

A Study On the Prevalence and Awareness of Prediabetes Among Adult Women Aged 20-40 Years

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Abstract- Prediabetes is a metabolic condition characterized by elevated blood glucose levels that are not yet high enough to be diagnosed as diabetes but carry an increased risk of progression to type 2 diabetes and associated complications. This study aimed to assess the prevalence and awareness of prediabetes among adult women aged 20–40 years in the Koti region. A survey was conducted with a sample size of 100 participants selected through simple random sampling. Information was gathered through a structured questionnaire that encompassed socio-demographic characteristics, anthropometric data, lifestyle behaviors, family and clinical background, eating habits, and food consumption frequency. Findings revealed that 55% of the respondents had blood glucose levels above normal, indicating a high pre-diabetic prevalence. 43% failed to meet the recommended 150 minutes per week. Obesity was present in 23% of participants, and 42% were overweight, highlighting the role of body mass in disease risk. A total of 47% of the individuals who took part in the study reported having a family history of diabetes. Awareness was low, with only 30% acknowledging the importance of a reported balanced diet, and 43% eating after 8 PM daily. Regular intake of sugary drinks along with a limited consumption of whole grains was also noted. The study concludes that despite a relatively educated population, awareness and preventive practices related to prediabetes remain inadequate. These findings emphasize the urgent need for health education and interventions promoting lifestyle modifications to reduce the risk of prediabetes.

Keywords: Prediabetes, type 2 diabetes, threshold, metabolic condition.

I. INTRODUCTION

Prediabetes is a medical condition in which blood glucose levels are elevated above the normal range but still fall short of meeting the criteria for diabetes, suggesting a greater risk of eventually developing diabetes. Impaired glucose tolerance (IGT) is defined by a 2 -hour glucose level ranging from 7.8 to 11.0 mmol/L (140 to 199 mg/dL), Impaired fasting glucose (IFG) is characterized by fasting blood glucose levels ranging from 6.1 to 6.9 mmol/L (110 to 125 mg/dL). based on the World Health Organization (WHO) criteria, are commonly used to define prediabetes, Impaired glucose tolerance (IGT) is typically marked by reduced insulin sensitivity in muscle tissue and diminished glucose absorption, whereas impaired fasting glucose (IFG) is mainly attributed to insulin resistance in the liver and an overproduction of glucose by the liver.

Risk Factors

Among the various factors that elevate the risk of developing prediabetes, excess body weight stands out as a major contributing factor. The fattier tissue

you have especially inside and between the muscle and skin around your abdomen the more resistant your cells become to insulin. An increased waist circumference may be a sign of insulin resistance. A waist size exceeding 40 inches in men and more than 35 inches in women is linked to a higher likelihood of developing insulin resistance. Additionally, the consumption of red and processed meats, along with sugar-sweetened beverages, has been linked to an increased likelihood of prediabetes. While diabetes may occur at any stage of life, the likelihood of developing prediabetes tends to rise beyond the age of 35.

Symptoms

Prediabetes typically presents without noticeable signs or symptoms. However, one possible sign is the darkening of the skin in certain parts of the body. Affected areas can include the neck, armpits and groin lassic signs and symptoms that suggest you've moved from prediabetes to type 2 diabetes include: Heightened thirst, recurrent urination, excessive hunger, tiredness, vision that becomes blurry, a tingling or numb sensation in the hands or feet,

repeated infections, and wounds that heal slowly are all commonly observed symptoms.

Complications

1. Cardiovascular Disease (CVD): People diagnosed with prediabetes are at a heightened risk of developing cardiovascular-related health issues. Research has demonstrated that prediabetes is linked to an increased occurrence of coronary heart disease, stroke, and overall mortality. This risk is attributed to factors like insulin resistance, endothelial dysfunction, and systemic inflammation.

2. Chronic Kidney Disease (CKD): Prediabetes can lead to early kidney damage. Research indicates that individuals with prediabetes are up to twice as likely to develop CKD compared to those with normal glucose levels. This results from the stress that high blood sugar levels exert on the kidneys, causing damage to small blood vessels.

3. Non-Alcoholic Fatty Liver Disease (NAFLD): Elevated glucose levels in prediabetes can cause the body to convert excess glucose into fat, which gets stored in the liver. Insulin resistance can impair the liver's ability to process and break down fats, leading to fat buildup. Non-alcoholic fatty liver disease (NAFLD) has the potential to advance to more serious liver conditions if not properly addressed or treated.

Diagnosis

Different organizations use varying criteria to define prediabetes, leading to a lack of uniformity. The World Health Organization (WHO) characterizes prediabetes as a state of intermediate hyperglycemia, identified through two main indicators: impaired fasting glucose (IFG), which is defined as a fasting plasma glucose (FPG) level between 6.1–6.9 mmol/L (110–125 mg/dL), and impaired glucose tolerance (IGT), defined as a 2 - hour plasma glucose level of 7.8–11.0 mmol/L (140–200 mg/dL) following the ingestion of a 75-gram oral glucose load. A diagnosis can be made based on either condition or a combination of both, as determined by a 2-hour oral glucose tolerance test (OGTT).

Treatment and Management

Lifestyle interventions: Lifestyle intervention programs primarily focus on altering modifiable risk factors for prediabetes and diabetes, emphasizing the reduction of obesity through enhanced physical activity and improved dietary habits. The two most prominent diabetes prevention trials—the United States Diabetes Prevention Program and the Finnish

Diabetes Prevention Study (DPS)—have both demonstrated the positive impact of such lifestyle changes.

Pharmacotherapy: Pharmacotherapy for prediabetes has been explored using various classes of antidiabetic medications, including Biguanides, Thiazolidinediones, α -Glucosidase Inhibitors, and GLP-1 analogs. In addition to these, non-antidiabetic approaches such as anti-obesity medications and bariatric surgery have also been investigated in the context of managing prediabetes.

Bariatric surgery: Bariatric surgery includes various procedures aimed at creating a malabsorptive condition, a restrictive condition, or a blend of the two, with the goal of decreasing overall calorie consumption. Commonly performed surgical techniques include Roux-en-Y gastric bypass, laparoscopic adjustable gastric banding, sleeve gastrectomy, and duodenal switch with biliopancreatic diversion.

The aim of the study is to assess the prevalence and awareness of prediabetes among young adult women aged 20–40 years. The objectives include determining the incidence rates of prediabetes, assessing the impact of lifestyle factors on prediabetic prevalence, identifying the number of individuals with prediabetes in the specific age group, evaluating the level of awareness among women aged 20–40 years, and promoting nutritional education to enhance understanding and encourage healthy dietary choices.

II. METHODOLOGY

Methodology plays a vital role in every research study; it refers to a systematic and scientific process

for gathering, evaluating, and interpreting either quantitative or qualitative data. A non-experimental type of study was used for this purpose. A simple random survey was done to collect the information. The area selected for the study was Koti, and the focus was on adult women between the ages of 20 and 40 years. A random sampling technique was employed to select a total of 100 women. Only women aged 20 to 40 years were included in the study, and those below 20 or above 40 years were not considered. A structured questionnaire was formulated to collect the necessary information. It included questions about their background, body measurements, daily habits, family and medical history, food habits, and a food frequency checklist. This helped gather all the needed details for the research.

Statistical Analysis

The data collected through the questionnaire was compiled, consolidated, and subjected to statistical analysis. The data was analyzed by calculating the percentage, and frequency and applying statistical techniques like mean, median, and standard deviation. The association was established using Chi-square analysis.

Chi-Square Analysis

The Chi-square test is a statistical method used to determine if there is a meaningful difference between the observed frequencies and the expected frequencies within experimental data. It is used to test hypotheses about whether data is as expected or whether there are any differences between the categorical variables in the same population. In the year 1900, Karl Pearson developed the Chi-square test as a tool for examining categorical data and interpreting how it is distributed. It is represented by the symbol χ^2 .

Chi-Square Test Formula:

$$\chi^2 = \sum [(O_i - E_i)^2 / E_i]$$

III. RESULTS AND DISCUSSION

Age Distribution

The age distribution refers to the proportion of individuals in different age groups within a

population. This approach helps in analyzing how age groups are distributed within a population and is typically illustrated using tools like a population pyramid or an age distribution chart.

Table 1: Age distribution

Age distribution	Percentage
21- 25	36 %
26-30	25%
31-35	13%
36-40	26%

This pie chart shows the age distribution of the participants. The majority of them (36%) are between 20–25 years, followed by 26–30 years (25%) and 36–40 years (26%). The smallest group is 31–35 years, making up only 13%. This indicates that most participants are young adults.

Time Spent For Physical Activity

Participating in consistent physical activity involves dedicating at least 150 minutes weekly to moderate-intensity or 75 minutes to vigorous-intensity exercises. Additionally, incorporating muscle-strengthening activities into your routine 2-3 days per week can provide added health benefits.

Table 2: Time spent for physical activity

Frequency	Percentage
Less than 150 minutes per week	43%
150-300 minutes per week	23%
300-450 minutes per week	27%

The data reveals that majority 43% of respondents engage in less than 150 minutes of physical activity per week, which falls short of the recommended guidelines. This group may be at increases of developing lifestyle and related conditions including prediabetes. A total of 57% of the participants reported engaging in physical activity for 150 minutes or more each week. 27% reaching 300 to 450 minutes a level associated with stronger health benefits like improved blood sugar regulation. Only 7% exceed 450 minutes per week indicating a smaller group that is highly active.

Prediabetic Status

Prediabetes test results indicate blood sugar levels are higher than normal but not high enough to be classified as diabetes, serving as a warning sign for potential development of type 2 diabetes.

Table 3: Prediabetic status

Prediabetes	Percentage
Normal	45%
More than normal	55%

The above chart presents data about the frequency of pre-diabetes in the population. Normal 45% indicates that 45% of the people tested fall within the normal range that is they do not show pre-diabetic level. More than normal 55% this implies that 55% of individuals have blood sugar levels that are higher than normal, possibly indicating prediabetes.

Awareness of Balanced Diet

Understanding the significance of a nutritious diet in prediabetes prevention is essential, as consuming a diet abundant in fruits, vegetables, whole grains, and unprocessed foods aids in blood sugar control, supports healthy weight, and lowers the chance of developing of type 2 diabetes.

Table 4: Awareness of balanced diet

Category	Percentage
Yes	30%
No	55%
Somewhat	15%

This chart reveal that 55% of respondents are not aware of the importance of balanced diet in preventing conditions like prediabetes and diabetes. Only 30% answered yes indicating full awareness, and 15% were somewhat awareness about it. There is a noticeable lack of awareness, emphasizing the importance of implementing health education and awareness initiatives to educate the public on chronic disease prevention.

Statistical Analysis

The statistical analysis was conducted using the chi-square test to investigate correlations between the variables under study. This method was chosen for its effectiveness in analyzing categorical data and

determining the significance of observed relationships within the diabetes.

Table 5: Association between age group and prediabetic status

Age group	Normal	Prediabetic	P- value
21-25	33	3	0.001
26-30	12	13	
31-35	2	8	
36-40	4	25	

There is a statistically significant association between age group and prediabetes test results ($p < 0.001$). The younger group (20–25) had mostly normal glucose levels. From age 26 and above, the number of individuals with pre-diabetic/high glucose results increased steadily, especially in the 36–40 age group. This shows a clear trend that age increases, the abnormal glucose levels increases, indicating higher risk for prediabetes.

Table 6: Association between time of physical activity and prediabetes

Physical activity (minutes per week)	Normal	Prediabetic	P- value
Less than 150 minutes per week	14	30	0.013
150- 300 minutes per week	11	12	
300- 450 minutes per week	17	10	
More than 450 minutes per week	2	4	

A statistically significant association was found between physical activity and blood glucose results ($p < 0.013$). Participants who engaged in less than 150 minutes of physical activity per week were more likely to have higher-than-normal blood glucose levels, compared to those who were more physically active. This suggests that inadequate physical activity may be a contributing factor to elevated blood sugar and increased risk of prediabetes.

Table 7: Association between aware of importance of balanced diet and age group

Age group	No	Somewhat	Yes	P- value
21-25	14	4	18	0.00042
26-30	12	3	10	

31-35	5	4	1
36-40	24	4	1

There is a statistically significant association between age group and awareness of the importance of a balanced diet ($p < 0.05$). Younger age groups (20–30) tend to report higher awareness levels ("Yes" responses). Older age groups (31–40) show less awareness, especially the 36–40 group with high "No" responses. This suggests that nutritional education efforts may need to be targeted more toward middle-aged women to increase awareness of balanced diets and their role in preventing prediabetes.

VI. NUTRITIONAL EDUCATION



This pamphlet provides an overview of pre-diabetes, a condition where blood glucose levels are higher than normal but not high enough to be classified as type 2 diabetes. It highlights the causes, such as family history, obesity, sedentary lifestyle, poor diet, age, ethnicity, and history of gestational diabetes. Symptoms may include increased thirst, frequent urination, dark skin on the neck and armpits, and fatigue. Diagnosis involves fasting glucose tests (100-125mg/dL) and oral glucose tolerance tests (140-199mg). The primary treatment is lifestyle changes, including a healthy diet, weight loss (5-7%), quitting smoking, and medications if needed.

V. CONCLUSION

The study reveals a high prevalence of prediabetes among adult women, with 55% showing elevated blood glucose levels, indicating a growing metabolic health concern. Anthropometric data show that 42% were overweight and 23% obese, while only 30% had a normal BMI, reflecting poor weight management. Insufficient sleep was reported by 34%, a factor associated with increased diabetes risk. Physical inactivity was also significant, with 43% engaging in less than the recommended 150 minutes of exercise per week, which was found to be associated with higher blood glucose levels. Family history of diabetes was reported by 47%, with 43% having relatives with type 2 diabetes and 8% with prediabetes.

Other health conditions such as high blood pressure (21%), elevated blood sugar (16%), and obesity (20%) further increased the risk. Despite these indicators, only 26% believed they were at risk, indicating a clear lack of awareness and emphasizing the need for health education and early interventions.

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