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Preventive measures of type 2 diabetes mellitus: A retrospective analysis

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Abstract

Diabetes is a major and rising public health challenge which looms to devastate medical services in the future. Type 2 diabetes deliberates significant morbidity and mortality, with target organ damage to the eyes, kidneys, nerves and heart. Prevention is always the best medicine for all comorbid and non-comorbid illness. This review aims to recapitulate the lifestyle, pharmacological and surgical therapies targeted preventing diabetes and pre diabetes. Various pharmacological and non-pharmacological interventions are studied.

Keywords: Diabetes, management, precautions, life style changes

Introduction

Diabetes is one of the serious non comorbid illness which contributes significant complications in various systems of the body. According to the World Health Organization (WHO), the biggest increase is among low and middle income countries. Diabetes is one of the most common chronic disease in India so far and India also called as diabetes capital due to highest cases found in the country [1, 2]. Diabetes results in various short term and longterm complications. Short-term Complications includes Hypoglycemia, Diabetic ketoacidosis (DKA), Hyperosmolar hyperglycemic state and Long-term Complications includes The eyes (retinopathy), Kidneys (nephropathy), Nerves and feet (neuropathy) and Heart (cardiovascular disease) [3]. Such complications have dire consequences for a person's health and well-being, as well as a negative effect upon the economies of nations [4, 5]. Since it affects the multiple system of the body controlling the glycemic level is important at the onset. Various interventions are available to regulate the blood glucose level. However most of the pharmacological interventions have its own side effect and damages other body system too. The interventions are also aimed to delay the complications of diabetes. Poorly controlled diabetes can lead to serious health complications, which results in other specialist areas needing to become involved. This means more pressure upon resources and a greater financial burden being placed upon the health system [6, 7]. There are various modifiable and non-modifiable risk factors for diabetes. Life style is one of the commonly involved risk factors for diabetes among the young adults. Developments in preventive medicine have seen an effective reduction in the burden of risk from diabetes, hyper tension and other cardiovascular related

complications [8]. In 2011, there were 366 million people globally with diabetes, and the prevalence is estimated to reach 552 million by 2030, in part a consequence of the emerging epidemic in developing countries [International Diabetes Federation, 2012]. While antidiabetic medications, with newer anti-obesity medications and interventional bariatric procedures have shown some hopeful benefits, diet and therapeutic lifestyle change remains the mainstay of management to recover the metabolic profile of individuals with glucose dysregulation [9]. This review is intended to analyze the various pharmacological and non-pharmacological interventions to prevent diabetes.

Methodology

A retrospective narrative review study was carried out by examining the specifics of previously published papers was conducted of the electronic data bases in the year 2000 to 2020.

Inclusion criteria

- Randomized clinical trial
- Randomized Controlled Trial
- Case Study
- Systematic Review
- Comparative Study
- Narrative Review
- Article published in the year 2000 to 2020
- Full text article

Exclusion criteria

- Papers published in other languages
- Conference paper
- Letter to editor

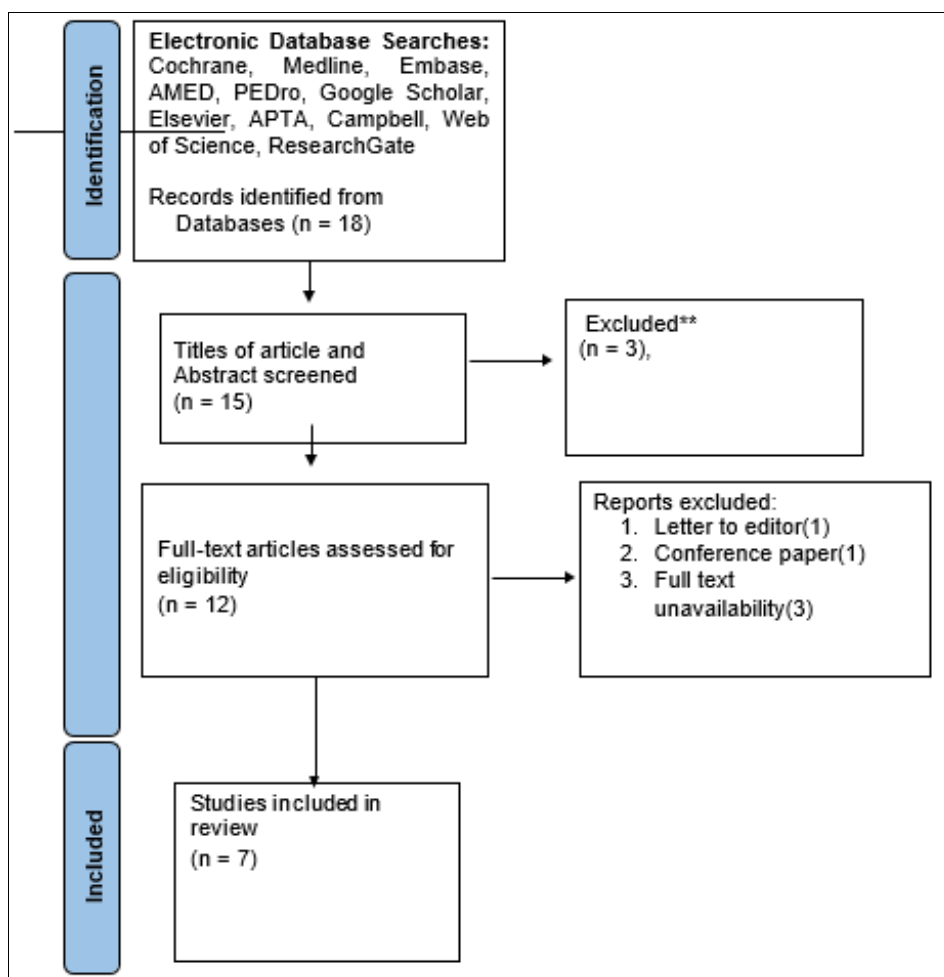


Fig 1: Flow chart

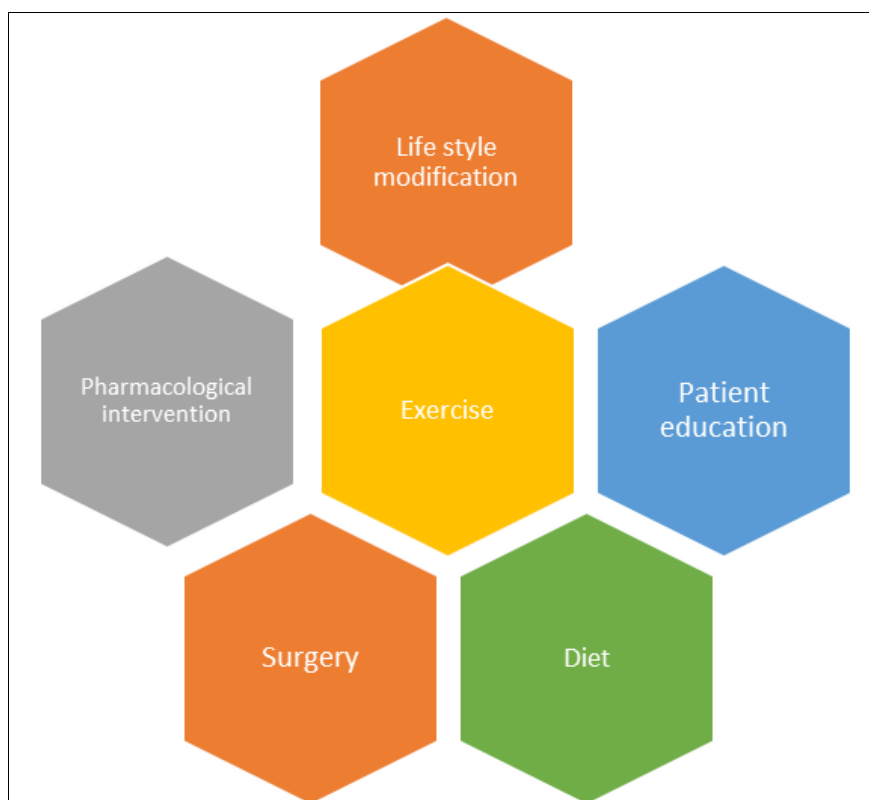


Fig 2: Preventive measures

Discussion

According to the Centers for Disease Control and Prevention (CDC), an estimated 34.2 million US adults have diabetes, and 90–95% of these are thought to have type 2 diabetes. In high-income countries, a large proportion of the total diabetes expenditure is associated with the treatment of related complications. The prevention of diabetes is a universal health care priority. It is imperative for health care systems to put policies in place for early diagnosis and appropriate and timely treatment to help reduce the complications associated with progression of the disease and the associated ever-increasing demand on health care resources [10]. Diet and exercise over the past 10 years numerous randomized clinical trials have tested the premise that lifestyle modification, especially weight loss and/or increased activity or exercise, can avert type 2 diabetes mellitus. The first of these studies was conducted in Chinese community health clinics and included 577 individuals with impaired glucose tolerance. Individuals were assigned, according to which clinic they attended, to a program of dietary modification, exercise, or both, and were followed up for 6 years. The dietary intervention focused on increased consumption of vegetables and reduced consumption of alcohol and simple carbohydrates. The relationship between the amount of weight lost and diabetes incidence was inconsistent and all three interventions were similarly effective in preventing diabetes. Weight loss improves outcomes in type 2 diabetes mellitus and delays or prevents complications associated with type 2 diabetes [11]. In addition to this Bariatric surgery is also shown effective in reversing or preventing type 2 diabetes mellitus [12]. In a prospective study of individuals with impaired glucose tolerance and severe obesity, diabetes incidence rates were 4.7 cases per 100 person-years of follow-up in the untreated (control) group, compared with 0.15 cases per 100 person-years in patients who underwent bariatric surgery [13].

In another study it has been mentioned that sustained weight loss in overweight individuals can have a main preventative effect on the occurrence of type 2 diabetes mellitus. With a reasonable weight loss of approximately 4 kg protective against progression to type 2 diabetes mellitus in at-risk patients [14]. Thus, many strategies intended at preventing type 2 diabetes mellitus have focused principally on weight loss, which has made it tough to control the independent effects of weight loss, dietary changes and exercise due to their mixture in a lifestyle intervention arm of many studies. A meta-analysis of 8 placebo-controlled double-blind randomized trials of sibutramine including a total of 1093 obese patients with T2DM reported a 5.5 kg average weight loss in those treated with sibutramine group, with substantial reductions in HbA1c of 0.28% and small but substantial decreases in basal blood glucose levels.

A recent study estimated that in 2015 there were 5 million people with non-diabetic hyperglycaemia in England. With increasing levels of obesity, sedentary lifestyles, and low fitness, these numbers are likely to rise over the coming decades; there is robust evidence that that lifestyle modification programmes promoting a healthy diet, weight loss, and increased physical activity could reduce the incidence of type 2 diabetes mellitus [1].

Pharmacological interventions are frequently used to treat diabetes (metformin, acarbose, thiazolidinediones) and a

weight-loss drug (orlistat). Metformin is the most meticulously studied drug used for diabetes prevention. Metformin reduced the risk of developing diabetes by 31% compared with placebo. Metformin was most effective in individuals whose baseline BMI was higher than 35 kg/m², in whom it reduced the incidence of diabetes by approximately 50%. Metformin had little beneficial effect in older participants (those aged 60–85 years).

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