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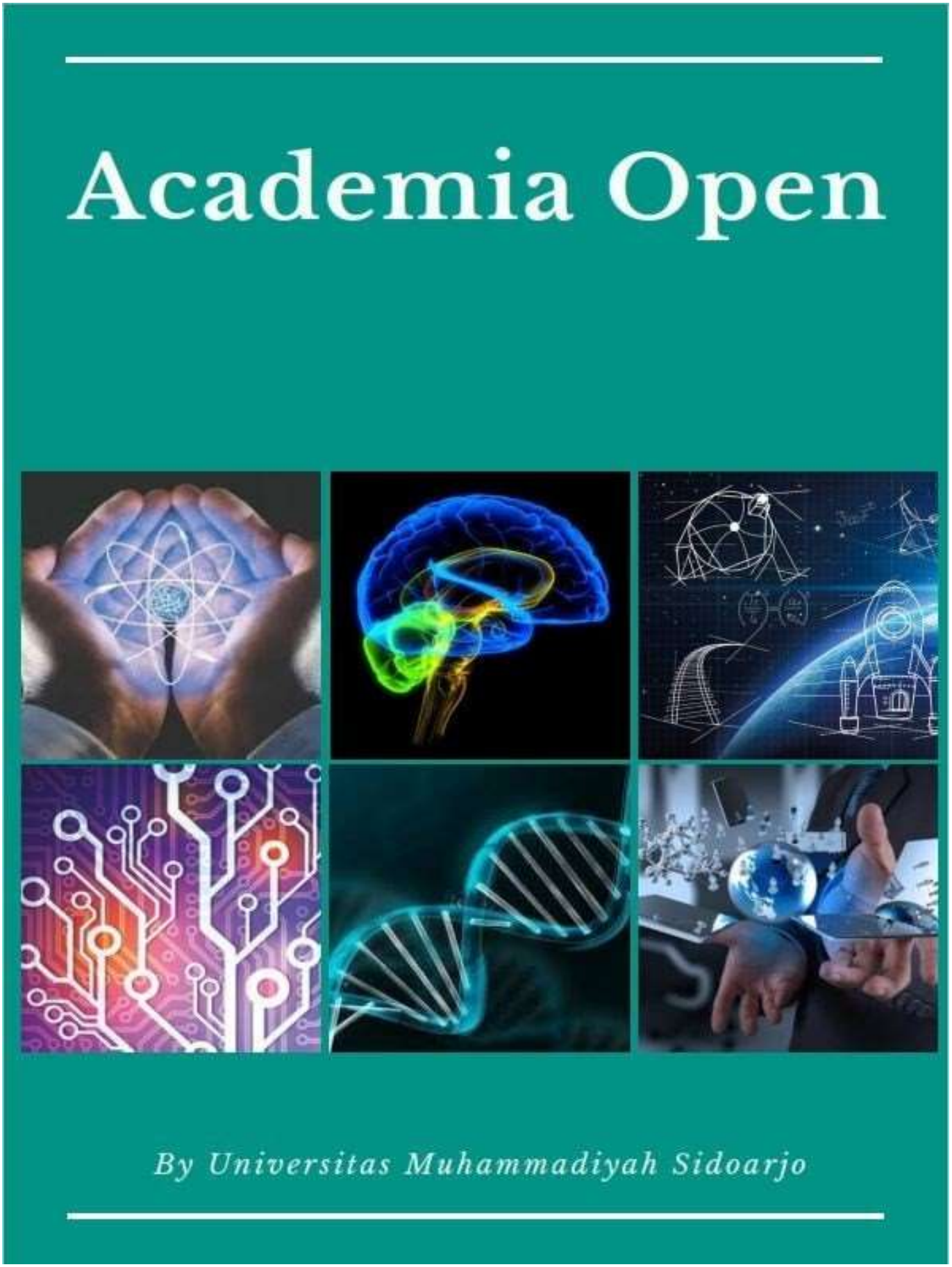

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Pediatric NAFLD Epidemiology, Risk Factors and Research Gaps in Uzbekistan and India

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Abstract

General Background: Pediatric Non-Alcoholic Fatty Liver Disease (NAFLD) represents a critical chronic liver condition in children globally, characterized by hepatic fat accumulation without alcohol exposure, potentially progressing to steatohepatitis, fibrosis, and cirrhosis. **Specific Background:** Rapid socioeconomic transitions in Asia have escalated childhood obesity rates, with India reporting prevalence estimates of 12–63% among overweight children, while Uzbekistan demonstrates 50–66% prevalence in similar cohorts, though comprehensive epidemiological data remain limited. **Knowledge Gap:** No comparative analysis exists examining pediatric NAFLD patterns between Uzbekistan and India, particularly regarding temporal trends and population-based prevalence. **Aims:** This study compares burden, risk factors, and clinical characteristics of pediatric NAFLD across both nations through systematic literature review. **Results:** Both countries exhibit increasing prevalence driven by obesity and insulin resistance, with male preponderance and age-dependent patterns; however, Uzbekistan lacks population-based studies unlike India's more established epidemiological framework. **Novelty:** This represents the first cross-country comparison of pediatric NAFLD between Central and South Asian contexts. **Implications:** Findings underscore urgent need for standardized screening protocols, culturally adapted lifestyle interventions, and population-based research in Uzbekistan to inform national health policies.

Keywords : Pediatric NAFLD, Childhood Obesity, Non-Alcoholic Fatty Liver Disease, Metabolic Syndrome, Insulin Resistance

Highlight :

- Prevalence reaches 42-47% among overweight Indian children, with boys consistently more affected.
- Uzbekistan shows 50-100% rates in obese cohorts but lacks comprehensive population-based studies.
- Both nations face growing burden from dietary transitions, urbanization, and sedentary lifestyles.

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Introduction

Pediatric Non-Alcoholic Fatty Liver Disease (NAFLD) is now one of the leading chronic liver diseases in children worldwide. The disease occurs when excess fat accumulates in the liver without alcohol exposure. NAFLD includes simple steatosis and the more severe non-alcoholic steatohepatitis (NASH), which may progress to fibrosis, cirrhosis, and early adulthood hepatocellular carcinoma [1-3]. Globally, pediatric NAFLD prevalence is estimated at 7–10%, increasing to 30–70% in obese children. Rapid socioeconomic development in Asian and Central Asian countries has shifted dietary patterns toward high-calorie, low-nutrient foods and reduced physical activity [4-6]. India reports a high burden of childhood obesity and metabolic syndrome, making it a NAFLD hotspot. Uzbekistan, similarly, is undergoing nutrition transition and rising childhood obesity, but national epidemiological data remain limited as there is no nationalised data the research remains scarce and only the data from specific hospitals remains the only information [7-9]. Research gap: There is no comparative analysis describing the pediatric NAFLD patterns between Uzbekistan and India. As there is also no research on the increasing cases every year [10]. Aim: To compare prevalence, risk factors, diagnostic approaches, and management strategies of pediatric NAFLD in Uzbekistan and India. This article aims to grow attention to this increasing risk. This also incorporates to grow emphasis of National Council of both Countries to not treat this disease as a Benign (not harmful in effect) condition as after children may progress faster in some cohorts due to early exposure to obesity and insulin resistance. Studies in Asia show that up to 10–20% of children with NASH can develop significant fibrosis before adulthood.

Methods

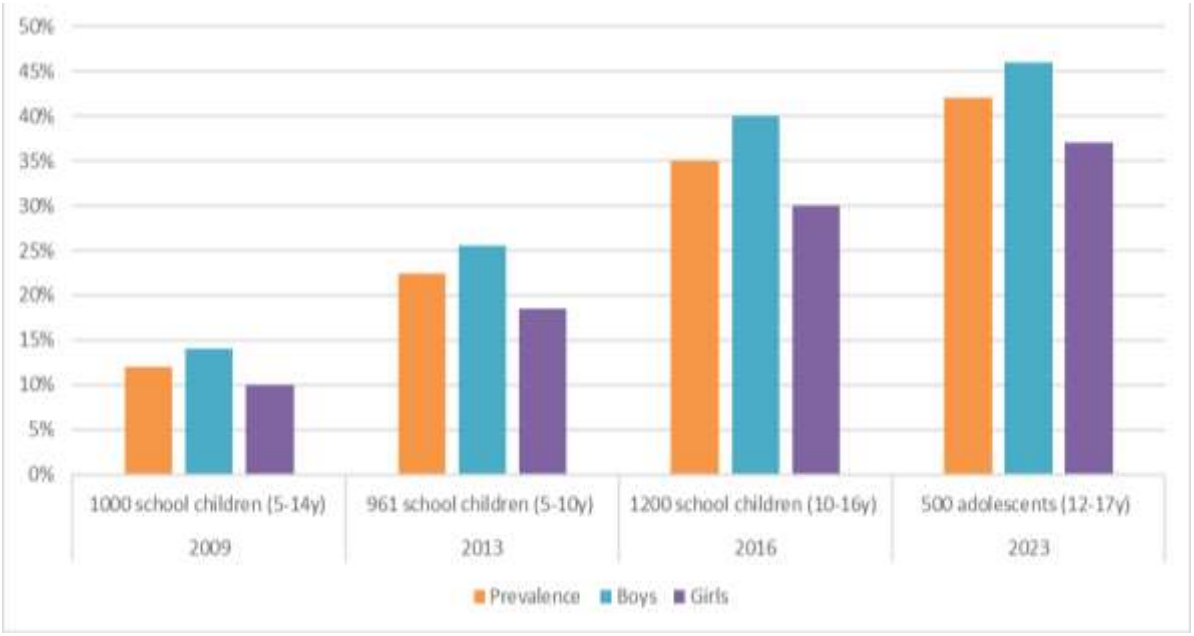
Study type: Narrative review / cross-country comparison.
Data sources: PubMed, Scopus, Google Scholar, WHO country reports, Uzbekistan Ministry of Health data, National Family Health Survey (India).

Results

1. Boys > Girls: Both India and Uzbekistan show higher prevalence in boys, consistent with global pediatric NAFLD data.
2. Rising trend: NAFLD prevalence is increasing year by year, driven by rising obesity rates and lifestyle changes.
3. Age dependence: Older children and adolescents have higher prevalence.
4. Data limitations:
India has more studies, but still mostly urban cohorts.
Uzbekistan data are very limited and focused only on obese children.
5. Growth Charts: Over the past decade, pediatric NAFLD has shown a steadily increasing trend in both India and Uzbekistan, with boys consistently affected more than girls. In India also, earlier studies (no meta-analysis was conducted) around 2009 have stated a comparatively lower NAFLD prevalence of 12% amongst the children between 5–14 y[6] wherein boys were found to be slightly more prevalent than girls. In 2013, prevalence was 22.4% in the age group 5–10 first, but there were more affected boys (25.6%) than girls (18.5%). This increasing trend persisted, and in 2016 prevalence among urban adolescents (10–16 years) was 35%, mirroring rising obesity along with dramatic changes in lifestyle. Even more recent analyses between 2020 and 2023 especially in overweight and obese children reported prevalences from between 42% to 47%, with the prevalence in boys close to almost half of them (50–54%) and girls between around one-third (37–39%). Taken together, all these data suggest an increasing trend of NAFLD among Indian children especially from urban background and those with obesity [11-13].

In Uzbekistan, information is more scarce (and very little is known regarding the elderly), particularly data from fresh cases, but what is there recorded in obese children also reveals an increasing prevalence of the disease. A 2015 study among obese children aged 6–16 years found NAFLD in 50% of the sample, with boys slightly more affected. By 2018, among adolescents with visceral obesity, prevalence had increased to 65.9%, again higher in boys. The most severe trend is seen in data from 2022, where adolescents aged 16–18 years with abdominal obesity showed a striking 100% prevalence, indicating that in severe obesity NAFLD becomes almost universal [14-15]. Although Uzbekistan lacks large population-based studies, the existing evidence clearly demonstrates that NAFLD becomes more common with advancing age and increasing obesity severity, similar to trends observed in India.

A. Growth Charts for India.



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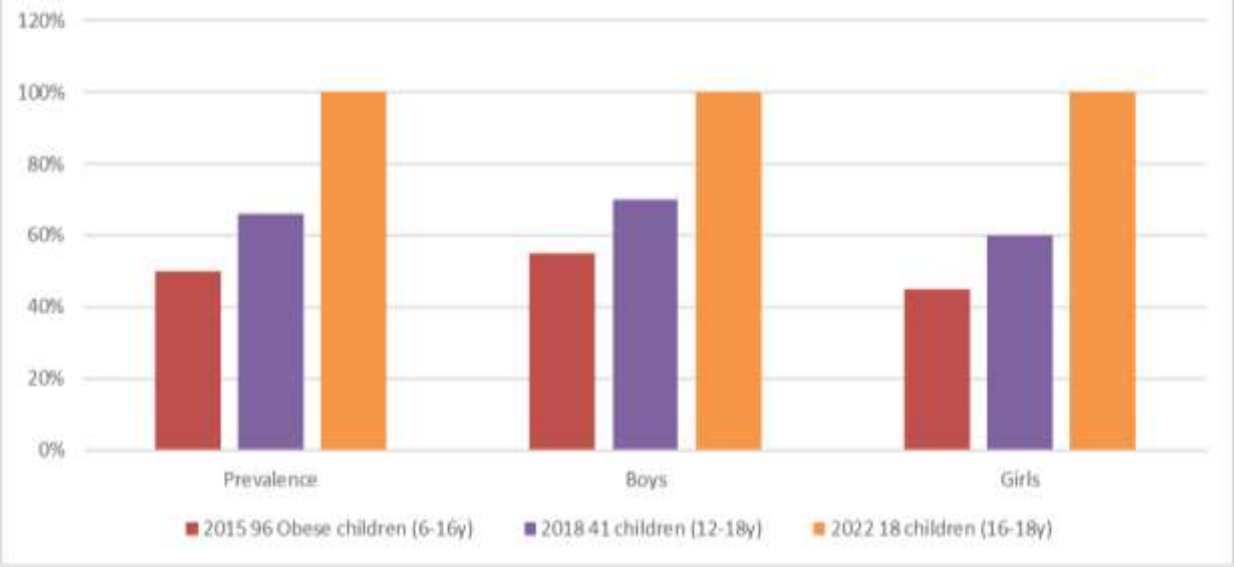
B. Growth Charts for Uzbekistan.



Discussion

Both in Uzbekistan and India, there is observed a continuously rising burden of pediatric NAFLD due to escalating obesity and insulin resistance. India has stronger studies of epidemiology and has some of the highest prevalence rates of pediatric NAFLD in Asia. Data from Uzbekistan are scarce, but the trend resembles those in other Central Asian countries that are experiencing a rapid shift toward unhealthy lifestyles. Key challenges: Low awareness among pediatricians; Lack of uniform screening recommendations in Uzbekistan; Cultural high carbohydrate low fiber dietary habits; Low physical exercise level among children; Increased Vitamin D deficiency and its impact on metabolic outcomes Inadequate number of School Doctors Still considered NAFLD a benign disease.

Conclusion

Child NAFLD is also the emerging public health problem in both Uzbekistan and India, primarily due to growing childhood obesity, insulin resistance, and early sedentary life. In India there are extensive data regarding high prevalence and standardized screening, whereas Uzbekistan demonstrates emerging, but underexplored burden. Early detection and the use of preventive, culturally adapted lifestyle interventions and school-based prevention are fundamental for preventing long-term metabolic/liver-related complications in children. There is a pressing need for population-based large-scale studies in Uzbekistan to guide national strategies and public health policies

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