Review Article

A SYSTEMATIC REVIEW ON ADHERENCE TO ORAL ANTIDIABETIC DRUGS IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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ABSTRACT

Type 2 diabetes mellitus (DM) is a chronic metabolic disorder in which prevalence has been increasing steadily all over the world and one of the main reason for this is poor adherence to oral anti-diabetic drugs, which can lead to therapy failure and increase risk of complications. So we planned this systematic review with an aim to get an adherence estimation to oral anti-diabetic drugs in type 2 diabetes mellitus patients for which a literature search was performed in pubmed, Google Scholar, scopus, and central databases to find observational studies on therapeutic adherence in users of oral anti-diabetic drugs. Our analyses showed that adherence rate to oral anti-diabetic drugs therapy ranged from 23 to 90%. This review confirms that many patients for whom diabetes medication was prescribed were poor compliers with treatment of oral anti-diabetic drugs.

Keywords: Adherence, Type 2 diabetes mellitus, Oral anti-diabetic drugs

INTRODUCTION

The term diabetes mellitus is defined as a metabolic disorder of multiple etiology, which is characterized by chronic hyperglycaemia and disturbances in carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both. According to the International Diabetes Federation, there are approx 537 million people who were living with diabetes in 2021, as compared to 108 million people in 1980. Overall, the number of adults globally living with diabetes has more than tripled over the past 20 years, predicted to increase to 784 million by 2045 [1]. In many cases, changes in lifestyle and diet are considered as the first step in addressing its therapy. If changes in lifestyle and diet fail, drugs must be added. Diabetes mellitus type 2 is associated with high morbidity and mortality, contributing to 6.7 million deaths in 2021 [1]. Indeed, smoking, overweight/obesity, consumption of processed foods, and sedentary lifestyle are well-recognized exogenous risk factors for the onset of insulin resistance and, subsequently, Diabetes mellitus type 2 [2]. Several studies suggest that a large proportion of people with diabetes have difficulty managing their medication regimens as well as other aspects of self-management [3]. Despite the large number of OADs, adequate glycemic control (HbA1c<7.0%) in patients with type 2 diabetes (T2D) is difficult to reach. A major cause of therapy failure is poor adherence (often referred to as "compliance") to oral anti-diabetic drugs, which plays a crucial role in the progression of T2D and risk of diabetes complications. Indeed, poor medication adherence is one of the most common causes of emergency room visits, hospitalization, enhanced morbidity and mortality, and increased costs of care in patients with T2D [4]. Apart from lifestyle changes, current therapeutic choices for DMT2 in adults are metformin, sodium-glucose cotransporter-2 inhibitors (SGLT2i), glucagon-like peptide-1 (GLP-1) analogues, dipeptidyl peptidase (DPP-4 inhibitors), thiazolidinedione's (TZDs), sulfonylureas-(SU), and insulin. The choice of treatment is based on the following parameters such as efficacy of drugs, safety, adverse reactions, mechanism of action, risk of hypoglycemia, impact on weight gain or weight loss, patient-friendly process, and the economic cost [5]. There are numerous factors which contribute to poor blood glucose control, including lack of integrated care in many healthcare systems, clinical inertia among healthcare providers, and poor patient adherence to self-care recommendations. Among them, it is evident that poor medication adherence looms large [6].

The current definition of adherence is the degree to which a patient correctly follows medical advice. Poor adherence rate to medications is generally associated with inadequate blood glucose control, increased use of health care resources, high medical costs, and markedly high mortality rates. The National Health and Wellness Survey of 1,198 patients with T2D found that each 1-point drop in self-reported medication adherence (using the Morisky Medication Adherence Scale) was associated with 0.21% increase in HbA1c, as well as 4.6%, 20.4%, and 20.9% increase in physician, emergency room (ER), and hospital visits, respectively [7]. Good medication adherence has the potential to significantly impact type 2 diabetes healthcare costs. Patients with type 2 diabetes T2D who evidenced an improvement in medication adherence had a 13% reduction in the risk of hospitalization or ER visits, while a 15% increase in hospitalization and ER visits was associated with worsening adherence over time [8]. By now, we came to know that poor adherence to oral anti-diabetic drugs (OADs) in patients with type 2 diabetes (T2D) can lead to therapy failure and increase risk of complications. So we planned this systematic review with an aim to get adherence estimation to oral anti-diabetic drugs in type 2 diabetes mellitus.

MATERIALS AND METHODS

A systematic literature search was conducted to identify articles containing information on the rate of adherence or with oral anti-diabetic drugs. Abstracts captured by the systematic literature search were first screened against the protocol inclusion criteria. In literature search, first, we identified papers related to adherence estimation to oral anti-diabetic drugs in type 2 diabetes mellitus. After that, abstracts with adherence estimation to oral anti-diabetic drugs in type 2 diabetes mellitus were then retrieved for screening against the inclusion criteria. Full articles meeting the inclusion criteria were reviewed in detail. Only those papers were included in this systematic review in which medication adherence rates to oral anti-diabetic drugs were reported. Papers which did not include adherence rates and reports of adherence with diet or exercise that did not also include medication adherence rates were excluded.

Search strategy

We have searched pubmed, Google Scholar, scopus, and central databases to find observational studies on therapeutic adherence in users of oral anti-diabetic drugs from 2015 to 2023. The search strategy was composed of three main terms. The first term was type 2 diabetes mellitus; the second term was adherence or compliance, while the third term was oral anti-diabetic drugs. The three terms were combined using the Boolean operator "AND".

Adherence assessment

For this review, medication adherence was done as "taking medication as prescribed and/or agreed between the patients and the health care provider." The "adherence rate" was the proportion of doses taken as prescribed.

Analyses

Descriptive statistics (means, ranges) present data from the selected studies or reports are tabulated by methodology.

RESULTS

This systematic review was based on 10 reports that included quantitative information on adherence to anti diabetic drugs in type 2 diabetes mellitus. Adherence rates among 10 retrospective studies [9-18] using large databases ranged from 23 to 90%, which was shown in table 1 and fig. 1. The mean age of patients in all these studies was more than 40 y, indicating that these were older patients with type 2 diabetes mellitus.

Table 1: Showing adherence rate to oral anti-diabetic drugs in type 2 diabetes mellitus

| S. No.	Reference	Year of publication	Sample/Patient population	Age (±SD)	Adherence rate
1	Sendekie AK *et al.* [9]	2022	403	55±10.8 y	23%
2	Faisal K *et al.* [10]	2022	257	(53±13.3)	62.9%
3	Yazew KG *et al.* [11]	2019	6467	50±11.8 y	69.53%
4	Bagonza J *et al.* [12]	2015	521	Not mentioned	83.3%
5	Mishra R *et al.* [13]	2015	277	50.80 (± 10.6)	44%
6	Kirkman MS *et al.* [14]	2015	218384	65(±11.8)	69%
7	Sahoo J *et al.* [15]	2022	331	53.40(±11)	34.14%
8	Mirghani HO *et al.* [16]	2019	102	59.62±9.91	23.5%
9	Shaikh SAA *et al.* [17]	2023	204	49 y	90%
10	Piragine E *et al.* [18]	2023	1004192	Not mentioned	54%
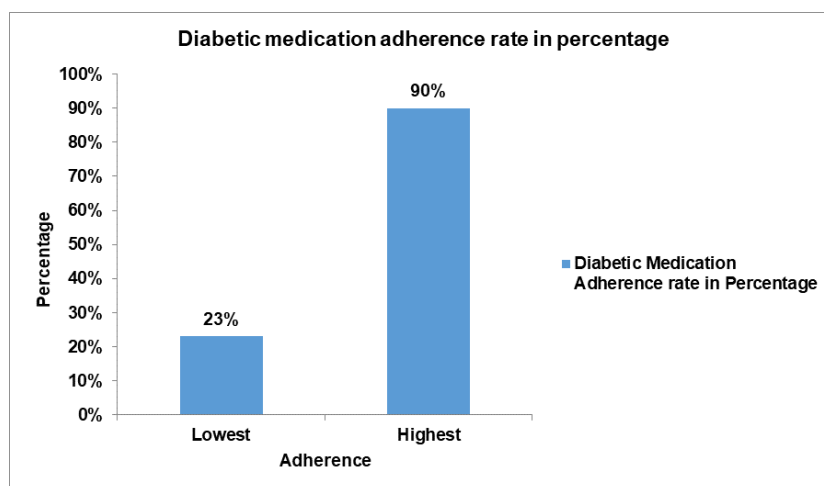
Fig. 1: Showing the lowest and highest adherence rate to oral anti-diabetic medication

DISCUSSION

This was a systematic review on adherence to anti-diabetic medications in which we found adherence rate to oral anti diabetic medications ranging from 23% to 90 %. This systematic review confirms that many patients with diabetes took fewer medications than the prescribed amount of medication. Now we know that Diabetes is a chronic disease that requires patients to be on long-term drug therapy. Poor treatment adherence is one the significant barrier in the treatment of diabetes mellitus. In developed nations, approximately 50% of diabetes patients do not adhere to the recommended therapies [19]. This review was somehow in line with a survey conducted by cramer *et al.* [20] on a systematic review of adherence with medications for diabetes in which adherence ranges from 36–93%. Our findings are similar to those of Ahmad *et al.* [21], who reported that 53% of their respondents were non-adherent to medications. However, much lower rates of non-adherence have been seen in studies conducted by Sendekie AK *et al.* [9]. The present findings were similar to a study conducted in Ethiopia which showed higher adherence rates (74.9%) [22]. After going through different articles on adherence to anti-diabetic medications it is assumed that medication therapy management and better communication of the patients and healthcare providers are highly relevant for therapy optimization and reducing non-adherence. Large multi-centric studies are highly recommended to assess adherence to an individual class of medications. In this systematic review, we have seen adherence only in type 2 diabetes (adult patients) which is a limitation of this review as diabetes is also prevalent in childhood secondly, we have only compiled studies in which oral anti-diabetic drug and excluded the studies in which insulin was used, other limitations can be small or limited number of studies are involved in this review.

CONCLUSION

The result of the review suggests that the anti-diabetic medication adherence is low, which can range from 23% to 90 % and confirms that many patients with diabetes took less medications than the prescribed amount of medication; there is a urgent need to plan and implement awareness and counselling programs and regular follow-up to motivate patients to improve adherence to recommended treatment and lifestyle regimens. According to us we highly recommend that health organizations which are involved in diabetic care services globally should incorporate diabetic medication adherence services and there should be early screening of poorly adherent patients as well as training of the hospital staff and health professional on the adherence to the anti-diabetic medications.

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