Iranian authors about diabetes and exercise in national (SID, IranMedex, and Magiran) and international journals (PubMed, Web of Science and Scopus) up to 2015 were reviewed. After screening and adjusting for duplicates, 180 studies were remained and categorized by subject category, methodology, WHO classification and NHMRC criteria.

Results: Among 180 obtained articles, in term of subject area most number of documents was about the type of sports (55%) followed by social aspect of exercise and physiologic effects. Aerobic exercise (52.5%) was the most common exercises studied. Moreover, overall trend of publications was relatively increasing during the study period. More than half of the papers were randomized clinical trial (RCT) (51.11%).

Conclusion: Although trend of papers subjects was relatively scattered, most of exercise studies in Iran were about the type of sports with more focus on aerobic exercises in patients with type 2 diabetes. Future research in this field should be directed more toward cohorts and systematic reviews that provide high level of evidence. However, quality assessment for all studies should be carried out in future research.

Keywords: Exercise, Diabetes, Research roadmap, Iran

Introduction

Diabetes is one of the leading health issues around the world. It affects 5%-8% of the Iranian population (1,2). Today, our physically inac-

tive lifestyle is one of the biggest risk factors that lead to type 2 diabetes. Exercise, aside from being an effective primary preventive measure, is

one of the most beneficial therapeutic interventions for this disease. Diabetic patients can safely use exercise to manage their blood pressure and glucose levels, lipid profile and weight. In addition, exercise has psychological benefits including but not limited to decreased anxiety, less depression, and improved sleep quality. The importance of exercise and physical activity is defined in the treatment options and lifestyle of type II diabetic patients. However, its relevance in type I diabetes is unclear (3, 4).

Exercise, aside from being an effective primary preventive measure, is one of the most beneficial therapeutic interventions for this disease. Diabetic patients can safely use exercise to manage their blood pressure and glucose levels, lipid profile and weight.

Various exercise routines such as aerobics, strength training, and stretching routines can be prescribed for patients. However, when prescribing exercise regimen, its duration, intensity, and frequency must be monitored and safety issues concerning diabetic patients were taken into account. Patients themselves must be well-educated in these matters (5,6). Before patients undertake an exercise regimen that is more rigorous than their daily routine, they undergo full medical evaluation so their physical activity recommendation takes into consideration all their probable limitations (7). Regular exercise increases production of glucose transporter protein and as a result, facilitates the intake of glucose by cells especially muscle cells. On the other hand, repeated contraction of muscles especially large muscles of the body helps intake of blood glucose. This allows for greater intake of blood sugar on a cellular level. Therefore, different exercises particularly aerobic exercise such as walking, running and mild to moderate intensity swimming can be used as a proper and cheap alternative method for control and therapy of all types of diabetes (8).

To find the research gap in the field of sports science in diabetes, evaluation of detail characteristics of previous studies is required. There is no comprehensive analysis of studies performed on exercises and DM neither in Iran nor in the world. This is the first study that reports detailed

characteristics of exercise research in DM in Iran. This study was a part of Iran Diabetes Research Roadmap (IDRR) study to find research gap in the field of exercise in diabetes. The main goal of present study was to evaluate and report characteristics of exercise studies in DM in Iran.

Methods

All publications of Iranian authors about diabetes and exercise in national and international journals up to 2015 were reviewed. Search process of the present study is part of search strategy of Iran Diabetes Research Roadmap (IDRR) study. Comprehensive search was performed in international databases including PubMed, Web of Science and Scopus as well as national databases including SID, IranMedex, and Magiran as described in the study protocol (9). The keywords used for English database search were "Diabetes mellitus" and "Iran*" in the author affiliations according to each database instructions. For search in national databases, equivalent Persian keywords were used. However, the search strategy has been described in detail in the protocol study (9).

A total number of obtained papers were categorized into eleven groups according to the study topic (protocol study). In each group, all papers (after adjusting for duplicates) were classified based on the study design, subject category, WHO classification (10) and Australian National Health and Medical Research Council (NHMRC) criteria (11). WHO criteria for research classify the studies to know whether research meets health needs and improve health outcomes or not. NHMRC criteria are applied for definition of research area.

In this study, however, unrelated topics, letter to the editors, meeting abstracts, news, as well as studies on foreign population and studies of Iranian authors with foreign affiliation were excluded.

After screening according to the mentioned method, 180 studies were remained and categorized as described above by subject category, methodology, WHO classification and NHMRC criteria.

Statistical Analysis

The data was analyzed by descriptive statistic and results were depicted by appropriate graphs. SPSS software version 17 (Chicago, IL, USA) for Windows was used for data analysis.

Results

Among the obtained documents, only nine documents were about exercise and physical activity in type 1 diabetes and the rest was in type 2 diabetes patients. Fig. 1 shows the growing trend of number of publications in the study period. The top number of documents was obtained in 2014. Regarding WHO classification, 65.56% of studies were categorized in researches that evaluate the delivery, efficiency and effectiveness of health systems, guide health policy development and optimize implementation of health programs. In this classification, 21.11% of studies were about distribution, causes of disease, 7.32% were re-

lated to interventions, and 6.11% were about solutions. Considering Australian National Health and Medical Research Council criteria, the most common documents were in the field of clinical research (117 documents/65%) followed by public health research (22.22%) and basic research (12.78%).

From methodological aspect, randomized clinical trial (RCT) (51.11%) was the most common methodology used in the obtained documents (Fig.2). After RCTs, qualitative studies and other interventional studies were in the next ranks.

Regarding the subject of study, exercise with the frequency of 55% was the most common subject of obtained documents followed by social aspect of exercise and physiologic effects (Fig.3). In our documents, aerobic exercises (52.5%) were the most common exercises studied (Fig.4). In the next ranks after aerobic exercises were hydrotherapy and strength training, respectively.

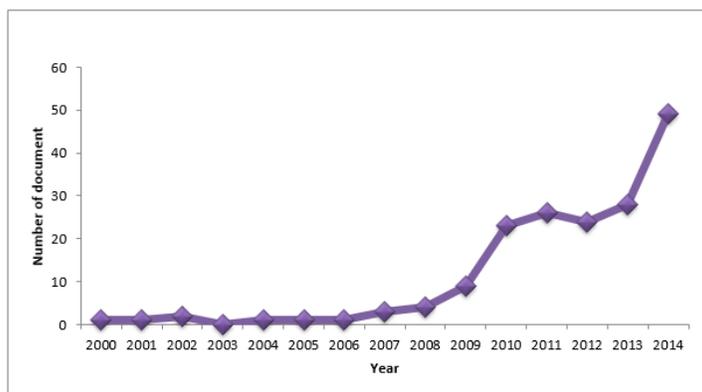


Fig. 1: Trend of number of publications in the field of exercise and diabetes research during the study period

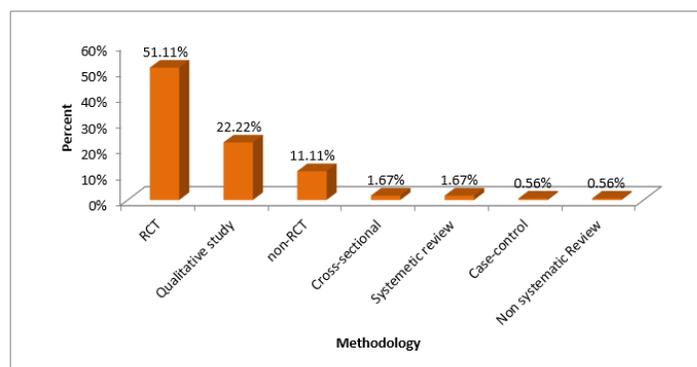


Fig. 2: Distribution of different methodology used in the obtained documents

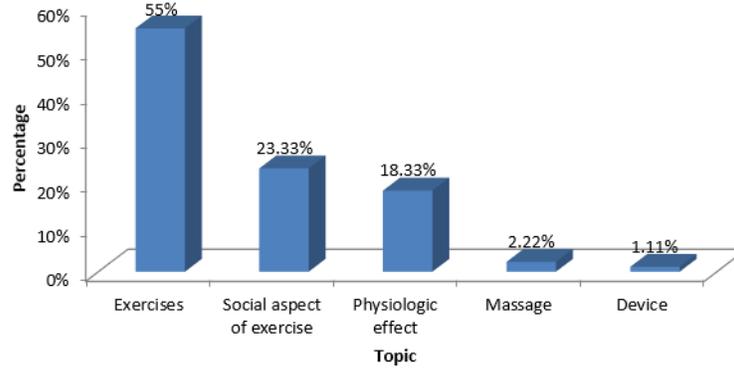


Fig. 3: Classification of studies by subject

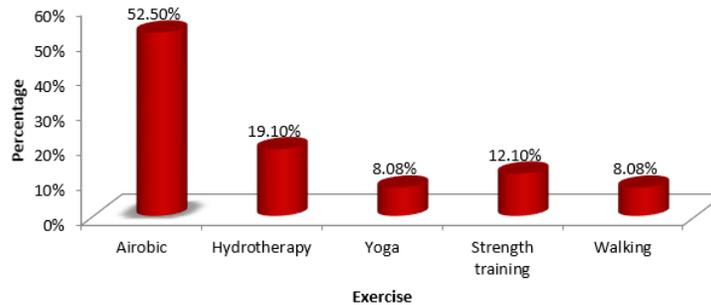


Fig. 4: Distribution of various exercises in the obtained documents

Discussion

This study showed that only nine of the 180 studies about exercise and diabetes in Iran have considered type 1 diabetes. This serious shortage can be explained by the pathophysiological nature of disease that exercise is not a primary intervention method for treatment and control of glycemia in type 1 diabetes (12). Thus, results presented here in our analysis were related to type 2 diabetes.

In our study, regarding WHO classification, most published articles were about evaluation of the effect of exercise on diabetes and also most of them were clinical research as predicted regarding Australian criteria.

Among the 180 studies done in the area of diabetes and exercise, 88 studies focused on interventions using different types of exercise for type

2 diabetes patients and most involved aerobic exercises. Among all types of exercises, aerobics exercises are essential in the management of type 2 diabetes (13). Aerobics exercises were correlated with lower risk of death due to heart and vascular disease, improved psychological conditions, improved quality of life and improved weight management.

Hydrotherapy, strength training and Yoga respectively were the most common studied exercises after aerobic exercises in our study. Hydrotherapy has increased and gained popularity in the recent two decades and has improved to a therapeutic exercise. Hydrotherapy can reduce disease symptoms and improve motor and cognitive status in many diseases (14). In our study, 19% of articles evaluated the effect of hydrotherapy on diabetes. The main limitations of this exercise are high

cost, need for facilities and equipment and difficult accessibility especially for women in Iran. Strength training is another type of exercise recommended to diabetic patients (15, 16). Yoga was the third common exercise studied in our documents in this study. Yoga increases strength and flexibility of muscles, oxygen absorption, blood circulation and hormonal levels. In addition, Yoga stabilizes autonomic system, controls emotions and improves wellbeing sensation (17). In this study, eight documents (8%) were about the walking and diabetes. Simple walking by reducing weight, adipose tissue and blood pressure is an effective exercise in the management of diabetes. Walking is an exercise without cost, without age and gender limitation, and is practical every time and everywhere and is available to everyone (18).

However, given that the majority of exercise studies were about the evaluation of the exercise effect often based on self-reported information, it is suggested to launch well-design qualitative studies via standard questionnaires and interviews in order to obtain more accurate estimate of patients' participation in exercise programs. Another point that seems has not paid attention to that in the studies is to design exercises programs tailored to the patients' personal goals and their exercise capacity (19).

However, it is difficult for people with type 2 DM to put into action the exercise recommendations for a number of external and internal barriers(5). Therefore, future studies should be focused more on perceived barriers to exercise among diabetic patients to be able to use more appropriate workout protocol that has fitness and weight-loss benefits.

Conclusion

The main gap identified in this study was lack of cohort studies and systematic reviews for providing high level of evidence. Future research should be directed more toward cohorts and systematic reviews as well as understanding of mechanism of exercise effects in diabetes to personalized

physical activity in diabetes patients. However, quality all studies should be assessed in future research.

Ethical considerations

Ethical issues (Including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc.) have been completely observed by the authors.

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