

89201\_Auto\_Edited.docx

**Name of Journal:** *World Journal of Clinical Pediatrics*

**Manuscript NO:** 89201

**Manuscript Type:** EDITORIAL

**‘Prediabetes’ a practical distinctive window for workable fruitful wonders-prevention  
& progression alert as advanced professionalism**

Sunil Jain

**Abstract**

Diabetes is a devastating public health problem. Prediabetes is observed as an intermediate stage in all of the disease processes leading to diabetes, including Types 1 & 2 Diabetes. In the article “Prediabetes in children and adolescents: An updated review” Ng *et al* have attempted to present current evidence. Clear sophistication is conducive for success, with advancements professionally perfect. Simplification of evidence for working rationale and rewarding is opined as Conceptual framework ‘3ASs’ (1) Awareness Sensible; (2) Algorithms Simple; and (3) Appealing Strategies. Policy makers and public majorly need to be alerted. The prevalence of Prediabetes should send alarm bells ringing, for parents, individuals, clinicians, and policy makers. Prediabetes is defined by: Impaired fasting glucose (100-125 mg/dL); impaired glucose tolerance (2 h postprandial glucose 140-199 mg/dL); OR hemoglobin A1c values of 5.7%-6.4%. Any of the above positive test alerts for intervention. Clinical guidelines do not recommend preferring one test over the other for evaluation. Decisions should be made on the strengths and shortfalls of each test. Patient preferences and test accessibility should be taken into consideration. Algorithm based on age, physiological stage, health status, and risk factors is provided. Primordial prevention targeting populations aims at eliminating risk factors through public education and encouraging practices through modifications in the environment. Access to healthy foods is provided. Primary prevention is for individuals with Prediabetes diagnosis, and involves a structured program to reduce

body weight and increase physical activity, along with a healthy diet. Overall move to healthy lifestyle methodically for lifelong health is need of the hour for populations and people. Early energetic prediabetes action is necessary.

## **INTRODUCTION**

Obesity is a global public health crisis. Prevalence rates are increasing among children and adolescents. Prediabetes identifies individuals at high risk of diabetes effectively<sup>[1]</sup>. Prediabetes provides preventive action window against progression and is observed as an intermediate stage in all of the disease processes leading to diabetes. The expanded list of diabetes aetiologies Figure 1. All entities need necessary attention, particularly in prevention with energetic identification for action of Prediabetes.

*“Discoveries many!  
Necessitating strategies novel,  
Innovative & inspiring”*

In the article “Prediabetes in children and adolescents: An updated review” Ng *et al*<sup>[2]</sup> have attempted to present current evidence comprehensively. They aim to provide pediatricians and primary care providers with an updated overview of this important condition. Clear sophistication is conducive for advancements for success. Policy makers and public majorly need to be alerted and apprised. Simplification of working sophisticated is opined as Conceptual framework ‘3ASs’, Figure 2.

## **AWARENESS SENSIBLE**

As many as 34% or 88 million United States adults had prediabetes, as per the most recent estimate (2020), by the Centers for Disease Control and Prevention<sup>[3]</sup>. Children are likely to be similarly affected, with rising obesity. The authors Ng *et al*<sup>[2]</sup> have reported a pooled prevalence of up to 8.84% from a recent systematic review and meta-analysis<sup>[2,4]</sup>. The

prevalence awareness should send alarm bells ringing, for parents, individuals, clinicians, and policy makers.

*'Statistics alarming necessitating advanced strategies'*

Prediabetes is defined by: Impaired fasting glucose (IFG) (100-125 mg/dL [5.6-6.9 mmol/L]), OR: Impaired glucose tolerance (IGT) (2 h postprandial glucose 140-199 mg/dL [7.8-11 mmol/L]), OR: Hemoglobin A1c (HbA<sub>1c</sub>) values of 5.7%–6.4% (39-47 mmol/mol)<sup>[5]</sup>.

Actions begin with suspicion, and tests advance actions, which attempt to restore healthy status, the working wonderful. Any of the above positive test alerts for intervention. Clear concepts are must for practice, and this should provide impetus to the Core tip given by Ng *et al*<sup>[2]</sup> "child health practitioners are struggling with the definition".

*'Knowing, understanding, & knack,  
Testing, numbers, & tact'*

### ALGORITHMS SIMPLE

Evidence facts need to be expertly forged into algorithms. We present an algorithm based on American Diabetes Association Professional Practice Committee recommendations (Figure 2)<sup>[6]</sup>. Algorithm based on age, physiological stage, health status, and risk factors is better. Current evidence comprehensive is: (1) 1 in 5 United States adolescents with obesity have Prediabetes<sup>[7,8]</sup>; (2) Comorbidities of pediatric overweight and obesity: Prediabetes and diabetes occur more frequently among children  $\geq 10$  years age, are in early pubertal stages, or have a family history of type 2 diabetes mellitus (T2DM)<sup>[8]</sup>; (3) The risk profile for diabetes mellitus and nonalcoholic fatty liver disease in children  $<10$  years age is lower (especially in the absence of severe obesity). Hence, obtaining tests for abnormal glucose metabolism or liver function is not universally recommended for these children<sup>[8]</sup>; (4) Prediabetes is often associated with the insulin resistance syndrome (also known as metabolic syndrome), which has dyslipidemia of the high-triglyceride or low- or high-density lipoprotein type, or both, and hypertension<sup>[5]</sup>; and (5) Progression of IFG

to overt T2DM appears to be lower in the pediatric obese population than in adults<sup>[9]</sup>. On the other hand, the transition from IGT to T2DM is more rapid in children and adolescents than adults<sup>[10]</sup>.

To encourage a pragmatic and efficient evaluation strategy (avoiding repeated testing), it is recommended that in <sup>1</sup> children with obesity, evaluation for lipid abnormalities, abnormal glucose metabolism, and liver dysfunction should be done at the same time, beginning at age 10 years<sup>[8]</sup>.

Diagnostic tests for prediabetes are Fasting Glucose, Glucose Tolerance test, and HbA<sub>1c</sub>. <sup>1</sup> Clinical guidelines do not recommend preferring one test over the other for evaluation. <sup>1</sup> All need to know and understand the strengths and shortfalls of each test, for judicious use. Patient preferences and test accessibility should be taken into consideration<sup>[8]</sup>.

In view of these, we recommend following tests for abnormal glucose metabolism, and their significance is: <sup>2</sup> (1) IFG: > 99 mg/dL (5.5 mmol/L) is the upper limit of normal, and alerts action as uncontrolled it causes a progressively greater risk for the development of microvascular and macrovascular complications<sup>[5]</sup>; (2) IGT: Hyperglycemia when challenged with the oral glucose load, necessitates strict dietary measures sternly, is useful for counselling, and improves its adherence; and (3) HbA<sub>1c</sub>: The HbA<sub>1c</sub> test is easy to obtain as it can be done anytime and fasting is not required. This provides stronger and more specific associations with cardiometabolic risk<sup>[11]</sup> (Figure 3).

Further, Ng *et al*<sup>[2]</sup> have given a simplified approach algorithm, which leads based on risk factors. One size does not fit all, especially in the dynamic growing pediatric age group. It has proposed testing oral glucose tolerance test or fasting plasma glucose, +/- HbA<sub>1c</sub>. I wonder if as per definition elucidated above (which states any one of the 'Tests for abnormal glucose metabolism' positive diagnosing Prediabetes), what happens in following situations: (1) Children < 10 years age and 'Severely obese' and no risk factors mentioned: If FBG is normal, whether IGT test will be done. As per their algorithm, it is only if risk factors are there. It should be done, as <sup>2</sup> (I) Individuals with IFG often manifest hyperglycemia only with the oral glucose load challenge, as used in the standardized oral

glucose tolerance test. Results will motivate working prevention rationale (II) <sup>3</sup> subjects with both IFG and IGT have dangers of additive metabolic defects and are more likely to progress to overt T2DM<sup>[10]</sup>; and (2) Overweight (only) and risk factors: If IFG positive, should one proceed to IGT? No, as unnecessary testing is burdensome for individuals and healthcare institutions. Further, many individuals with IFG <sup>2</sup> are euglycemic in their daily lives and may have normal or nearly normal HbA1c levels<sup>[5]</sup>. Thus, they are taking healthy diets, not binge eating, and even if bingeing, their body is taking care of sugar levels. Lifestyle interventions for ideal weight should suffice, rewardingly!

*'Simple choices – comprehensive success'*

### **APPEALING STRATEGIES**

Diabetes is dangerous, its management difficult for good glucose control and complications prevention. Prediabetes provides early opportunity for health promotion and prevention. Hence the need of energetic strategies and ensuring success with appeal.

*'Methods scientific, Motivation strong,  
Success major over morbidity & mortality'*

Authors Ng *et al*<sup>[2]</sup> point “The lack of prospective long-term longitudinal data to inform evidence-based practice for disease prevention and complication avoidance is the real challenge and major gap in pediatric prediabetic research”<sup>[2]</sup>. Waiting for evidence is unpardonable. <sup>2</sup> The Diabetes Prevention Program strikingly showed that lifestyle or drug intervention intensified in individuals with IGT prevents or delays the onset of T2DM<sup>[12]</sup>. Similar beneficial effects in obese adolescents with IGT are likely and believable!<sup>[5]</sup> Such benefits necessitate large scale strategies for more benefits for many. Ng *et al*<sup>[2]</sup> provision of only individualistic strategies needs further expansion<sup>[2]</sup>.

Prevention is most beneficial if it is early and energetic. Given the rising burden of lifestyle diseases and associated risks, we outline succinct strategies, as appealing advancements: (1) Primordial prevention: Targeting towards entire population is important, and this focusses on social and environmental conditions<sup>[13]</sup>. This aims at



eliminating risk factors in general populations, through public education and encouraging practice through modifications in the environment. Access to healthy foods is provided<sup>[1]</sup>. Breastfeeding should be encouraged and ensured, and it is associated with protection against childhood overweight and diabetes<sup>[14]</sup>. In mothers with gestational diabetes, breastfeeding protects against obesity and type 2 DM<sup>[15,16]</sup>. A sedentary lifestyle is to be avoided and advice should be to be <sup>5</sup> physically active for at least 60 min per day on all 7 days of the week<sup>[17]</sup>; (2) Primary prevention: Interventions aiming at ameliorating risk factors reward favourably. Individuals with Prediabetes diagnosis should prompt referral to a structured program for reducing body weight and increasing physical activity. Healthy meal plan is provided. Encouragement provided for compliance. This should be intensive.

Appeal is ensured by education of awareness of long-term health burdens, which culminate in decreased life-expectancy. Health benefits of lifestyle modification are emphasized.

Attraction & compliance needs to be ensured with motivational methods like health education and hope inspiring interestingly – ‘healthy lifestyle must for lifelong smiles’.

Use of new information and communications technologies for improving health and preventing obesity with improvement in knowledge for nutrition habits and physical activity promotion has been shown beneficial in a recent Systematic review<sup>[18]</sup>. Doctors should be educated to be proficient in new technologies use<sup>[19]</sup>.

Ng *et al*<sup>[21]</sup> have pointed use of metformin as a second-line management in those refractory to lifestyle interventions<sup>[2,20]</sup>. However, results of a recent systemic review have been inconclusive as to the benefits of metformin to prevent the progression to overt T2DM in children and adolescents with prediabetes<sup>[21]</sup>. Hence focus should be on continuation of lifestyle interventions.

## CONCLUSION

Finally, the message is high incidence, higher risks unattended, necessitate highest professionalism. Move to healthy lifestyle methodically for lifelong health needs attention and advancement.

*“Progress for health, contemporarily, future favourable completely,*

*Prediabetes alerting professional tact timely,*

*Energetic and rationale, ensuring lifelong smiles surely”*

### **ACKNOWLEDGEMENTS**

The author is thankful to authors of all the references quoted, for all the insights interesting for advancing care of children.



# 16%

SIMILARITY INDEX

### PRIMARY SOURCES

1	<a href="https://publications.aap.org">publications.aap.org</a> Internet	86 words — 5%
2	<a href="https://archive.org">archive.org</a> Internet	79 words — 4%
3	<a href="https://ndl.ethernet.edu.et">ndl.ethernet.edu.et</a> Internet	45 words — 2%
4	<a href="https://www.thieme-connect.de">www.thieme-connect.de</a> Internet	26 words — 1%
5	<a href="https://oxfordjournals.org">oxfordjournals.org</a> Internet	15 words — 1%
6	<a href="https://article.sciencepublishinggroup.com">article.sciencepublishinggroup.com</a> Internet	14 words — 1%
7	<a href="https://www.mdpi.com">www.mdpi.com</a> Internet	13 words — 1%
8	<a href="https://clinicalgate.com">clinicalgate.com</a> Internet	12 words — 1%

