Short Research Article

Prediabetic risk and disease burden-A crosssectional survey of an Ayurveda hospital.

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ABSTRACT:

Aim: To know the prevalence of prediabetes and diabetes among the health seekers visiting to an Ayurveda hospital, the survey study was conducted. Prediabetes is a serious health condition where blood sugar levels are higher than normal, but not high enough yet to be diagnosed as type 2 diabetes. Diabetes is one of the largest global health emergencies of this century, ranking among the 10 leading causes of mortality. Early screening is as essential as early diagnosis and treatment..
Study design: A cross-sectional survey study
Place and duration of the study: Department of Swasthavritta, Sri DharmasthalaManjunatheshwara College of Ayurveda and Hospital, Hassan, between January2020 and December 2020.
Methodology: Laboratory registers accessed from Sri DharmasthalaManjunatheshwara Ayurveda Medical College and Hospital, Hassan, Karnataka. Guidelines of Centers for Disease Control and Prevention was used to detect prediabetes and diabetes.
Results: The preliminary report on the survey study conducted for one year during 2020 showed among the subjects tested for blood and urine sugars, around 13% were prediabetics and 27% were diabetics.
Conclusion: Awareness among public and healthcare professionals regarding etiological factors, risk factors are crucial in finding out prediabetics. Public visiting the hospital for health promotion, to improve quality of life must be encouraged to prevent non communicable diseases such as Diabetes.

Keywords:Prevalence, prediabetes, diabetes, risk factor, survey, Ayurveda hospital

1. INTRODUCTION

The burden of diabetes is expected to raise from 415 million individuals in 2015 to 642 million individuals by 2040. Most individuals pass through a phase of prediabetes before developing full-blown diabetes. Individuals older than 40 years of age and other high-risk individuals should be screened for diabetes. Because nearly all patients with T2DM(Diabetes mellitus-Type 2) pass through an extensive phase of prediabetes, targeting prediabetes with effective interventions can significantly alter the natural history of T2DM.[1] Prediabetes (intermediate hyperglycaemia) is a high-risk state for diabetes that is defined by glycaemic variables that are higher than normal, but lower than diabetes thresholds.

Prevalence of prediabetes is increasing worldwide. Observational evidence shows associations between prediabetes and early forms of nephropathy, chronic kidney disease, small fiber neuropathy, diabetic retinopathy, and increased risk of macrovascular disease.[2] The estimates in 2019 showed that 77 million individuals had diabetes in India, which is expected to rise to over 134 million by 2045. Approximately 57% of these individuals remain undiagnosed. The prevention and management of diabetes and associated complications is a huge challenge in India due to several issues and barriers, including lack of multisectoral approach, surveillance data, awareness regarding diabetes, its risk factors and complications, access to health care settings, access to affordable medicines, etc. Thus, effective health promotion and primary prevention, at both, individual and population levels are the need of the hour. [3]Diagnosis of prediabetes is based on the presence of impaired fasting glucose, impaired glucose tolerance, and/or elevated HbA1c levels between 5.7% and 6.4%.Impaired glucose tolerance is defined as blood glucose levels of 140 to 199 mg/dL during a 75-gram oral glucose tolerance test (normal < 140 mg/dL), and impaired fasting glucose is defined as blood glucose levels of 100 to 125 mg/dL, although

the World Health Organization has a narrower threshold of between 110 and 125 mg/dL.[4] Prediabetes consists of impaired fasting glucose and/or impaired glucose tolerance and is a significant risk factor for the development of type 2 diabetes, microvascular, and macrovascular disease. The values used to define prediabetes are arbitrary, because prediabetes represents an intermediary category along the continuum from normal glucose levels and tolerance to overt hyperglycemia. The progression from prediabetes to type 2 diabetes occurs over many years, strong evidence to support intervention to delay the progression from prediabetes to diabetes. Large, randomized prospective studies with lifestyle intervention and/or various modes of pharmacotherapy have demonstrated successful delay of diabetes. [5] The latest estimates of the global prevalence of diabetes mellitus are in the range of 9.3% , while 1 out of 3 adults may fulfill the diagnostic criteria for prediabetes, although the latter is highly dependent on the used definition. However, irrespective of definition, prediabetic states share a high probability of progression to T2DM. Typical diabetes complications associated with chronic hyperglycemia, such as neuropathy, retinopathy, nephropathy and coronary artery disease may already be evident among patients with prediabetes. Although there are ongoing randomized trials to address the issue of prevention of complications through antihyperglycemic therapy at this stage, the principal strategies in prediabetic populations aim towards the prevention of progression to T2DM through lifestyle modification and, to a lesser extent, drug therapy. A diagnosis of prediabetes most often emerges during screening for T2DM, which is recommended for individuals with high-risk features, namely overweight or obesity plus one or more defined risk factors for dysglycemia. Even though diabetes and prediabetes become more prevalent with older age and demographic aging is a prominent cause for the racing diabetes pandemic, current recommendations do not consider advanced age (or any particular adult age for that matter) as a compelling risk factor regarding DM screening. Furthermore, elderly individuals are often grossly underrepresented in clinical trials for diabetes therapy or prevention . As a result, many issues regarding prediabetes detection, management and prevention of DM are yet to be conclusively addressed.[6]

2.MATERIAL AND METHODS:

2.1. SOURCE OF DATA: Laboratory registers of Sri DharmasthalaManjunatheshwara Ayurveda Medical College and Hospital, Hassan, Karnataka

2.2.STUDY PERIOD: Data accessed from January 2020 to December 2020

2.3.DIAGNOSTIC CRITERIA: Prediabetes and diabetes were defined as shown in the image 1. [7]
The results were explained in simple proportions

Result*	A1C Test	Fasting Blood Sugar Test	Glucose Tolerance Test	Random Blood Sugar Test
Diabetes	6.5% or above	126 mg/dL or above	200 mg/dL or above	200 mg/dL or above
Prediabetes	5.7 – 6.4%	100 – 125 mg/dL	140 – 199 mg/dL	N/A
Normal	Below 5.7%	99 mg/dL or below	140 mg/dL or below	N/A

Image 1: Diagnosis criteria of Diabetes, Prediabetes, Normal.

3. RESULTS:

The results of the preliminary report on the survey study to know the prevalence of Prediabetic risk and diabetics those approached the hospital is as follows:

Table 1. Observations on Data, showing number of laboratory investigations done during the year 2020, number of subjects tested for blood/urine sugar, identified prediabetics, diabetics, non-diabetics.

No. of subjects tested for any of the laboratory investigations	*122426*
No. of subjects tested for Blood or Urine sugar	3099
No. of Normoglycemic subjects	1831
No. of Prediabetic subjects	407
No. Diabetic subjects	861

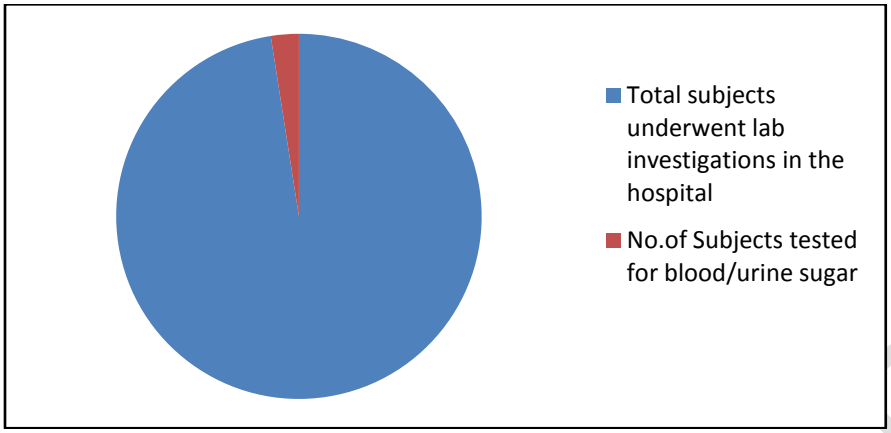

Figure 1: Pie diagram shows the number of subjects tested for any of blood/urine sugar investigatons among the total subjects underwent any laboratory investigations.

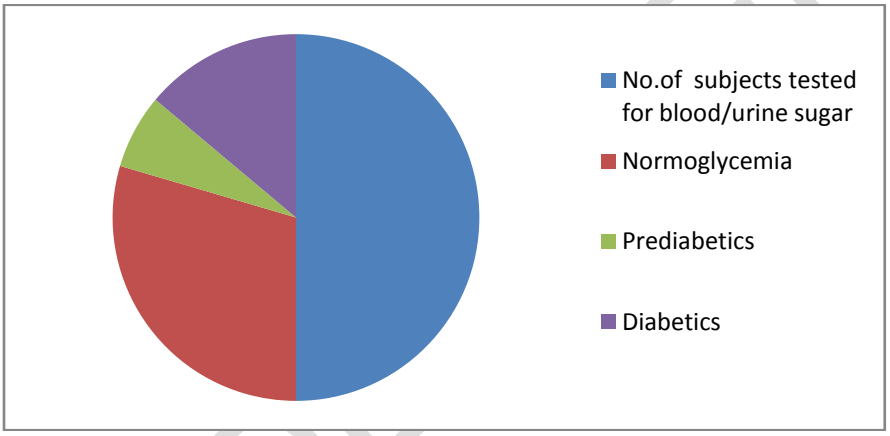

Figure 2: Pie diagram shows prevalence of diabetes, prediabetes, non diabetes.

4. DISCUSSION:

The preliminary survey data showed about 1,22,426 subjects underwent either of hemotology, biochemistry,serology or microbiological laboratory investigations. Among these, 3099 subjects tested for one or the other blood and urine sugar such as fasting and postprandial blood sugar, fasting and postprandial urine sugar, HbA1C, Random blood sugar, GTT. Normoglycemia subjects were found to be 59% (1831), 27.78% (861) subjects were Diabetics followed by 13.13% (401) subjects were Prediabetics. The interim analysis report was presented in this work, the data collection will be continued and analysed based on the type of sugar test done, age, gender, locality. And also the data will be statistically analyzed.The overall prevalence of prediabetes and diabetes in all 15 states of India was 10·3% and 7·3% respectively. The prevalence varied from state to state and there are large differences between the

states in India. The study reports an evidence of an epidemiological transition, with a higher prevalence of diabetes in low socioeconomic groups in the urban areas of the more economically developed states. The spread of diabetes to economically disadvantaged sections of society is a matter of great concern, warranting urgent preventive measures.[8]The prevalence of prediabetes is increasing worldwide and it is projected that >470 million people will have prediabetes in 2030. Prediabetes is associated with the simultaneous presence of insulin resistance and β-cell dysfunction, abnormalities that start before glucose changes are detectable. Observational evidence shows associations of prediabetes with early forms of nephropathy, chronic kidney disease, small fibre neuropathy, diabetic retinopathy, and increased risk of macrovascular disease. Multifactorial risk scores could optimize the estimation of diabetes risk using non-invasive parameters and blood-based metabolic traits in addition to glycaemic values. For prediabetic individuals, lifestyle modification is the cornerstone of diabetes prevention with evidence of a 40%–70% relative risk reduction. Accumulating data also suggests potential benefits from pharmacotherapy. [9]The prevention and management of diabetes and associated complications is a huge challenge in India due to several issues and barriers, including lack of multisectoral approach, surveillance data, awareness regarding diabetes, its risk factors and complications, access to health care settings, access to affordable medicines, etc. Thus, effective health promotion and primary prevention, at both, individual and population levels are the need of the hour. The risk for diabetes is largely influence by ethnicity, age, obesity and physical inactivity, unhealthy diet, and behavioral habits in addition to genetics and family history. Good control of blood sugar blood pressure and blood lipid levels can prevent and/or delay the onset of diabetes complications. [10] The progression from prediabetes to type 2 diabetes occurs over many years before the development of overt hyperglycemia seen in diabetes. The risk of progressing to diabetes depends on the degree of insulin resistance and deficiency of insulin secretion as well as other diabetes risk factors.[11] As with prediabetic status, diabetes risk models provide a method for identifying individuals at risk of developing diabetes based on parameters available to the general practitioner. There is no single universally accepted diabetes prediction model and given that ethnicity is strongly related to diabetes risk, recalibration of prediction algorithms may be necessary when they are applied to different populations. Irrespective of the definition and diagnostic criteria used, the term prediabetes denotes a state of dysmetabolism with a high risk of progression to diabetes mellitus. Although diabetes-related complications may already be evident among individuals with prediabetes, interventions at this stage primarily aim to hinder the development of overt hyperglycemia rather than to prevent complications. [12] Prediabetes is a term used to describe a state of metabolic dysregulation, which is distinguished by glucose levels above normal but lower than those diagnostic for diabetes mellitus. The results of the study may present a series of important implications in clinical practice. The first consideration would focus on the prognosis and natural history of prediabetes. Most importantly, screening should occur strictly after the physician has weighted that any preventive or therapeutic interventions that may arise based on screening results are likely to decisively affect patient prognosis and quality of life. Finally, regarding identified cases of prediabetes in this age group, further preventive strategies should focus on improving the overall health status, prognosis and quality of life of patients rather than explicitly target prevention of progression to T2DM.The prevalence of diabetes and prediabetes are higher in both urban and rural areas of India compared with earlier studies. With greater urbanisation, growth of the middle class and ageing of the population, one can expect huge increases in the numbers of people with diabetes in India in the future. [13] Diabetes is one of the largest global health emergencies of this century, ranking among the 10 leading causes of mortality together with cardiovascular disease (CVD), respiratory disease, and cancer. According to the World Health Organization (WHO), non-communicable diseases (NCDs) accounted for 74% of deaths globally in 2019, of which, diabetes resulted in 1.6 million deaths, thus becoming the ninth leading cause of death globally. According to these estimates, there is an urgent need for improved diabetes screening. They also highlight the importance of identifying undiagnosed diabetes and providing appropriate and timely care as undiagnosed diabetes can have negative consequences such as an increased risk of diabetes related complications, increased healthcare use, and associated costs.[14]

5. CONCLUSION:

Diabetes is more a lifestyle disorder and is preventable. A strict diet and lifestyle modification, stress free life, active and physical fitness, conscious living are the choices. It requires the awareness about the disease in the patient, responsibility from the healthcare professionals. The pathophysiology of the disease can be reversed and managed if diagnosed earlier. Many studies have proved the prediabetic stage can be converted back to normoglycemia. Prediabetes is a high risk state where the individual acquiring diabetes can be prevented. To delay the progression and development of diabetes, there is a need to check on risk factors that are non modifiable like family history, genetic and modifiable risk factors

like diet, physical activity, obesity. There is a need to bring up the model in identifying the at risk individuals. Screening at the earliest will help in early diagnosis and intervention. This will aid in preventing disease progression and leading to diabetic complications. The sugar levels higher than normal but less than hyperglycemic value will be generally paid no attention by the health seekers and healthcare providers. The right intervention imposed when an individual at risk of getting diabetes or wide approach if given to a diabetic, the quality of life will be improved.

ETHICAL APPROVAL (WHEREEVER APPLICABLE)

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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