Review Article

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EARLY DETECTION AND MANAGEMENT OF PREDIABETES IN PRIMARY HEALTH CARE SETTINGS: A NARRATIVE REVIEW

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ABSTRACT

Prediabetes is an intermediate metabolic state characterized by blood glucose levels above normal but below the diagnostic threshold for diabetes mellitus. It represents a growing public health concern world-wide, particularly in low- and middle-income countries. Early detect-ion and timely intervention at the primary health care level can significantly reduce progression to type 2 diabetes mellitus and its associated complications. This narrative review aims to summarize current evidence regarding the epidemiology, diagnostic criteria, risk factors, and management strategies for prediabetes, with emphasis on the pivotal role of primary health care providers.

KEYWORDS: Prediabetes; primary Health Care; Early Detection; Lifestyle Modification; Diabetes Prevention.

INTRODUCTION

Prediabetes is increasingly recognized as a critical stage in the continum of glucose dysregulation and the natural history of type diabetes mellitus(T2DM).[1] Individuals with prediabetes are at increased risk of developing overt diabetes, cardiovascular diseases, and microvascular complications.[2] Despite this, prediabetes often remains undiagnosed, particularly in primary health care settings where screening opportunities may be missed.[3] Strengthening early detection strategies in primary care can substantially reduce the future burden of diabetes and improve population health outcomes.[4]

Epidemiology

The global prevalence of prediabetes has risen dramatically over the past two decades. According to the international diabetes federation, hundreds of millions of adults worldwide are estimated to have impaired glucose regulation.[5] Each year, approximately 5-10% of individuals with prediabetes progress to type 2 diabetes if no preventive measures are undertaken.[6] The burden is particularly significant in developing countries, where health systems face increasing pressure from chronic non-communicable diseases.[7]

Risk Factors

Several modifiable and non-modifiable and risk factors contribute to the development of prediabetes. Obesity and physical inactivity are the most important modifiable determinants, while advancing age family history of diabetes, and history of gestational diabetes are key non-modifiable factors.[8]

Table 1: Major Risk Factors for Prediabetes.

Risk Factor	Description
Obesity	Body mass index>25 kg/m2
Physical inactivity	<150 minutes of moderate activity/week
Family history	First-degree relative with diabetes
Age	>45 years
Gestational diabetes	Previous history in women

Pathophysiology

Prediabetes is primarily driven by insulin resistance and progressive B-cell dysfunction. Peripheral tissues, particularly skeletal muscle and adipose tissue, exhibit reduced sensitivity to insulin, leading to compensatory hyperinsulinemia.[9] Over time, pancreatic B-cell failure ensues resulting in impaired glucose tolerance and fasting hyperglysemia.[10]

Table 2: Diagnostic Criteria for Prediabetes.

Test	Prediabetes Range
Fasting plasma glucose	100-125mg/dl
2-hour Oral Glucose Tolerance Test	140-199mg/dl
Hba1c	5.7 -6.4%

Routine screening of high–risk individuals in primary health care settings is strongly recommended.[12]

Management of prediabetes

Lifestyle modification is the cornerstone of prediabetes management and has been shown to be highly effective in preventing progression to type 2 diabetes.[13] Weight

Diagnostic criteria

The diagnosis of prediabetes is based on laboratory thresholds defined by international guidelines, including the American Diabetes Association (ADA) and the National Institute for Health and Care Excellence (NICE).[11]

loss of 5-10 %, regular physical activity, and dietary modification significantly improve insulin sensitivity.[14]

Pharmacological therapy, particularly metformin, may be considered for high –risk individuals, including those with obesity, younger age or a history of gestational diabetes.[15]

Table 3: Management Strategies for Prediabetes.

Intervention	Clinical Benefit
Lifestyle modification	First-line and most effective
Weight reduction	Improves insulin sensitivity
Physical activity	Reduces progression risk
Metformin	For selected high-risk patients
Regular follow-up	Early detection of progression

METHODOLOGY

This narrative review was conducted through a structured search of pee-reviewed literature published in English between January 2o14 and December 2024.Electrical databases including PubMed, Google Scholar, and the Cochrane Library were searched using keywords such as (prediabetes, primary health care, early detection, and diabetes prevention). Relevant international guidelines from the ADA and NICE were also reviewed. Studies focusing on adult populations, screening strategies, and primary care–based interventions were included. Articles with unclear methodology, non-relevant outcomes, or pediatric –only populations were excluded.

Role of Primary Health Care

Primary health care centers represent the most accessible and cost-effective setting for early detection and prevention of prediabetes.[16] Family physicians play a central role in screening high-risk individuals, providing patient education, initiating lifestyle interventions, and ensuring long-term follow-up.[17] Integrating structured prevention programs into primary care can significantly reduce the incidence of diabetes at the community level.[18]

DISCUSSION

Evidence strongly supports the effectiveness of early intervention in individuals with prediabetes. Lifestyle-based interventions implemented in primary care settings

have demonstrated sustained reductions in diabetes incidence and cardiovascular risk-factors.[19] However, challenges remain, including limited resources, patient adherence, and lack of standardized screening programs in some regions.[20]

CONCLUSION

Prediabetes is a common, preventable, and potentially reversible condition. Early identification and effective management within primary health care settings are essential to reduce progression to type 2 diabetes mellitus, particularly in resource limited settings, is a key strategy in addressing the growing global diabetes burden.

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