



ORIGINAL ARTICLE

Evidence Gap on the Prevalence of Non-conventional Risk Factors for Type 2 Diabetes in Iran

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Abstract

Objectives: Robust scientific evidence exists about the role of non-conventional risk factors in type 2 diabetes worldwide. The current epidemiological pattern of the disease in Iran suggests a precipitating role for these non-conventional risk factors. This review was performed to examine the research evidence suggesting a higher prevalence of non-conventional type 2 diabetes risk factors in Iran.

Methods: MeSH keywords were applied to search several databases, including PUBMED, MEDLINE, AMED, EMBASE, Iran DOC, and the Scientific Information Database without a time limit from inception to September 2011. The quality of the non-interventional and population-based studies on Iranians included in these databases was assessed by the authors and any disagreement was resolved with consensus.

Results: The literature search yielded 1847 publications, of which 62 were included in this study after eliminating non-relevant and overlapping papers. No study was found that verified a higher prevalence of the non-conventional type 2 diabetes risk factors in the Iranian population.

Conclusion: The identified evidence gap about the role of prominent non-conventional risk factors of type 2 diabetes in the Iranian population could be a major caveat in the application of an evidence-based approach to endorse or reject existing hypothesis about these risk factors. Studies on the prevalence of non-conventional biomarkers of type 2 diabetes among Iranians could be a promising area of research.

1. Introduction

Type 2 diabetes is a highly prevalent metabolic disorder and accounts for about 90% of all cases of diabetes

in the world [1]. The global prevalence of type 2 diabetes has reached 6.4%, which could be an overwhelming burden on the health and economies of countries [2]. Although there is robust scientific evidence about the role

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of conventional risk factors and, consequently, about effective preventive strategies to halt the progress of the disease worldwide, the marked increase in type 2 diabetes in recent decades represents a failure in putting the established science into practice [3].

The prevalence of type 2 diabetes among adult Iranians aged 25–64 years is estimated to be 7.7%, excluding undiagnosed patients [4]. Lifestyle changes, especially in urban areas, low rates of physical activity, and obesity are the main recognized conventional triggers in the occurrence of type 2 diabetes across the country [5]. The onset of the disease in Iran is currently mostly observable in the 45–55 year age group, whereas in the developed world it is mainly a disease of old age,

i.e., over the age of 65 years [6]. Such a difference may be due to a higher prevalence of conventional and non-conventional type 2 diabetes risk factors in Iran.

Lower plasma creatinine [7], a high intake of total and animal protein [8], plasma apelin and visfatin levels [9,10], lower β -cell function [11], plasma preptin levels (a hormone that is co-secreted with insulin and amylin from the pancreatic β cells) [12], serum 25-hydroxyvitamin D (25OHD), and dietary calcium [13–16] are a group of non-conventional risk factors that may explain the higher incidence and prevalence of type 2 diabetes in some ethnic groups.

This study was performed to look at the empirical research evidence about the studied risk factors for type 2

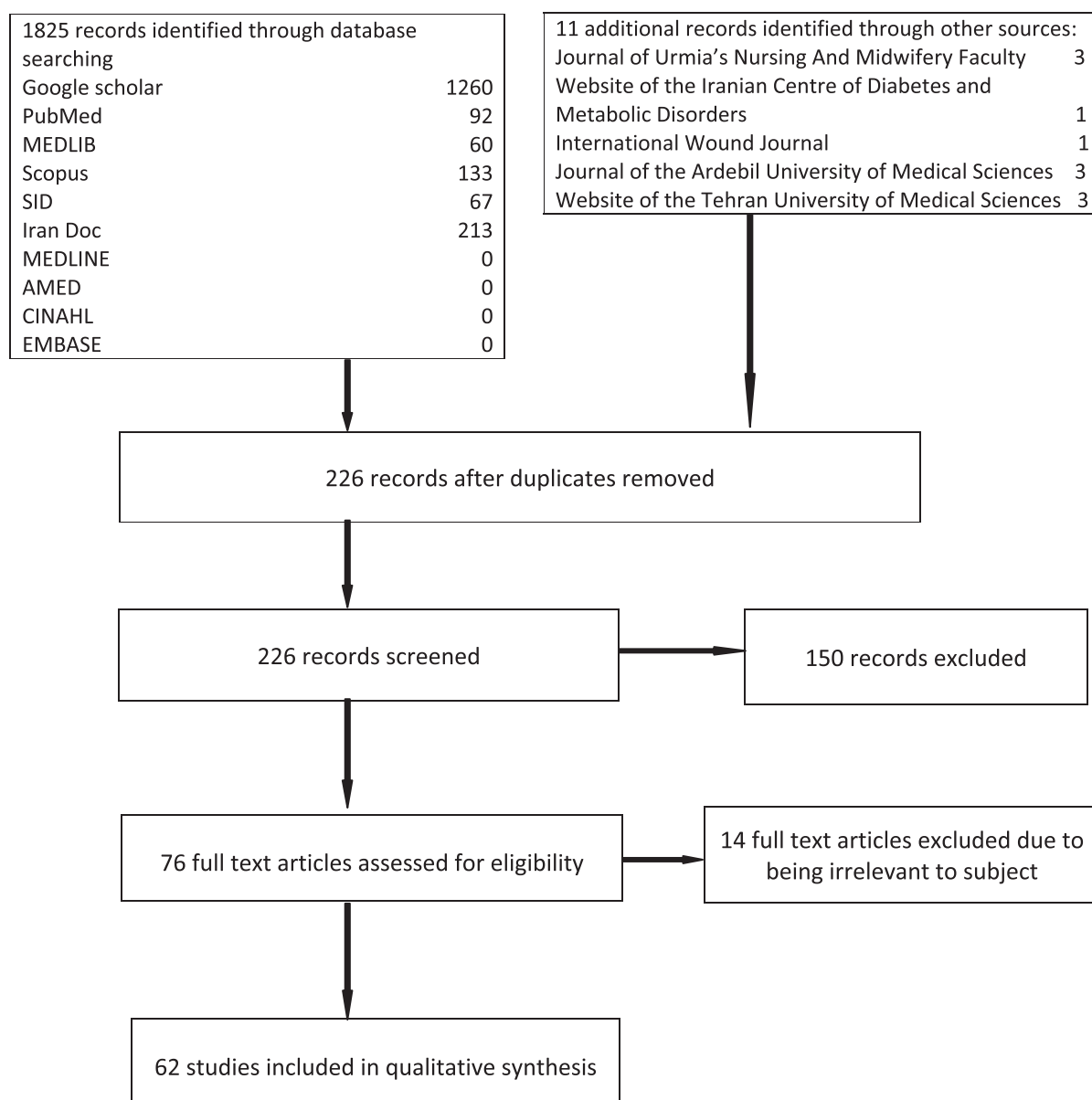


Figure 1. Flow diagram of the method of selecting publications on the risk factors of type 2 diabetes in Iran retrieved from databases.

diabetes in the Iranian population and to check whether there was any hypothesis to suggest a higher prevalence of non-conventional type 2 diabetes risk factors in Iran.

2. Materials and methods

In this systematic review, various keywords (including “type 2 diabetes”, “diabetes mellitus”, “maturity onset diabetes” or “noninsulin-dependent diabetes”, and “Iran” and “risk factor” with their Persian equivalents) were applied to search the PUBMED, MEDLINE, AMED, CINAHL, EMBASE, SCOPUS, and MEDLIB databases, and also the Scientific Information Database (SID; a national database of published articles in Iranian journals) and IRAN DOC (a database of published papers and thesis in Iran) without a time limit from inception to September 2011. The Super Searcher of Google Scholar was also checked for unpublished materials within the same time limit. All non-interventional population-based studies on Iranians living in Iran were included, but studies on people living in institutions, Iranians living abroad, and publications in non-English or non-Persian languages were excluded.

A customized data extraction sheet was used to extract and record the study data. The quality of the studies was determined based on the study design, sample size, sampling method, sampling frame, study feature, and a report of the type of conventional and non-conventional type 2 diabetes risk factors studied. The quality of the retrieved publications based on these quality criteria were assessed independently by the authors and any disagreement was resolved with consensus.

3. Results

We found 1836 publications in the first round of the search, along with 11 publications found through serendipitous discovery. The titles and abstracts of these identified publications were inspected and their relevance to the objective of this study was checked. As a result of overlaps among the scanned databases or inconsistencies with the study objectives, 1610 publications were excluded. Of the remaining publications (226), 150 papers were also excluded after they had been scrutinized in detail for inclusion and quality criteria. The full text of 76 publications were obtained at this stage and were studied thoroughly. Finally, 14 publications were excluded because they were not directly relevant to the study objectives. Consequently, 62 publications [17–74] were included in this review (Figure 1).

The risk factor most often studied in the selected publications was obesity and waist circumference; the least studied risk factors were polycystic ovary syndrome and the use of specific types of drugs, such as phenytoin

(Dilantin), diuretics (thiazides), corticosteroids, beta blockers, and steroids (contraceptives; Table 1). The applied cutoff points to assign abnormality in the retrieved studies are given in Table 2. Data about the year of publication of the included publications are given in Table 3.

We found no study focused on the prevalence of non-conventional type 2 diabetes risk factors in the Iranian population, nor any hypothesis explaining a probable higher prevalence of non-conventional risk factors for type 2 diabetes.

4. Discussion

The findings of this study revealed a major gap in the study of prominent non-conventional risk factors for type 2 diabetes in the Iranian population. Obesity and waist circumference were among the most frequently studied risk factors that have been screened as predictors of type 2 diabetes in Iran. Inconsistency in the applied cutoff points of the studied risk factors compared with internationally agreed recommendations was noticeable in these studies [75]. To the best of our knowledge, this is the first systematic review investigating scientific evidence about the prevalence of non-conventional risk factors of type 2 diabetes in Iran. Although there is empirical research evidence suggesting that identified non-conventional type 2 diabetes risk factors might play a part in the incidence of the disease [76–78], no research evidence was identified to endorse or reject a higher prevalence of non-conventional type 2 diabetes risk factors in Iran. This should be considered as a major caveat in the application of an evidence-based approach

Table 1. Studied risk factors of type 2 diabetes in the Iranian studies retrieved from databases.

Risk factor	No. (%) of publications
Obesity and waist size	51 (82.1)
Hypertension	25 (40.3)
Dislipidemia	25 (40.3)
Old age	20 (32.2)
Female sex	14 (22.5)
Family history	14 (22.5)
Lifestyle	13 (20.9)
Smoking	11 (17.7)
Urbanization	6 (9.6)
Waist to hip ratio	6 (9.6)
Educational level	4 (6.4)
Stress and anxiety	4 (6.4)
Frequent pregnancies	3 (4.8)
Waist to height ratio	2 (3.2)
Polycystic ovary syndrome	1 (1.6)
Use of some drugs ^a	1 (1.6)

^aPhenytoin (Dilantin), diuretics (thiazides), corticosteroids, beta blockers, and steroids (contraceptives).

Table 2. Cutoff point applied to indicate a higher risk of type 2 diabetes in the Iranian studies retrieved from databases.

Obesity	BMI > 25 kg/m ²
Waist size	> 102 cm in men and > 88 cm in women
Hypertension	Systolic blood pressure > 140 mmHg and diastolic blood pressure > 90 mmHg
Dislipidemia	
Triglycerides	> 150 mg/dL (1.69 mmol/L)
HDL cholesterol	< 40 mg/dL (1.03 mmol/L)
Total cholesterol	> 200 mg/dL (5.17 mmol/L)
Old age	> 65 years
Waist to hip ratio	> 0.9 in me and > 0.8 in women
Waist to height ratio	> 0.5

BMI = body mass index; HDL = high-density lipoprotein.

in preventive and interventional programs to mitigate the burden of the disease.

Selection bias due to limited accessibility to all the relevant international databases, a lack of access to published work in Iran due to the absence of an integrated database of scientific publications, and inclusion criteria of selecting only publications in the English and Persian languages were major methodological sources of bias in this review. Therefore the study results must be considered with caution.

The findings of this study, regardless of the inherent limitations, highlight a major gap in studying the epidemiology of type 2 diabetes in Iran and demonstrated the inadequacy of scientific evidence to precisely explain the triggering factors for the epidemic in the country. The paucity of scientific evidence to inform the national type 2 diabetes care protocol may explain and even broaden the current identified gaps in the Iranian type 2 diabetes care protocol [79]. As a promising area of study, we invite researchers to work on the prevalence of the prevailing

Table 3. Year of the publication of the Iranian studies on the risk factors of type 2 diabetes retrieved from databases.

Year of publication	No. (%) of publications
2011–2010	17 (27.4)
2009–2008	25 (40.0)
2007–2005	9 (14.5)
2004–2000	9 (14.5)
1999–1995	2 (3.2)

non-conventional type 2 diabetes biomarkers and also on any hypothetical non-identified biomarker that could potentially clarify whether any non-conventional type 2 diabetes risk factors may explain the current expanding pattern of the disease in Iran.

Conflicts of interest

The authors declare no competing or conflict of interests.

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