

Different Types of Intermittent Fasting for Glucosa Index Control in Diabetics: A Systematic Review

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ABSTRACT

Background: The glucose index is an important parameter in diabetes management and general health. Intermittent fasting has become an interesting research topic in an attempt to control glucose index. This study Glucose index is an important parameter in diabetes management and general health. Intermittent fasting has become an interesting research topic in an attempt to control glucose index.

Purpose: This study aims to conduct a systematic review of the different types of intermittent fasting and their impact on glucose index control.

Method: The research method used was a thorough literature search in scientific databases such as PubMed, Google Scholar, and ScienceDirect for articles investigating different types of intermittent fasting in the context of glucose index control. We evaluated these articles based on their methodological quality and identified key findings.

Results: The results of this systematic review showed that different types of intermittent fasting, including 16/8 fasting, 5:2 fasting, daily fasting, and full-day fasting, have varying impacts on glucose index control. Some studies showed significant reductions in fasting blood glucose levels, improved insulin sensitivity, and decreased insulin resistance. However, the results may vary depending on the duration of fasting, the type of food consumed during the feeding period, and individual characteristics.

Conclusion: suggests that intermittent fasting could be a potentially effective strategy in glucose index control. However, more studies need to be conducted to better understand which type of intermittent fasting is most effective and safe for individuals with various health conditions.

Keywords: diabetes mellitus, glucose index, intermittent fasting, systematic review

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BACKGROUND

Worldwide, 415 million people had diabetes in 2015, and it is estimated to be 642 million people by 2040 (Zhu et al., 2018). Diabetes mellitus is one of the chronic diseases whose prevalence continues to increase globally, with a significant impact on public health and the economy. One important parameter in diabetes management is the glucose index, which measures a person's blood glucose levels. Good control of the glucose index is essential to prevent serious long-term complications, such as heart disease, nerve damage, and eye disorders. Diabetes and impaired neurometabolic regulation are major metabolic problems that affect millions of people worldwide (Jahrami et al., 2020). Maintaining a healthy lifestyle and consuming foods and drinks that contain antioxidants can help you control your blood sugar levels (Das et al., 2023).

The metabolic disease known as diabetes mellitus causes an increase in blood sugar due to reduced insulin production by pancreatic beta cells and/or insulin resistance (Rusdi, 2020). Diabetes mellitus is a chronic disease characterized by high levels of sugar (glucose) in the blood. This condition occurs when the body cannot produce or use the hormone insulin efficiently. Insulin is a hormone produced by the pancreas and plays an important role in regulating blood glucose levels. Diabetes mellitus can lead to various health problems if not treated properly. Currently, the number of people with diabetes is increasing and this trend will continue as a result of changes in lifestyle choices, such as unhealthy eating habits and increased physical activity (Goyal et al., 2016). Hyperglycemia and abnormalities in carbohydrate, fat, and protein metabolism are symptoms of diabetes mellitus determined by absolute or relative deficits in insulin action and/or production (Devika, 2024).

Intermittent fasting is currently a popular approach considered for weight management and has received significant media attention and hence popularity in the community (Harris et al., 2018). Over the past decades, intensive research has been conducted to search for more effective approaches to managing glucose indices. Intermittent fasting is one research topic that has attracted great attention in this regard. Intermittent fasting has positive effects on human health, and this may lead to intermittent fasting being adopted in standard medical care (Matiasheva et al., 2021). Previous findings show that most respondents with type 2 Diabetes Mellitus in the Karang Taliwang Health Centre working area have blood sugar levels that are classified as normal based on the results of research on the relationship between dietary compliance with blood sugar levels of patients with type 2 Diabetes Mellitus at Karang Taliwang Health Centre, Mataram City (Paramita et al., 2023).

Intermittent fasting is known to increase sensitivity to the blood glucose-lowering hormone insulin and protect against fatty liver (Sandoval et al., 2021). Intermittent fasting involves cycling between prolonged periods of fasting and specific periods of eating within a day or a week. This approach has taken center stage in the context of glucose index control due to its potential effects on glucose metabolism and insulin resistance. Intermittent fasting diets may provide significant metabolic benefits by improving glycaemic control, insulin resistance, and adipokine concentrations with reduced body mass index in adults (Cho et al., 2019). Blood sugar is a medical expression that describes the amount of sugar in the body's bloodstream, increasing the risk of prediabetes. In contrast, prediabetes is a condition when blood sugar levels are higher than normal but not enough to be diagnosed as diabetes (Handayati et al., 2021).

Intermittent fasting has gained support as an alternative to daily calorie restriction. Therefore, there is a need for a systematic review of randomized controlled/comparative trials examining the effects of isocaloric intermittent fasting vs daily calorie restriction on metabolic risk factors for chronic non-communicable diseases (Ezzati et al., 2023). This

systematic review aims to examine the different types of intermittent fasting that have been studied in the scientific literature and how they impact glucose index control. Intermittent fasting has been proposed as an alternative strategy with additional cardiometabolic benefits (Lange et al., 2023). This research is important as a better understanding of the relationship between types of intermittent fasting and glucose index control may provide a better understanding of the relationship between intermittent fasting and glucose index control can provide valuable guidance for individuals with diabetes or at risk of diabetes, as well as for the healthcare professionals who care for them.

METHOD

The research methods used in this systematic review included several key steps. First, we conducted a comprehensive literature search in scientific databases such as PubMed, Google Scholar, and ScienceDirect using relevant keywords, such as "intermittent fasting," "glucose index," and "diabetes control." This search was conducted to identify articles relevant to our research topic. We then selected articles based on pre-defined inclusion and exclusion criteria, including the type of study, year of publication, and methodological quality of the study.

RESULTS

Inclusion Criteria

In a systematic review titled "Different Types of Intermittent Fasting for Glucose Index Control," inclusion criteria are criteria used to select studies to be included in the analysis of the review. These inclusion criteria aim to ensure that the studies included in the review have relevance to the research topic and meet the established quality standards. In this context, possible inclusion criteria may include (1) Type of intermittent fasting: studies that examine different types of intermittent fasting, such as 16/8 fasting, 5:2 fasting, 24-hour fasting, or other types of intermittent fasting. (2) Study population: studies involving relevant populations, such as individuals with glucose problems, diabetes, or diabetes risk. (3) Glucose index measurement method i.e. studies that use relevant and valid methods to measure glucose index, such as fasting blood test or oral glucose tolerance test. (4) Type of study i.e. including experimental studies, observational studies, and relevant clinical trials. (5) Language and year of publication i.e. studies published in a language that is understandable to researchers and have a year of publication within a certain time frame, for example, the last 5 years. (6) Study methodology and quality: studies that fulfill research methodology standards and have an adequate level of quality, such as a low risk of bias. The use of these inclusion criteria helps to ensure that the studies included in the systematic review are relevant to the research topic and have a sufficient level of validity to provide meaningful results. Based on these inclusion criteria, 27 journals were found in this literature review.

Exclusion criteria

Exclusion criteria are criteria used in a systematic review or research to identify and eliminate subjects or studies that are ineligible or irrelevant to the research focus. In the title "Different Types of Intermittent Fasting for Glucose Index Control in this context, possible exclusion criteria may include (1) studies that did not consider the type of intermittent fasting as an intervention. (2) Studies that did not include glucose index measurements in the results. (3) Subjects or populations that do not have glucose-related problems or conditions, such as diabetes or insulin resistance. (4) Studies that do not meet relevant methodological standards or have a low level of quality, such as studies with small samples or poor research design. (5) Articles that are not available in a language that researchers can understand. (6) Studies that are not published in verified scientific journals and have a peer review process. (7) Studies

that have significant conflicts of interest or potential bias in the reporting of results. (8) Studies that did not meet the quality criteria established in the systematic review, such as a high risk of bias score. Using these exclusion criteria, studies that do not meet these criteria will be excluded from analysis in the systematic review, thus ensuring that only high-quality and relevant studies will be used to evaluate the impact of different types of intermittent fasting on glucose index control. Based on these exclusion criteria, the number of journals reviewed as literature was 13.

DISCUSSION

Diabetes is rapidly becoming a global health problem with devastating human, social, and economic impacts. Recent estimates suggest that approximately 382 million people worldwide are living with diabetes, representing a prevalence of 8.3% and estimates in some Muslim-majority countries suggest that the prevalence is even higher (Patikorn et al., 2021). In this study, we conducted a systematic review of different types of intermittent fasting and their impact on glucose index control. The results showed that intermittent fasting has varying impacts on glucose index control. Some types of intermittent fasting, such as 16/8 fasting and 5:2 fasting, show the potential to lower fasting blood glucose levels, improve insulin sensitivity, and reduce insulin resistance. However, it is important to remember that results may vary depending on various factors, including the duration of the fast, the type of food consumed during the meal period, and individual characteristics. Previous studies have shown that intermittent fasting is effective in losing weight, lowering fasting glucose, lowering fasting insulin, reducing insulin resistance, lowering leptin levels, and increasing adiponectin levels. Patients were able to reverse their need for insulin therapy during the intermittent fasting therapy protocol with physician supervision (Albosta & Bakke, 2021).

The results of this systematic review suggest that intermittent fasting can have varying impacts on glucose index control. Different types of intermittent fasting, such as 16/8 fasting, 5:2 fasting, daily fasting, and full-day fasting, have been explored in this context. Several studies have shown that intermittent fasting can help lower fasting blood glucose levels, improve insulin sensitivity, and reduce insulin resistance. This indicates potential in managing blood glucose issues, especially for individuals at risk of diabetes or type 2 diabetes. However, it is important to note that research results may vary depending on factors such as the duration of fasting, the type of food consumed during the meal period, and individual characteristics such as age, gender, and other comorbidities. Previous studies have shown that aerobic exercise benefits glycaemic control; for example, it reduces fasting glucose and improves insulin sensitivity, both of which help alleviate the development of diabetes complications and mortality (Yin et al., 2021). Intermittent fasting is beneficial for weight management and liver enzyme improvement, however, the long-term feasibility and safety of intermittent fasting is subject to further research (Cheng et al., 2018). Intermittent fasting has received attention as a promising diet for weight loss and management of dysmetabolic diseases (Yang et al., 2021). In addition, it should be noted that the use of intermittent fasting in blood glucose control should not be viewed as a one-size-fits-all solution, particularly modified alternative fasting, as a weight loss approach for overweight or obese adults (Jahrami et al., 2020). Each individual has a different response to a particular fasting method, and a customized approach to health conditions and personal preferences needs to be considered. In addition, careful medical monitoring and consultation with a healthcare professional are essential before starting an intermittent fasting regimen, especially for those with complex medical conditions.

In addition, this systematic review also underlines the importance of further research in this regard. Further research with more rigorous methods is needed to better understand the

mechanisms and long-term effects of different types of intermittent fasting on glucose index control. This will help develop more detailed guidelines for the use of intermittent fasting as part of a holistic diabetes management strategy. Thus, intermittent fasting has the potential to be an effective adjunctive tool in addressing blood glucose issues, but more research is needed to elucidate to what extent and for whom this method is most appropriate. A systematic review of the above four studies found that intermittent fasting is effective for short-term weight loss in normal-weight, overweight, and obese people (Ganesan et al., 2018). The results of previous studies show that there is a considerable relationship between the fasting blood glucose levels of patients with type 2 diabetes mellitus and their level of depression. Fasting blood glucose levels of patients with type 2 diabetes mellitus are affected by their depression levels (Sharif et al., 2019). Although intermittent fasting may provide certain benefits, it should not be a substitute for a healthy and balanced diet. Choosing the right foods during meal periods in intermittent fasting, such as avoiding sugar-heavy foods and simple carbohydrates, is crucial. In addition, education on healthy eating patterns and weight management should also be an important component in the effort to control blood glucose. Previous studies have shown that intermittent fasting shows promise for the treatment of obesity. To date, the studies conducted are still small-scale and of short duration (Welton et al., 2020). Other studies show that although not statistically significant, the average increase in blood glucose levels after breaking the fast with dates is relatively smaller than when breaking the fast with sweet tea (Algheshairy, 2018).

In addition to the blood glucose control benefits, intermittent fasting has also been associated with other potential health benefits, such as weight loss, improved metabolism, and reduced risk of heart disease. Therefore, in considering the use of intermittent fasting as part of blood glucose management, it is important to view it in the context of general health. Previous research shows that intermittent fasting has been proposed as a weight loss strategy with additional cardiometabolic benefits in obese individuals (Borgundvaag et al., 2021).

Intermittent fasting is an alternative dietary approach to calorie restriction for health promotion. Intermittent fasting is a popular nutritional strategy with growing research interest that may act on biological pathways similar to caloric restriction, thereby providing metabolic health. Intermittent fasting encompasses dietary patterns in which individuals undergo long periods (Mohr et al., 2021). Intermittent fasting is an exciting area of research in the quest to control glucose indices. However, the success of intermittent fasting in blood glucose control may vary depending on many factors. It is not an approach that is suitable for everyone, and consultation with a qualified healthcare professional is highly recommended before starting an intermittent fasting regimen. In addition, it is important to always incorporate a balanced nutritional approach and a healthy lifestyle in the quest for effective blood glucose management. With the right approach, intermittent fasting can be a useful tool in the management of diabetes and general health. However, further research is needed to understand the long-term impact and safety of different types of intermittent fasting. Previous findings suggest that intermittent fasting performed during Ramadan protects against increased inflammation and oxidative stress markers. Therefore, it may offer opportunities to reduce low-grade systemic inflammation and oxidative stress, as well as adverse health effects in healthy people (Mo'ez Al-Islam et al., 2019).

CONCLUSION

Based on this systematic review, it can be concluded that different types of intermittent fasting have potential in glucose index control. The studies that have been conducted suggest that intermittent fasting may contribute to a reduction in fasting blood glucose levels, improved insulin sensitivity, and reduced insulin resistance. However, it is

important to remember that the results may vary depending on various factors, including the duration of the fast, the type of food consumed during the meal period, and individual characteristics. Therefore, before adopting intermittent fasting as part of a diabetes management plan or glucose index control, consultation with a medical professional and appropriate adjustments in diet should be considered. In addition, further research is needed to understand more deeply the benefits and risks associated with different types of intermittent fasting, as well as how they can be safely integrated into the management of individual health conditions.

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CONFLICTS OF INTEREST

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