



Iran Diabetes Research Roadmap (IDRR) Study; Gap Analysis of Diabetes Complications in Iran: A Review Article

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Abstract

Background: Diabetes mellitus (DM) is a common non-communicable diseases associated with different complications. The study aim was to analyze and report characteristics of research output in the field of diabetes complication in Iran in details and identify research gap in this field.

Methods: All scientific diabetes output published by Iranian authors in national and international journals until 2015 was included and analyzed. National and international databases including PubMed, Web of Science, SCOPUS, SID, IranMedex, and Magiran were searched. The obtained results were categorized into eleven subgroups. of complications, comorbidities, management, psychiatry, nutrition, prevention, physical activity, genetics, basic sciences, education and gestational diabetes mellitus (GDM). In each category, documents were classified based on the study design and topic as well as WHO and Australian National Health and Medical Research Council (NHMRC) classification.

Results: After screening, 1262 documents remained. Trend of publication was growing during the study period. However, small temporary drop was seen in 2012 and 2014. The most common type of studies in WHO and NHMRC classification belonged to distribution and causes and clinical research, respectively. Cross-sectional and animal designs were the most common methodologies used and vascular complications were the most common subject area in the obtained documents.

Conclusion: Subject trend of Iranian studies in the field of diabetes complications is compatible with the prevalence of such complications. However, results show lack of studies with high level of evidence including cohorts and systematic reviews in Iran. Although the trend of publications is growing but considering the importance of this issue, it is not enough and more funds should be allocated in this field. Considering the increasing frequency of basic research close collaboration between basic and clinical research is required to apply these findings in our diabetes guidelines.

Keywords: Diabetes mellitus, Complication, Neuropathy, Nephropathy, Retinopathy, Iran

Introduction

Diabetes mellitus (DM) is one of the most common non-communicable diseases associated with considerable mortality and morbidity. DM is an important health problem in developing coun-

tries. Prevalence of Diabetes has increased dramatically during the past two decades. According to IDF (International Federation of Diabetes) report, the number of patients living with di-

abetes was 415 million in 2015 and it is predicted to rise to 642 million in 2040 in the world (1).

Middle East and North Africa region (MENA) is a region with the highest rate of diabetes in the world. Saudi Arabia and Kuwait are two countries with highest prevalence of diabetes in this region. Greatest number of adults with diabetes in MENA region are living in Egypt (7.8 million), Pakistan (7.0 million) and Iran (4.6 million), respectively (1).

Higher prevalence of diabetes and poor diabetes control in developing countries increase prevalence of diabetes complications that are the most common causes of morbidity and mortality of diabetes.

Vascular complications including neuropathy, nephropathy, retinopathy and cardiovascular disease are among most common and important diabetes complications (2). In Iran, prevalence of peripheral neuropathy was reported 32%–38% in diabetic patients and age more than 50 yr, duration of diabetes more than 10 yr, and fasting blood glucose more than 200 mg/dl were the main risk factors for diabetic neuropathy (3). The same findings were observed and among these risk factors, hyperglycemia was identified as the only modifiable risk factor (4).

DM is a major cause of blindness worldwide due to advanced retinopathy. Diabetes nephropathy is one of the most common causes of ESRD (end stage renal disease), CKD (chronic kidney disease) and morbidity related to microalbuminuria. Microalbuminuria is associated with an increased risk of cardiovascular disease. Diabetic foot is one of the most common causes of foot amputation. All of diabetes complications reduce quality of life in diabetic patients. Prevention and control of complications reduce mortality and morbidity, and improve quality of life and reduce long-term costs.

Preliminary study showed that proportion of research in the field of diabetes complication to all diabetes research in Iran was higher than this proportion in the world (5). However, to improve quality and quantity of research in the field of diabetes complication, the first step is to identify research and knowledge gap in this field of science in Iran to know the necessities, prevent

duplication, avoid waste of time and money and provide priorities of research in the field of diabetes complication. To identify research gap, we should have a clear and details analysis of previous research in the country to be able to interpret about the research gap in the country to direct the research resources to the right target.

The current study aim was to provide detailed characteristics of Iranian diabetes complication research output and identify research gap to draw Iran diabetes roadmap.

Methods

This study is a part of the Iran Diabetes Research Roadmap (IDRR). This study included all Iranian diabetes research output from the beginning up to 2015 published in national and International journals.

In this study, search was performed in international databases including Web of Science, PubMed, and Scopus as well as national databases including, SID, Iran medex and magiran using appropriate keywords. Search keywords included "Diabetes mellitus" and "Iran" in English databases and equivalent Farsi keywords for search in national Databases. Details about the study method have been explained elsewhere in the study protocol (6).

Search obtained 8668 document primarily in international journal and 16921 documents in national journal (25589 documents).

In the next step, all documents were categorized according to by title into eleven groups of complication, genetics, comorbidity, education, management, prevention, psychology, nutrition, physical activity, basic sciences and gestational Diabetes Mellitus.

After assignment, in each above-mentioned group, duplication was removed by reviewing the document title as well as the journal volume and issue. After that, abstract and content was evaluated if required. In this stage 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.

Each member categorized assigned document based on the study design topic, WHO (7) classification and Australian National Health and Medical Research Council (NHMRC) criteria (8).

According to the mentioned procedure and after exclusion of above-mentioned documents, 1261 publications remained and were categorized according to above-mentioned method.

As there is no clear border between complications and comorbidities and sometimes there is overlap between them, as described in the study protocol, these conditions were classified according to Harrison's textbook classification (6, 9). Data analyzed by using SPSS software ver.17 for Windows (Chicago, IL, USA).

Results

Total amount of 25589 articles was found by searching the mentioned databases. After screening, 1262 articles remained and analyzed.

Articles were classified by year of publication, title, study design and WHO, Australian classification

papers included case report, review, basic study was not categorized in WHO classifications and paper included case report and review were not categorized in Australia classification.

Publication trend

Fig. 1 shows the trends of diabetes complications publications in the Iran in the recent decade. The number of articles before 1997 was few and not included in this figure. The publication trend was increasing during the study period except for small drop in 2012 and 2014. The largest number of documents was observed in 2013 and 2011, the number of published articles decreased slightly in 2014 and 2012.

WHO and NHMRC classification

Regarding WHO classification, the most frequent type of studies was about epidemiological distribution and causes of diabetes complications (65%) followed by interventions and solutions (32%) and evaluation (3%).

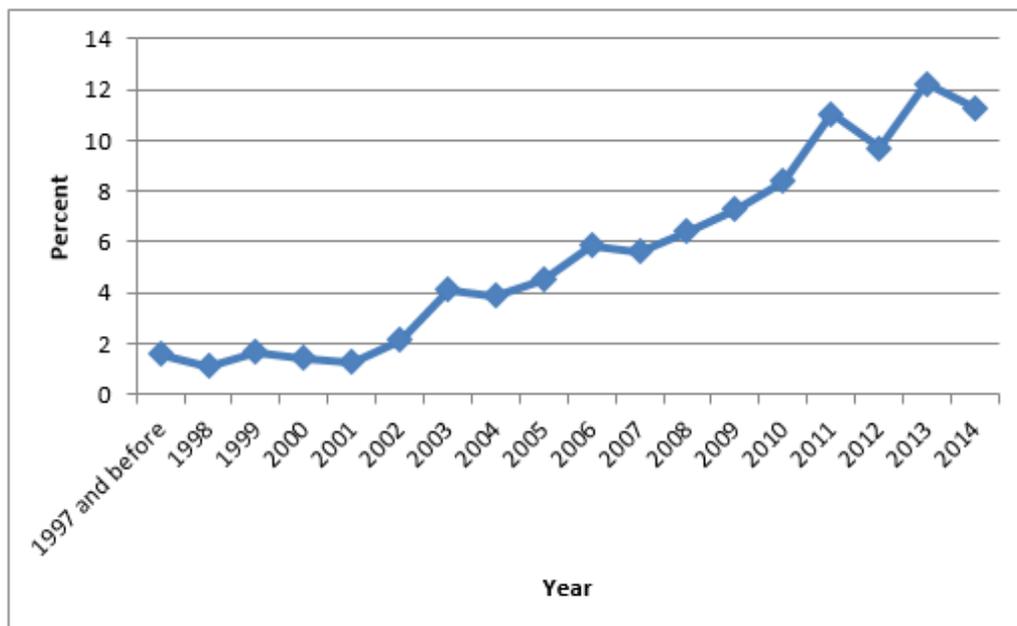


Fig. 1: Trend of Iranian publications in the field of Diabetes complications

Considering NHMRC classification, clinical research with 75% frequency was the most com-

mon type of studies and basic research was in the next rank after that (25%).

Methodology classification

The frequency of types of the study design has been shown in Fig. 2. The most common methodology was cross-sectional followed by the animal and case-control.

The study topic

The most common subject investigated in Iranian studies was vascular complications followed by nonvascular complications and diabetic foot (Fig. 3).

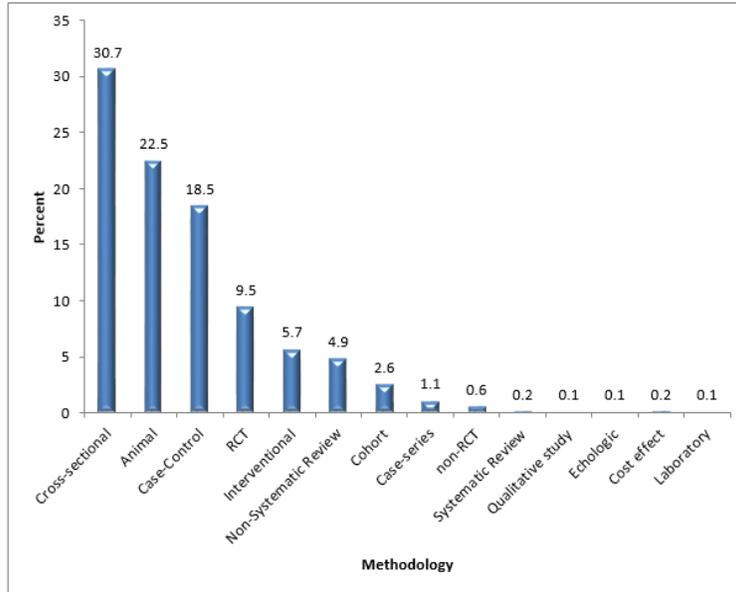


Fig. 2: Frequency of different study design among all obtained documents

Among vascular complications, the most common subject area was neuropathy followed by nephropathy and retinopathy (Fig. 4).

Among non-vascular diabetes complications, periodontal disorders and infection were the most common area studied (Fig. 5).

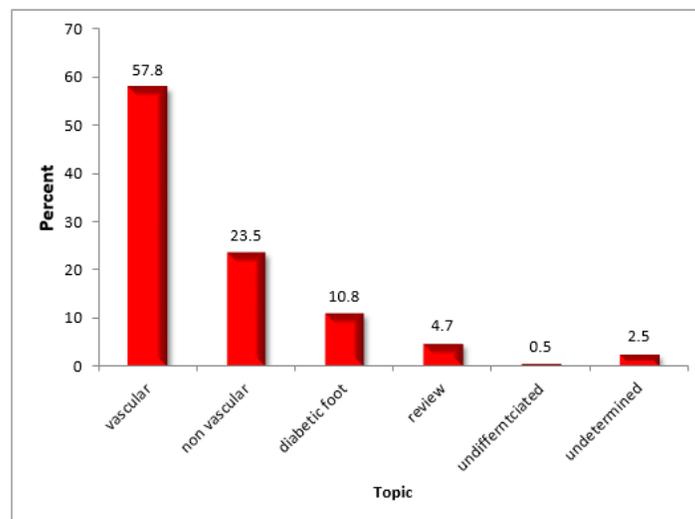


Fig. 3: Distribution of studies according to the study topic

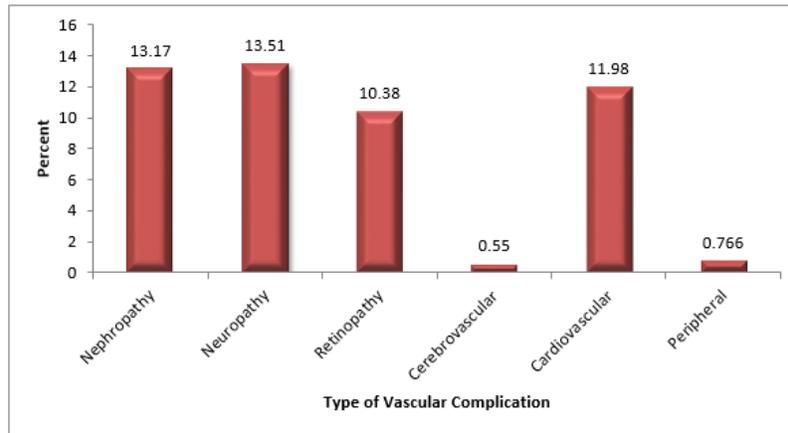


Fig. 4: Frequency of various diabetes vascular complications in the obtained studies

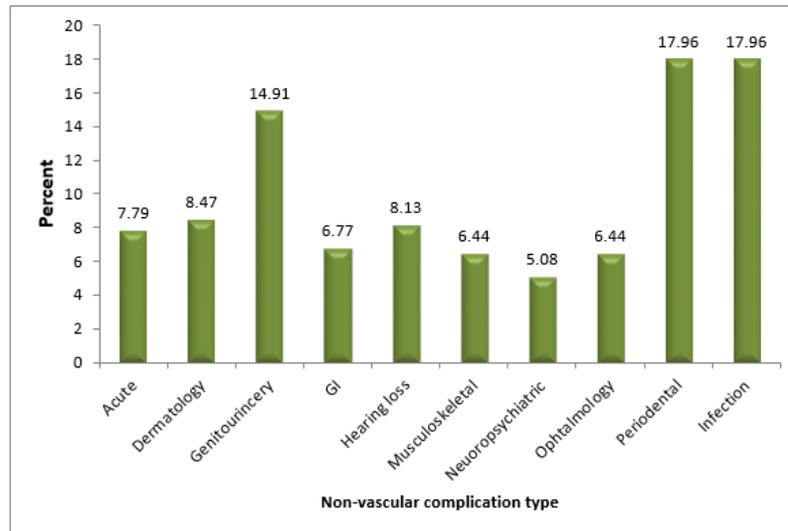


Fig. 5: Distribution of different non-vascular diabetes complications in the obtained documents

Discussion

Most of studies in Iran about diabetes complication are about vascular complication and its prevalence in different cities in the country and design of most studies is cross-sectional.

There is no similar scientometric analysis with the same approach of ours, neither in Iran nor in the world. Our study is the first in the country that provides details analysis of research in the area of diabetes complications.

In a scientometric study about diabetes, Iran diabetes output was evaluated from the beginning

until the end of 2014. Overall, 4425 documents in this period concluded that considering the increasing number of diabetes patients in Iran this number of publications is not considerable and IDF (International diabetes federation) has recommended that our country needs more investment in diabetes research (10).

In a recent bibliometric study, scientific production of the world about diabetes retinopathy during a 20-year period from 1993 to 2013 were analyzed to draw a roadmap for future research in this field (11). Their search in Web of Science obtained 3228 research articles about diabetes

retinopathy published by 11591 authors in 93 countries in ten languages. The language used in these documents was mostly English followed by German, French, and Spanish. The most number of documents was produced by United States, United Kingdom, and Japan, respectively. In that study, the topic of 10 highly cited papers were translational research (30%) and epidemiologic studies. In recent years, there are trends toward more translational research (11).

In a similar study to ours conducted in India, all diabetes scientific production from 1999 to 2008 was analyzed. In that study, United States followed by United Kingdom, Japan, Germany, Italy and France produced the most number of documents (12). Most of studies (more than 58.85%) were in the field of medicine followed by biochemistry, genetics and molecular biology. Areas in the next ranks were including pharmacology, toxicology, and pharmaceuticals, agricultural and biological sciences chemistry, neurosciences and immunology and microbiology (12). Among all Indian diabetes output, most documents were related to type 2 diabetes followed by type 1 diabetes and gestational diabetes. In the field of diabetes complication, the most number of articles were in the field of cardiovascular complication, nephropathy, neuropathy, and brain vascular disease, respectively. These findings are similar to our study results. Among first 18 leading countries in diabetes research, India was stand in 11th place. In addition, among all subject areas contributing to diabetes research, the greatest impact belonged to chemistry, followed by biochemistry, genetics and molecular biology. Although Indian diabetes research had a growth rate of more than 114% during the study period but it is not enough and funding in the field of diabetes research is inadequate. They suggested government invest more in diabetes research. However, there is need for more and better collaboration with the world countries and close collaboration between clinical and basic science researchers within the country (12). This study was the most similar study to ours.

In analyzed scientific production of Middle East countries in the field of diabetes from 1990 to

2012, Turkey, Israel, and Iran, respectively produced more than two-thirds of knowledge about diabetes and growth rate of Iran was 9% in the same period (13).

To decrease diabetes mortality, morbidity, and its related cost, diabetes research should be more focused on early diagnosis of diabetes and its complications. In addition, genetic predisposing factors of diabetes should be identified to prevent diabetes development by application of personalized medicine in future.

Current analysis showed that the design of most diabetes studies in Iran is cross-sectional and the number of studies with high level of evidence such as cohorts and systematic review in the field of diabetes complications is scarce. Lack of studies with such methodology is research gap in diabetes. Moreover, distribution of study on different diabetes complications is compatible with the prevalence of such complications as neuropathy is the most common diabetes complication followed by nephropathy and retinopathy while foot ulcer has the least prevalence (2). Similar order also was observed in the analysis of our diabetes complication output as the prevalence of foot ulcer is 8.6% in the Middle East (2) and in our study subject of 10% of studies was about foot ulcer.

In the current study research gap in diabetes complications were identified in Iran to draw a proper roadmap for diabetes research in the country. In this study, a substantial part of studies were basic science studies and we should provide close collaboration between basic and clinical research and apply these findings in our diabetes guidelines (14).

Conclusion

Positive growing trend of diabetes publications in Iran during the past years indicates ineffective role of world sanctions against Iran on diabetes research as it was shown previously for diabetes care (15).

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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