

ASSESSING THE DIETARY AWARENESS, AND THE IMPACT OF NUTRITIONAL EDUCATION TOOL AMONGST TYPE 2 DIABETES PATIENTS: A QUESTIONNAIRE BASED STUDY

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ABSTRACT

Type 2 Diabetes Mellitus (T2DM) is among the most prevalent metabolic disorders globally. It primarily develops due to a dual defect: impaired insulin secretion by the pancreatic β -cells and reduced responsiveness of peripheral tissues to insulin. The World Health Organization (WHO) defines diabetes mellitus as a chronic metabolic condition marked by persistently elevated blood glucose levels, which, over time, can result in serious complications affecting the cardiovascular system, kidneys, eyes, and nerves. T2DM accounts for more than 90% of all diagnosed cases of diabetes. According to the 2017 report by the International Diabetes Federation (IDF), the global burden of diabetes among adults has been steadily rising. At the time of the report, an estimated 451 million individuals were living with diabetes, a number projected to increase to 693 million by the year 2045. Alarmingly, nearly 49.7% of these individuals were believed to be unaware of their condition. Furthermore, diabetes was linked to approximately 5 million deaths globally within the 20 to 99-year age group. This study aimed to assess the level of awareness and the impact of educational tools among patients with type 2 diabetes, and to determine the prevalence of adequate knowledge, awareness, and good dietary practices. The study also evaluated the effectiveness of educational interventions in improving patients' understanding and self-management of diabetes. This interventional cohort study was conducted over three months at D.Y. Patil Hospital, Nerul, Navi Mumbai, among 100 patients with type 2 diabetes selected by convenience sampling. Pre- and post-intervention questionnaires were used to assess awareness, knowledge, and dietary practices. Participants received an educational session, including an educational tool and a portion control plate ("My Plate"), and the post-questionnaire was administered immediately to evaluate the intervention's effectiveness. These findings demonstrate that the educational tool effectively improved awareness, corrected misconceptions, and promoted healthier dietary practices among patients with type 2 diabetes. No significant differences were observed between male and female participants, as both genders showed similar gains in awareness, highlighting the overall effectiveness of the nutrition education intervention.

Keyword: - *Diabetes Mellitus, Dietary Practices, Metabolic Condition, and Glucose Levels etc....*

1. INTRODUCTION

Type 2 diabetes mellitus (T2DM) is often regarded as a disease linked to modern lifestyles. According to the most recent findings from the NCD Risk Factor Collaboration (2022), there were approximately 828 million individuals living with diabetes globally, with more than 95% of these cases classified as type 2 diabetes [1]. The International Diabetes Federation (IDF) reported that in 2019, diabetes was responsible for approximately 4.2 million deaths worldwide. That same year, an estimated 463 million adults between the ages of 20 and 79 were living with the condition. This number is expected to increase to around 700 million by 2045 [2]. India, frequently labeled as the diabetes capital of the world, highlights the severity of the growing diabetes crisis. A significant number of individuals remain unaware of their condition until it progresses and leads to serious health issues [3]. The World Health Organization (WHO) defines diabetes mellitus as a long-term metabolic disorder marked by high blood sugar levels, which over time, can cause harm to the heart, blood vessels, eyes, kidneys, and nerves [2].

The pathophysiology of Type 2 Diabetes Mellitus (T2DM) involves a disruption in the feedback mechanisms that regulate insulin secretion and action, resulting in elevated blood glucose levels. When pancreatic β -cells are impaired, insulin production decreases, reducing the body's ability to maintain normal glucose homeostasis. Concurrently, insulin resistance (IR) leads to excessive hepatic glucose output and diminished glucose uptake in the liver, muscle, and adipose tissue. Although both β -cell dysfunction and insulin resistance emerge early in the disease process, β -cell impairment is generally more pronounced. When these two mechanisms coexist, the resulting hyperglycemia is intensified, accelerating the progression of T2DM [2].

1.1 Risk factors

Type 2 diabetes mellitus (T2DM) has a multifactorial etiology, involving both nonmodifiable and modifiable risk factors. Nonmodifiable factors include age, genetic predisposition, ethnicity, and family history. However, the increasing global prevalence of T2DM is largely driven by modifiable factors such as physical inactivity, excess body weight, unhealthy dietary patterns, tobacco use, excessive alcohol consumption, exposure to environmental pollutants, adverse intrauterine conditions, psychological stress, insufficient sleep, and the kind of environment we live in also play a part in increasing diabetes risk.[4] A high-calorie Western diet, rich in fats and carbohydrates, raises blood glucose and increases levels of triglyceride-rich lipoproteins like VLDL, chylomicrons, and their remnants. This promotes the production of reactive oxygen species (ROS), triggering inflammation. As inflammation further enhances oxidative stress, their combined effects after meals worsen postprandial damage. Persistent elevation of ROS plays a key role in the development of insulin resistance and Type 2 Diabetes Mellitus [2].

1.2 Global burden and prevalence of T2DM

The global prevalence of diabetes has surged significantly, rising from 382 million individuals in 2013 to 592 million in 2023. Projections indicate that this number could exceed 1.3 billion by 2050, with the majority of cases occurring in developing countries. Type 2 diabetes makes up more than 90% of all cases, and its rapid rise is strongly associated with shifts in diet and lifestyle particularly increased calorie consumption and reduced physical activity mirroring the growing obesity crisis in recent decades [3]. Type 2 diabetes often develops due to common lifestyle habits, including unhealthy eating, lack of physical activity, obesity, and high stress levels. Research has shown that individuals at high risk of developing type 2 diabetes often have limited dietary knowledge. [5]

2. STUDY DESIGN

This study focuses on assessing the awareness, knowledge, and dietary practices among patients with Type 2 Diabetes Mellitus and evaluating the effectiveness of educational tools in improving diabetes self-management. Education plays

a crucial role in controlling blood glucose levels and preventing long-term complications of diabetes. The study was conducted at D.Y. Patil Hospital, Nerul, Navi Mumbai, among patients admitted to the hospital or attending the outpatient department who met the inclusion criteria. The study included patients diagnosed with type 2 diabetes attending D Y Patil Hospital and excluded individuals who were unconscious disoriented or had speech or communication difficulties. Written informed consent was obtained from all participants after providing detailed information about the study objectives, duration, and procedures. Baseline data on anthropometric measurements, dietary practices, and awareness levels were collected using a structured pre-intervention questionnaire. Participants were then provided with an educational intervention using a specially designed educational tool to improve knowledge, awareness, and dietary practices. Following the intervention, a post-intervention questionnaire was administered to assess changes in awareness and knowledge.

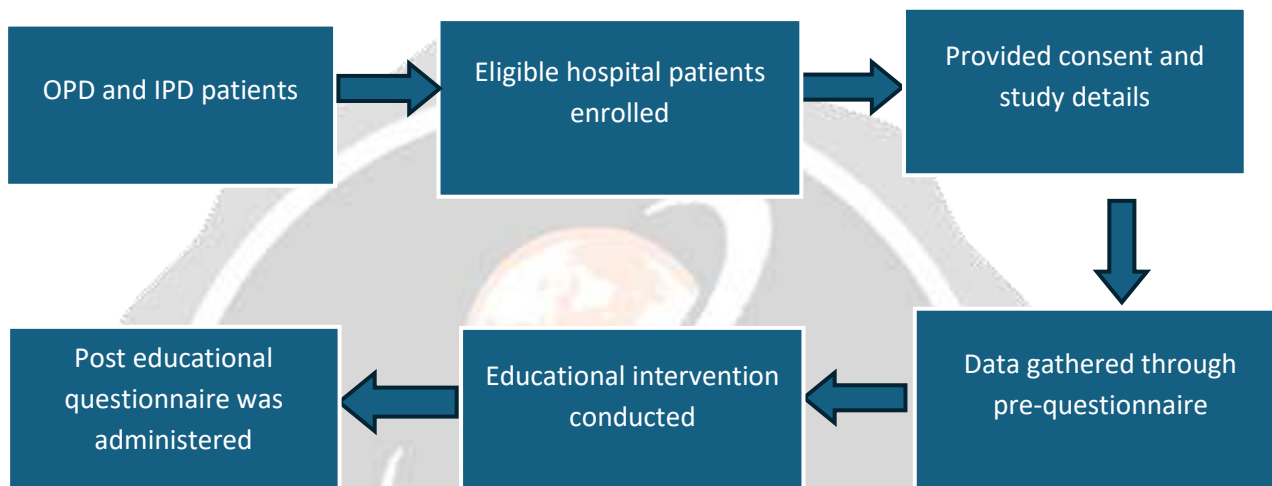


Fig -1: Method of data collection

2.1 Objectives

The primary objective of the study was to assess the level of awareness and impact of educational tool in patients with type 2 diabetes. The secondary objective was to compare the level of awareness regarding type 2 diabetes and related dietary practices between Male and female participants, and to find out prevalence of people with good dietary practice, awareness and knowledge.

Table -1: Study design and methodology

Study parameter	Description
Study design	Interventional cohort study
Study setting	D Y Patil Hospital, Nerul, Navi Mumbai
Sample size	100 patients
Sampling method	Convenience sampling

2.2 Methodology

An interventional cohort study was conducted at D.Y. Patil Hospital, Nerul, Navi Mumbai, over a period of three months. A total of 100 patients diagnosed with Type 2 Diabetes Mellitus, including both inpatients and outpatients, were selected using a convenience sampling technique. Baseline data were collected using a structured pre-intervention questionnaire designed to assess awareness, knowledge, and dietary practices related to diabetes. Following the baseline assessment, participants were provided with an educational intervention focusing on diabetes management and dietary modification. The intervention included the use of educational tools and a portion control plate (“My Plate”) to enhance understanding of balanced meals. Immediately after the intervention, a post-intervention questionnaire was administered to evaluate the effectiveness of the educational tools.

- Pre- Questionnaire
- Post- Questionnaire
- Educational tool

3. RESULT

The demographic and clinical profiles of the participants were evaluated at baseline pre and post to the education. The mean age of the study population was 44.94 years, with a range from 26 to 69 years. The mean height of participants was 162.98cm, with a minimum of 121.00 cm and a maximum of 180.00 cm. The mean weight of participants was 66.30kg, ranging from 42.00 kg to 100.00 kg. The calculated mean Body Mass Index (BMI) was 24.98 kg/m², with values ranging from 17.26 to 36.07 kg/m². Based on the BMI distribution, a substantial proportion of participants were categorized as overweight, which is consistent with the increased risk of type 2 diabetes associated with elevated BMI levels.

The educational intervention significantly improved participants’ awareness, knowledge, and dietary practices related to diabetes management. Awareness of risk factors—obesity, genetics, and stress increased from 21%, 22%, and 8% pre-intervention to 90%, 73%, and 78% post-intervention. Knowledge of blood sugar monitoring rose from 38% to 99% and understanding of dietary influence on HbA1c increased from 11% to 90%. Recognition of meal timing and fiber intake improved from 10% to 99%, portion control from 7% to 77%, and the effects of honey/jaggery, processed foods, dietary fiber, and functional foods increased to 100% from 32%, 24%, 16%, and 50%, respectively. Practical dietary behavior, including healthy food choices while eating out, improved from 0% to 97% post-intervention. Overall, the session markedly enhanced participants’ knowledge and behavior regarding diabetes management, with all improvements being statistically significant ($p < 0.0001$). educational intervention, participants showed significant improvements in awareness, knowledge, and dietary practices related to diabetes management. Awareness of key risk factors obesity, genetics, and stress increased from 21%, 22%, and 8% pre-intervention to 90%, 73%, and 78% post-intervention. Knowledge about regular blood sugar monitoring improved from 38% to 99%, while understanding of the impact of dietary choices on HbA1c rose from 11% to 90%. Recognition of meal timing and fiber intake increased from 10% to 99%, and awareness of portion control improved from 7% to 77%. Knowledge regarding the effects of honey/jaggery, processed foods, dietary fiber, and functional foods increased from 32%, 24%, 16%, and 50% to 100% post-intervention, respectively. Practical dietary behaviors, including consistently making healthy choices while eating out, improved from 0% to 97%. Overall, the educational session effectively enhanced participants’ knowledge and behavior concerning diabetes management, with all improvements statistically significant. Findings indicate that the educational tool was effective in substantially improving the knowledge, awareness and practices among diabetic patients.

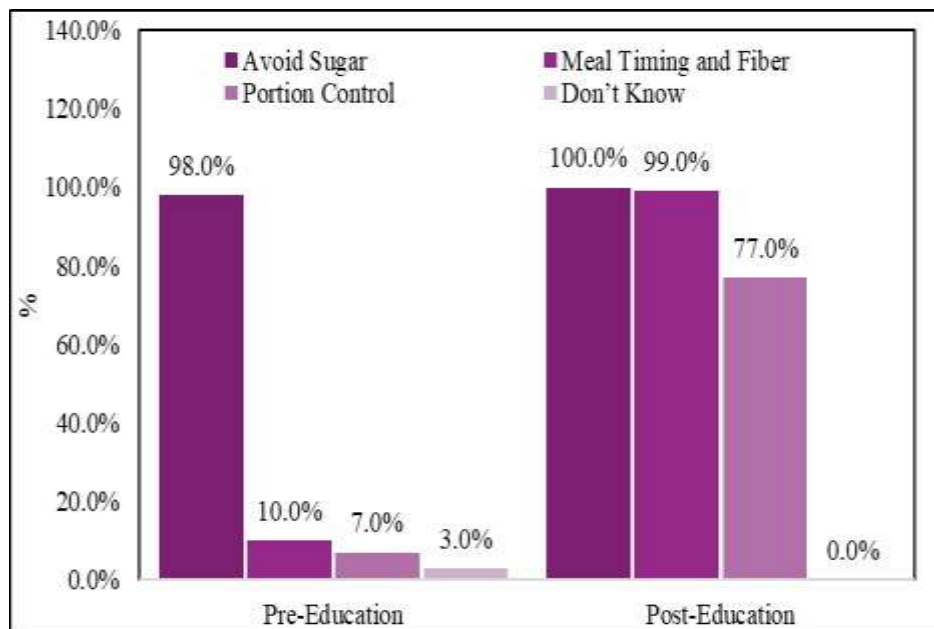


Chart -2: Dietary habits that can help control blood sugar

3.1 Comparison between Male and female participants pre and post education

The statistical insignificance ($p > 0.05$) in chi-square tests across most variables suggests no significant gender differences in post-education awareness, reinforcing the uniform effectiveness of the intervention across both Male and female participants. Both male and female participants showed significant improvement in awareness, knowledge, and dietary practices after the educational intervention.

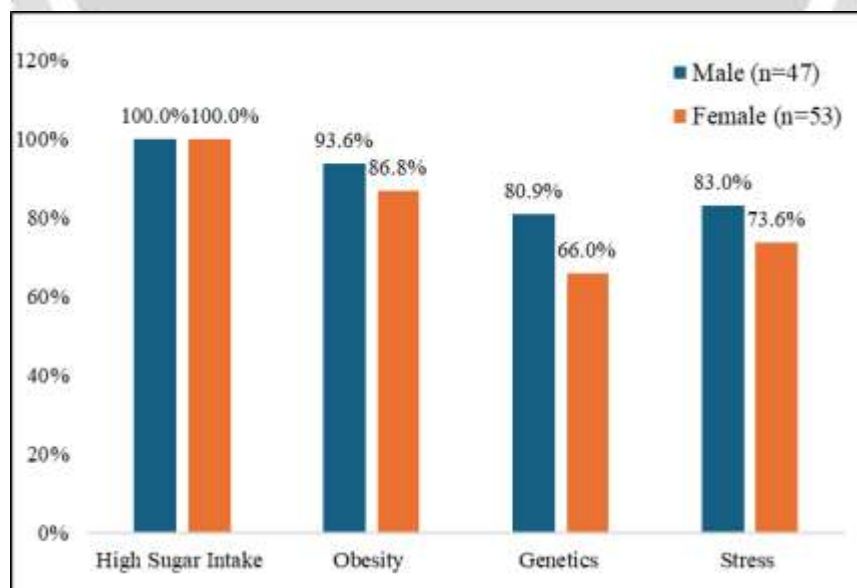


Fig -2: Common risk factors of high blood sugar comparison between Male and female participants post education

The educational intervention led to a marked increase in participants' awareness and knowledge of diabetes risk factors, blood sugar monitoring, dietary management, and the role of physical activity. Similarly, healthy dietary practices, including adequate water intake, consumption of vegetables, fruits, whole grains, and avoidance of refined flour, added sugar, and sweeteners, improved substantially. Overall, the intervention was highly effective in enhancing both knowledge and adoption of healthy behaviors, with most participants demonstrating near-complete awareness and adherence post-intervention.

4. CONCLUSIONS

In conclusion, this study aimed to assess the level of dietary awareness and the impact of a structured nutritional education tool among individuals with type 2 diabetes. Using a pre- and post-questionnaire, data were collected from 100 participants to evaluate their baseline knowledge, awareness, and dietary practices, followed by the implementation of a nutritional educational session.

The findings revealed a statistically significant improvement in participants' knowledge, awareness, and dietary practice following the nutrition education, indicating that the educational tool was effective in promoting positive changes. However, the study demonstrates that structured, visual-based nutritional education tools can play a critical role in improving dietary awareness and self-management practices in individuals with type 2 diabetes. Incorporating such tools into routine diabetes care may contribute to better glycemic control and overall health outcomes. By connecting nutritional knowledge with its practical application, these interventions present a promising strategy for enhancing the health outcomes and overall well-being of individuals with type 2 diabetes.

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