JCHR (2024) 14(1), 207-216

Journal of Chemical Health Risks

sanad.iau.ir/journal/jchr

REVIEW ARTICLE

A Comprehensive Review on Determinants of Poor Treatment Adherence among Type 2 Diabetes Patients and Low Health Literacy

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(Received: 22 November 2022 Accepted: 11 October 2023)

KEYWORDS

Poor treatment adherence;
Low health literacy;
Type 2 diabetes;
Systematic review

ABSTRACT: Both preventive and therapeutic interventions are necessary for good diabetes management and the prevention of complications. There are serious therapeutic and financial repercussions when patients don't follow their doctors' orders about medicine, nutrition, and healthcare procedures. The current comprehensive review aims to determine factors that have been observed in patients with type 2 diabetes and low health literacy, contribute to poor treatment adherence in 2022. Five steps were taken to complete this review: creating a research question, looking for and extracting relevant papers, choosing relevant studies, tabulating data, and reporting findings. Using the terms "Type 2 diabetes", "obstacles", "determinants", "factors", "barriers", "treatment", "medication", "therapy" "adherence", "non-adherence", "poor adherence", and "low health literacy" was gathered from six electronic databases (Scopus, Web of Science, Embase, Science Direct, PubMed and Google Scholar) from January 2018 to January 2022. Twelve were able to be reviewed from the initial 140 articles. In this review, ten studies have been selected involving 1497 patients with type 2 diabetes. The range of nonadherence prevalence was from 42% to 74.3%. Economic difficulties, inadequate communication with the medical staff, an absence of family support, ignorance, misinterpretation, and low health literacy were major barriers to treatment adherence in the publications. The findings of this study identified both modifiable and non-modifiable factors influencing medication adherence in type 2 diabetes patients. Modifiable factors must be addressed by suitable interventions carried out with the target population and healthcare experts.

INTRODUCTION

Diabetes is a potentially epidemic health problem that is quickly spreading throughout low- and middle-income nations like India [1]. According to the Diabetic Association of India projections, India is estimated to have 69.9 million cases of diabetes by 2025, with the great majority of cases still going untreated. This is primarily caused by food changes and inadequate or no physical activity, which alter the physiological environment and cause overweight or obesity as well as diabetes. The management of related problems, sustained compliance with treatment regimens, and prevention of chronic diseases like diabetes provide unique challenges [3]. This necessitates health systems' ongoing participation in the continuum of care at all levels. The

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DOI: 10.22034/jchr.2023.1973392.1648

term "treatment adherence" refers to the active participation of patients in their treatment programmes in accordance with the advice of healthcare professionals [4]. Only through this active engagement are problems and successful diabetes control achievable. The WHO defines adherence to chronic illnesses as practises like taking medications, adhering to a diet, and leading a healthy lifestyle that is in line with prescriptions from healthcare professionals. Medical experts and social scientists now face a serious dilemma with regard to patient adherence to treatment. The majority of the time, efforts made by doctors and other healthcare providers to assure that patients follow their prescription regimens have been unsuccessful. Although several programmes aim to increase treatment adherence, it seems that about half of them have fallen short. There are major financial and therapeutic repercussions when patients don't follow their medication and diet plans. Patients who do not take their medications as prescribed, for instance, run the danger of consequences that compromise their health and significantly lower their overall quality of life [6]. Chronically ill patients require more medication adherence since nonadherence has a detrimental impact on individuals and causes the disease to advance and become more chronic around the world. Nonadherence to drug regimens is a behavioural process that is complicated and is influenced by a number of variables, including patient characteristics, physician-patient interactions, and the healthcare system. One of the factors influencing patients' understanding of their illness is health literacy. The ability to read, listen, analyse, and make decisions in health situations is one aspect of health literacy. One of the main factors affecting health, according to the World Health Organisation, is health literacy [11]. The establishment of an association made up of all those impacted has also been advised for countries around the world in order to track and coordinate strategic initiatives for the promotion of health in various communities. Patients with diabetes frequently have low health literacy, which is linked to poor knowledge and understanding of the disease as well as consequences such as retinopathy and poor blood sugar control. A useful intervention can enhance one's understanding, abilities, attitudes, beliefs, and actions. By advancing knowledge and information, education can develop the abilities needed to accomplish goals [12].

In order to promote type 2 diabetes patients adherence to therapy, the current study analysed the variables influencing patients with type 2 diabetes and low health literacy's poor treatment adherence in 2022. Additionally, treatments can be created, put into practise, and evaluated to make a significant improvement in the well-being and standard of living of these patients.

MATERIALS AND METHODS

We developed five stages of research questions: finding and extracting relevant studies, developing relevant studies, tabulating, summarising, and reporting findings from these studies. A search strategy, inclusion criteria for the selected studies, data extraction forms, and a data analysis programme have been adopted after developing research questions on factors affecting poor adherence to treatment in patients with type 2 diabetes and low health literacy.

Data source and search strategy

We implemented a comprehensive computerised search of six electronic databases (Scopus, Web of Science, Embase, Science Direct, PubMed and Google Scholar) from July 2, 2022, to August 31, 2022. The search keywords were "Type 2 diabetes", "obstacles", "determinants", "factors", "barriers", "treatment", "medication", "therapy" "adherence", "non-adherence", "poor adherence", and "low health literacy". These keywords were used to find 140 articles in total. The studies were organised using Endnote. Multiple studies were disregarded. Then, studies that weren't eligible were taken out after the titles and abstracts were examined. As a result, 57 research-complete texts were examined. In the end, 12 articles that were published between January 2018 and January 2022 were chosen, which were assessed after 41 articles had already been eliminated. Finally, 10 articles were included in this review (Figure 1).

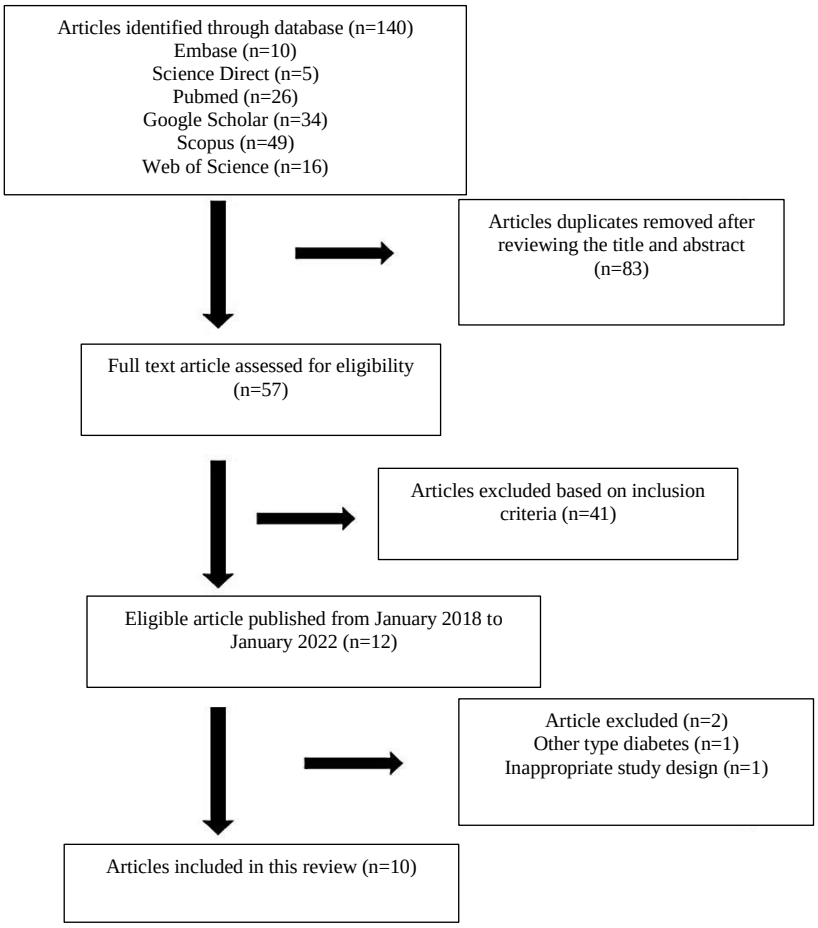

Figure 1. Selected articles flow chart

Literature selection

Inclusion and exclusion criteria

This study included all cross-sectional, qualitative, descriptive-analytical, systematic, trial, and review articles that discussed minimum one of the factors impacting poor treatment adherence from the perspectives of patients, their families, or healthcare professionals. One of the inclusion criteria was that the full texts of the articles relating to low health literacy be published in reliable journals between January 2018 and January 2022. Prior studies and articles not specifically addressing the factors that influenced adherence to treatment in diabetes patients have been removed.

Data extraction

The following categories of information were included in the data extraction process using a standard form: study identification number, study author, published year of the study, study location, study population, study type, sample size, primary objectives, methodology, conceptual approach, results, and conclusions. Discrepancies in data extraction were discussed and resolved.

Quality assessment

We evaluated the studies calibre using the Jadad score (Jadad et al., 1996). Three appraisal elements were used to determine the quality of the included studies: (a) selection bias (randomization procedure and allocation concealment); (b) blinding (masking of the outcome assessor but not the participants or therapist because DSME intervention cannot be concealed); and (c) attrition bias (withdrawals or dropouts). After that, studies were graded from 0 to 5 on a scale. Studies with a score of more than 3 were of high calibre.

Statistical analysis

All statistical analyses were performed using Stata (version 12.0) software. Figure 2 shows the pooled prevalence of poor treatment adherence and low health literacy among type 2 diabetes patients among the 10 articles was calculated with a 95% confidence interval (CI), and we also used the odds ratio (OR) for categorical data.

RESULTS

Ten studies involving 1497 patients with type 2 diabetes were included. Treatment adherence measures used in this research included those of Tiv et al. Adherence to Refills and Medicines Scale for Diabetes (ARMS-D), Morisky Medication Adherence Scale (MMAS), the researcher-conducted dietary adherence questionnaire, the Brief Adherence Rating Scale (BARS), and Morisky Medication-Taking Adherence Scale (MMAS-4). The Short-Test of Functional Health Literacy in Adults (S-TOFHLA), the Test of Functional Health, and other measures for measuring HL include the Health Literacy Scale (HLS-EU-Q47), the Newest Vital Sign (NVS), Literacy in Adults (TOFHLA), Literacy Assessment for Diabetes (LDA), the Diabetic Numeracy Test (DNT), and the Brief Health Literacy Screen (BHLS). According to the results of the study, the four main barriers to treatment adherence among patients with type 2 diabetes were financial issues, a lack of communication among healthcare teams, socio-individual factors, and a low level of health literacy as shown in the Table 1.

Financial issues

Studies have revealed that financial issues are the most common obstacle to complying with treatment. Adherence to a healthy diet, regular exercise, medicine, blood glucose monitoring, the use of a blood glucose monitor and adequate foot care is expensive, and financial difficulties can make it impossible for some people to set up their own personal hygiene practices. Especially for those with low incomes and those without health insurance, medical costs are a barrier to diabetes patients maintaining their treatment [4, 21, 22].

Lack of communication among the healthcare team

Another issue was the healthcare team's lack of communication. A contributing factor to patients' nonadherence to therapy for type 2 diabetes. The findings of the current study demonstrated that the doctor did not listen to the patient's comments and did not treat patients with respect. Patients stop seeing doctors altogether or cut back on the frequency of their visits because they are unable to speak with them constantly and effectively. Patients require counselling, interaction with the medical staff, the required suggestions for managing their sickness, and encouragement to stick with the prescribed course of action. Patients occasionally discontinue receiving therapy as a result of the poor conduct and attitude of their doctors. As a result, one of the most crucial variables in diabetes patients' adherence to treatment is the way the healthcare team works. These findings suggest that training in communication skills, particularly effective listening, will be helpful in this area.

Socio-individual factors

The results of studies indicate that several individual and social factors may contribute to treatment adherence. These include patients favourable opinions of their illness, concerns about the adverse effects of their medications, a lack of social and familial support, cultural and religious beliefs, an inability to take their medications regularly, forgetting to take their medications, and experiencing both their illness and the side effects of their medications. As factors affecting treatment adherence, age and education level were also mentioned [4, 23, 24].

Low level of health literacy

Studies have shown that the significant barrier to patient adherence in managing type 2 diabetes is limited knowledge of health conditions, although treatment adherence is the most efficient method. Most people with type 2 diabetes have low levels of health literacy, so it's important to raise that number by employing techniques like simplifying material or providing training that's easy to understand [17, 18].

Table 1. Studies on factors affecting poor adherence to treatment among type 2 diabetes patients and low health literacy.

Country	Study type	Sample size	Main aim	Method	Result	Reference
The US	Randomized controlled trial	N = 237	To evaluate obstacles to treatment adherence for diabetes using the information-motivation behavioral skill model (IMB)	A checklist has been taken of barriers for HbA1c and adherence. Identification of the majority of barriers to adherence was made; a relationship between patient characteristics and obstacles reported in each IMB has been investigated.	The most prevalent barriers were forgetting doses, lower age, and inadequate health literacy.	23
Iran	Integrative review	-	Identification of factors that influence and assist individuals with type 2 diabetes in following to their treatment plans.	After reviewing 53 publications on type 2 diabetes patients' adherence to treatment plans, the study was eventually completed.	The main barriers to following the treatment plan were depression, money issues, health issues caused by medications and side effects, memory issues caused by taking multiple drugs at once, and the intricacy of the treatment plan.	21
Iran	Review	-	Diabetes patient adherence to treatment: a crucial but unaddressed issue	-	The most important barriers to treatment adherence are individual helplessness, social constraints, and poor healthcare team practices.	32
Iran	Qualitative	N = 12	Identifying obstacles to type 2 diabetic patients' adherence to their treatment.	The content analysis method was applied to the research. The data was gathered through semi – structured interviews	Unbelief in medical knowledge that is both descriptive and prescriptive, personal history of illness, day-to-day difficulties, and interactive/economic difficulties were the four primary categories of barriers to treatment adherence.	24
Saudi Arabia	Cross-sectional	N = 404	Obstacles to diabetic retinopathy treatment adherence in Saudi Arabia	Demographic information, a diabetic index, an evaluation of knowledge regarding DR, attitudes toward DRS, and DRS hurdles were the five categories covered by the questionnaire. SPSS 23 was used to analyze the data.	The results showed that limited knowledge and budgetary constraints were obstacles to treatment adherence.	27
Pakistan	Cross-sectional	N = 524	To study how health literacy affects older women with type 2 diabetes patients' adherence to treatment	Convenience sampling was used to carry out this investigation. Each participant in the study successfully completed the medication adherence rating scale, the health literacy test, and the diabetic numeracy test.	Based on the study, those with high health literacy were more likely to remember when compared to those with low health literacy.	26
Malaysia	Cross-sectional	-	Frequency of low health literacy and factors associated with it in type 2 diabetes patients.	From January to March 2018, this cross-sectional investigation was carried out. Using the HLSEU-Q47, health literacy level was determined.	The findings of this study indicate that a significant proportion of type 2 diabetics in Perak, Malaysia, have inadequate health literacy.	28
The US	Cross-sectional	N = 228	Assessment of factors influencing type diabetes patients with varying degrees of health literacy in terms of medication adherence, including, detractors and facilitators.	In this mixed methods study, 23 individuals in the semi - structured interviews and 205 participants in the survey were included in this mixed methods study.	Barriers to treatment adherence included difficulty taking prescriptions on a regular basis, mistrust of healthcare professionals, worries about medication safety, and uncertainty regarding the aspect of medications.	29

Iran	Qualitative analysis	N = 23	Identifying the psychosocial challenges to type 2 diabetes patients treatment compliance.	In Isfahan, this qualitative analysis was carried out. From November 2017 to June 2018, participants completed face-to-face interviews. Using MAXQDA-10 and content analysis, data were analysed.	Six group of psychosocial challenges were identified through data analysis as having an impact on treatment adherence: (1) Anxiety, worry and discomfort; (2) fatigue and stress; (3) placing children's concerns ahead; (4) inadequate financial assistance; (5) communication difficulties; and (6) unfavourable work environment.	31
Iran	Qualitative	N = 69	To determine factors that prevent type 2 diabetes patients from adopting medical recommendations	Data collected from interviews lasted from 25 to 45 minutes and continued until data saturation when no new concept could be extracted from interviews. This procedure took 8 weeks (from November to December 2017). The data were analysed using Colaizzi's seven-step method	Individual and structural barriers were identified as obstacles to following medical advice. Systemic barriers were contained within 5 codes and 3 categories, whereas individual barriers were contained within 11 codes and 5 categories. Individual hurdles included physiological and physical issues, money issues, work-related issues, attitude issues, knowledge gaps, and social and familial issues. Systemic obstacles included poor inter-sectional coordination, insufficient equipment and facilities, inadequate publicizing and notification.	38

Figure 2 shows the pooled prevalence of poor treatment adherence and low health literacy among type 2 diabetes patients among the 10 articles was calculated, with a 95% confidence interval (CI) was found to be statistically significant between studies (I^2 = 99.7%, P < 0.0001)

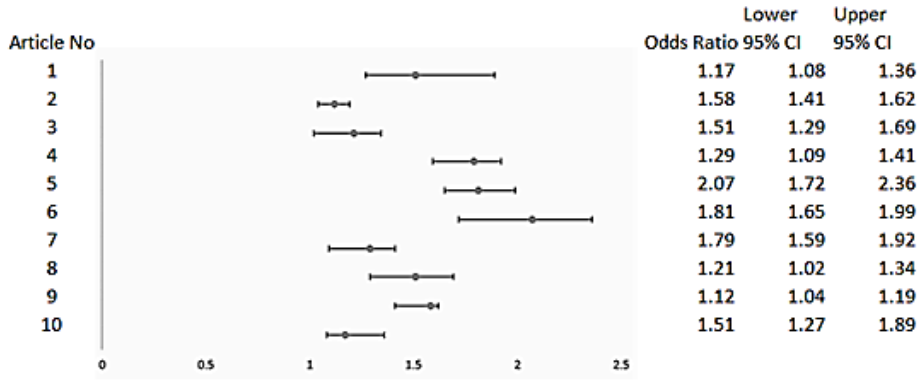

Figure 2. Prevalence of poor adherence to treatment and low health literacy among type 2 diabetes patients.

DISCUSSION

The studies in this review have shown that there are both unmodifiable and contributory factors to a lack of compliance with treatment for diabetes patients [14]. Absence of family, friends, and community support; scepticism towards medical professionals recommendations; misunderstandings regarding prescription drugs and diets; Complex treatment plans, an inadequate healthcare system, anxiety, worry, discomfort, fatigue, and stress, placing children's concerns ahead, an unfavourable work environment, the poor practice of healthcare providers, low self-esteem, depression, polypharmacy, and low health literacy are a few of the variables that can be altered that may be causing type 2 diabetes patients to not adhere to their treatment regimens. [25 - 27]. Studies have shown that patients are hindered in adhering to their treatment regimens by the patient's dissatisfaction with working conditions as well as his or her attitude, behaviour and support from family and friends. In addition, patients are less likely to adhere to treatment due to reasons like poor working circumstances, a lack of time to eat at the workplace, difficulties adhering to treatment due to job type, and forgetting to take medication due to a heavy workload and stress. Numerous studies have looked at

the value of such patients' assistance from others. In order for patients to comply with their treatment plans, family members are crucial. Without them, it would be difficult, or perhaps impossible. In addition, patients who have poor treatment adherence include those who blame themselves for their illness, fear others judgement, and others' acts of compassion [29].

These findings suggest that ineffective communication between patients and healthcare professionals, as well as poor practise by the healthcare team, are further obstacles to treatment adherence. It is difficult for healthcare professionals to encourage diabetes patients to follow their treatment plans. Less time is dedicated to education and counselling, and more time is spent to the clinical care and treatment of the patients. Despite the fact that patients want coordinated treatment or healthcare interactions that are accompanied by conversation and understanding, they do not have enough time to listen to the problems of the patients or to train them and their families. Participatory clinical opinions that consider the unique preferences of patients and give them access to different forms of therapy are ideal. According to other studies, one of the main obstacles to managing diabetes is a lack of training and counselling. In order to increase patient cooperation, healthcare professionals should streamline the treatment plan to reduce the likelihood of failure (for instance, by lowering the frequency of daily medicine administration). Establish a care plan, create realistic goals, engage the patient about the key elements of their treatment, remind the patient of care and appointments with follow-up programs, and encourage the patient and family members to adhere to the treatment regimen. Patients should also become acquainted with diabetes organisations or charities. Limited health literacy was identified in the studies as a significant barrier to treatment adherence. Health literacy is a complicated set of reading, listening, analytical, and decision-making abilities that must be applied to circumstances involving health. It is not just the ability to read. A patient who is health-literate is better able to read, comprehend, remember, and adhere to medical advice. Since having a high degree of health literacy can alter behaviour and lifestyle and improve health, disease complications are delayed. According to Ahmad et al., treatment nonadherence increased by 3.6 points for every 1% decline in disease knowledge. Although maintaining a treatment regimen is the best strategy to control type 2 diabetes, patients inability to maintain a treatment regimen is hampered by a lack of health literacy [28].

When creating educational interventions, it is important to take into account how these factors may affect treatment adherence among diabetes patients. Some of these factors can be changed by educating and empowering patients and their families, while others can be changed by educating healthcare professionals.

Economic difficulties, a shortage of insulin, advanced age, insufficient education, cultural and religious convictions, and the occurrence of various pharmacological side effects are non-modifiable factors. The publication's findings indicate that low treatment adherence among diabetic patients is largely a result of financial issues. Financial difficulties cause some self-care behaviours to be avoided since it is expensive to maintain a healthy diet and exercise routine, prepare medications, measure blood sugar, prepare glucometers, and take proper care of feet. Healthcare expenditures are a barrier to diabetes patients adherence to treatment, particularly those with low socioeconomic status and those without health insurance [35].

In other studies, age and education were indicated as determinants of influencing treatment nonadherence. Gholamaliei et al. viewed older age as a barrier to treatment adherence, whereas Nelson et al. showed that younger age constituted such a barrier [4, 23]. However, more research is necessary to arrive at a precise and reasonable conclusion. Other variables that may make it difficult for patients to stick with treatment include cultural and religious beliefs. Mukona et al. showed that families occasionally required patients to see conventional and religious therapists. Some patients claimed they sought treatment from spiritual healers because they thought their disease was caused by demons and a family curse. However, families found it appealing to visit with traditional and religious therapists. Since, in certain situations, it was less expensive or even free, especially if the patient had no income. Due to the cost and storage issues with insulin, some participants used herbal remedies to manage their blood sugar. Financial difficulties and cultural and religious convictions may be

related, according to research. It should be highlighted that while some cultural and religious beliefs are rooted in superstitions and misconceptions, others are too deeply ingrained to be changed through awareness or education. The appropriate authorities must, however, work to dispel people's misconceptions [20].

According to studies [37-39], experiencing pharmacological side effects can make getting treatment more difficult. Patients who inject insulin may experience the negative effects of diabetic drugs, particularly insulin, which are unavoidable. When people don't follow their drug regimens carefully and adjust their doses, this problem becomes more significant. By integrating several elements that pose barriers to treatment adherence for type 2 diabetes patients, the findings of this study can be used to develop complete programmes that empower individuals to adhere to their treatments.

Limitations

Although appropriate articles were found and examined, some unpublished research might have gone unnoticed, which is one of the study's weaknesses. Additionally, because the current study is a comprehensive review, there were no restrictions on the papers that could be chosen; hence, the article's quality was not evaluated. This could impact the findings of the study.

This study recommended that diabetic patients be offered education and advice services to increase awareness of diabetes, develop a health literacy programme aimed at encouraging them to adhere with the treatment regimen in order for improved wellbeing and quality of life. By creating and implementing educational interventions, policymakers and officials can improve the physical, emotional or social health of people with type 2 diabetes and their families. Further studies to assess the effectiveness of educational interventions in increasing medication adherence and low health literacy among type 2 diabetes patients are recommended.

CONCLUSIONS

The present study revealed two factors that influence patients with type 2 diabetes adherence to treatment, both modifiable and nonmodifiable. Due to the majority of these determinants being modifiable, it is possible to make a significant advance in patient empowerment by implementing targeted educational interventions. In addition to empowering and educating patients, as some of these features include the involvement of their families and healthcare teams, training for family members and health care professionals is also necessary in order to implement treatment adherence between type 2 diabetes patients.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

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