

IMPAIRED CARBOHYDRATE METABOLISM IN KYRGYZ POPULATION: CASE REPORT

КЫРГЫЗ ЭЛИНДЕ УГЛЕВОД АЛМАШУУНУН БУЗУЛУШУ: КЛИНИКАЛЫК
БАЯНДАМА

НАРУШЕНИЕ УГЛЕВОДНОГО ОБМЕНА У НАСЕЛЕНИЯ КЫРГЫЗСТАНА:
КЛИНИЧЕСКИЙ СЛУЧАЙ

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Abstract

Relevance. This case report presents a comprehensive analysis of impaired carbohydrate metabolism prevalence among Asian individuals in Kyrgyzstan. A dataset encompassing 223 patients aged between 25 and 73 years was scrutinized, revealing noteworthy insights into gender distribution, family history of diabetes mellitus, age demographics, body mass index (BMI) metrics, waist circumference, blood pressure readings, fasting glucose levels, and postprandial glucose concentrations. The findings underscore the imperative for targeted interventions and scientific strategies to tackle the escalating burden of impaired carbohydrate metabolism within this demographic.

Keywords: Diabetes Mellitus, Asian Population, Insulin Resistance, Public Health Intervention.

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Аннотация

Маанилүүлүк Бул баяндамада Кыргызстандагы азиат тектүү адамдар арасында углевод алмашуунун бузулушунун кеңири таралышы боюнча кеңири анализ берилген. 25 жаштан 73 жашка чейинки 223 бейтапты камтыган маалымат топтому кылдаттык менен текшерилип, гендердик бөлүштүрүү, кант диабетинин үй-бүлөлүк тарыхы, жаш демографиясы, дене салмагынын индекси (ВМІ), белдин айланасы, кан басымы, орозо кармаган глюкоза деңгээли жана тамактан кийинки глюкоза концентрациясы боюнча кызыктуу маалыматтарды камтыды. Жыйынтыктар бул демографиялык топтогу карбонгидрат алмашуу бузулууларынын өсүп бараткан жүгүн чечүү үчүн максаттуу кийлигишүүлөрдүн жана илимий стратегиялардын зарылдыгын көрсөтүп турат.

Ачык сөздөр: Кант диабети, Азия калкы, Инсулинге туруштук берүү, Коомдук саламаттык сактоо.

НАРУШЕНИЕ УГЛЕВОДНОГО ОБМЕНА У НАСЕЛЕНИЯ КЫРГЫЗСТАНА: КЛИНИЧЕСКИЙ СЛУЧАЙ

Аннотация

Актуальность. В этом отчете представлен всесторонний анализ распространенности нарушений углеводного обмена среди лиц азиатской национальности в Кыргызстане. Был тщательно изучен набор данных, охватывающий 223 пациента в возрасте от 25 до 73 лет, который позволил получить интересную информацию о гендерном распределении, семейном анамнезе по сахарному диабету, возрастной демографии, показателях индекса массы тела (ИМТ), окружности талии, показателях артериального давления, уровне глюкозы натощак и концентрации глюкозы после приема пищи. Полученные результаты подчеркивают необходимость целенаправленных вмешательств и научных стратегий для решения проблемы растущего бремени нарушений углеводного обмена в этой демографической группе.

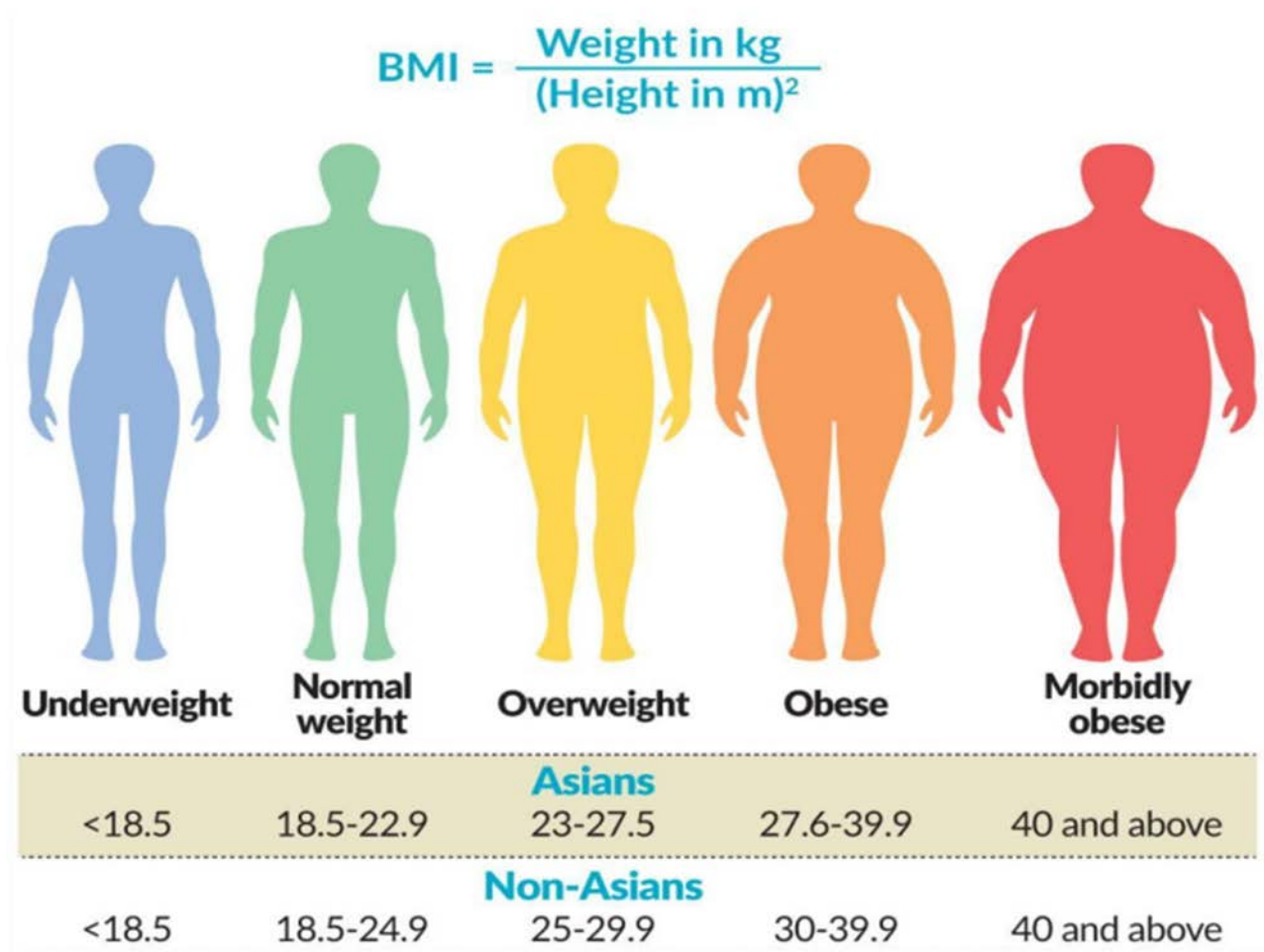
Ключевые слова: Сахарный диабет, Азиатское население, резистентность к инсулину, Общественное здравоохранение.

Introduction

Impaired carbohydrate metabolism, characterized by disruptions in insulin secretion or action, presents a formidable public health challenge globally. Asian populations, including those in Kyrgyzstan, are disproportionately impacted due to genetic predispositions and sociocultural determinants. This case report endeavors to elucidate the prevalence and associated determinants of impaired carbohydrate metabolism in Asian individuals residing in Kyrgyzstan, utilizing a meticulous analysis of pertinent biomedical metrics.

Importance of Diabetes Mellitus Diagnosis and Early Prevention in Low and Middle-Income Countries like Kyrgyzstan

Low and middle-income countries (LMICs) face unique challenges in addressing the burden of diabetes mellitus, including limited healthcare resources, inadequate infrastructure, and sociocultural barriers. Early diagnosis of diabetes mellitus and its precursor, impaired carbohydrate metabolism, is paramount in LMICs to mitigate the progression of the disease and reduce associated morbidity and mortality. By implementing cost-effective screening programs and raising awareness about the importance of regular health check-ups, individuals at risk can be identified early, facilitating timely interventions such as lifestyle modifications, pharmacotherapy, and patient education. In countries like Kyrgyzstan, where healthcare infrastructure may be limited, emphasis should be placed on community-based approaches, leveraging existing primary healthcare networks and engaging community health workers to provide education and screening services. Furthermore, fostering partnerships between governmental agencies, non-governmental organizations, and international stakeholders can enhance access to essential medications, diagnostic tools, and diabetes management resources. Preventing the onset of diabetes mellitus is particularly crucial in LMICs, where the economic burden of chronic diseases can exacerbate existing challenges related to poverty and healthcare disparities. Lifestyle interventions focusing on promoting physical activity, healthy dietary habits, and weight management can yield significant benefits in reducing the incidence of diabetes mellitus and its complications. Moreover, empowering individuals with diabetes mellitus through education and self-management support can improve treatment adherence and long-term health outcomes. Early diagnosis and prevention of diabetes mellitus are imperative in low and middle-income countries like Kyrgyzstan to address the burgeoning burden of non-communicable diseases and promote population health and well-being. Multisectoral collaborations, innovative healthcare delivery models, and targeted interventions tailored to the local context are essential components of comprehensive diabetes prevention and control strategies in LMICs.



Methods

A retrospective examination was conducted on a meticulously collected dataset comprising 223 Asian patients aged between 25 and 73 years. The dataset encompassed detailed information pertaining to gender distribution, familial predispositions to diabetes mellitus, age stratification, BMI metrics, waist circumference measurements, blood pressure profiles, fasting glucose concentrations, and postprandial glucose responses. Statistical analyses were executed to discern significant trends and inferential conclusions regarding the prevalence and determinants of impaired carbohydrate metabolism within the study cohort. Consent was obtained from all patients participating in this research endeavor, and the project received approval from the Ethical Review Board of Osh State University, Kyrgyzstan.

A comparison of the WHO BMI classifications for the general population and for Asian populations (WHO, 2016)

	WHO general population BMI classifications	WHO asian BMI classifications
Underweight	$<18.5\text{kg/m}^2$	$<18.5\text{kg/m}^2$
Ideal	$18.5\text{-}24.9\text{kg/m}^2$	$18.5\text{-}23\text{kg/m}^2$
Overweight	$25.0\text{-}29.9\text{kg/m}^2$	$23\text{-}27.5\text{kg/m}^2$
Obese	$\geq 30\text{kg/m}^2$	$>27.5\text{kg/m}^2$

Results

Among the 223 patients, 45 were male and 119 were female, with a discernible preponderance of females exhibiting impaired carbohydrate metabolism.

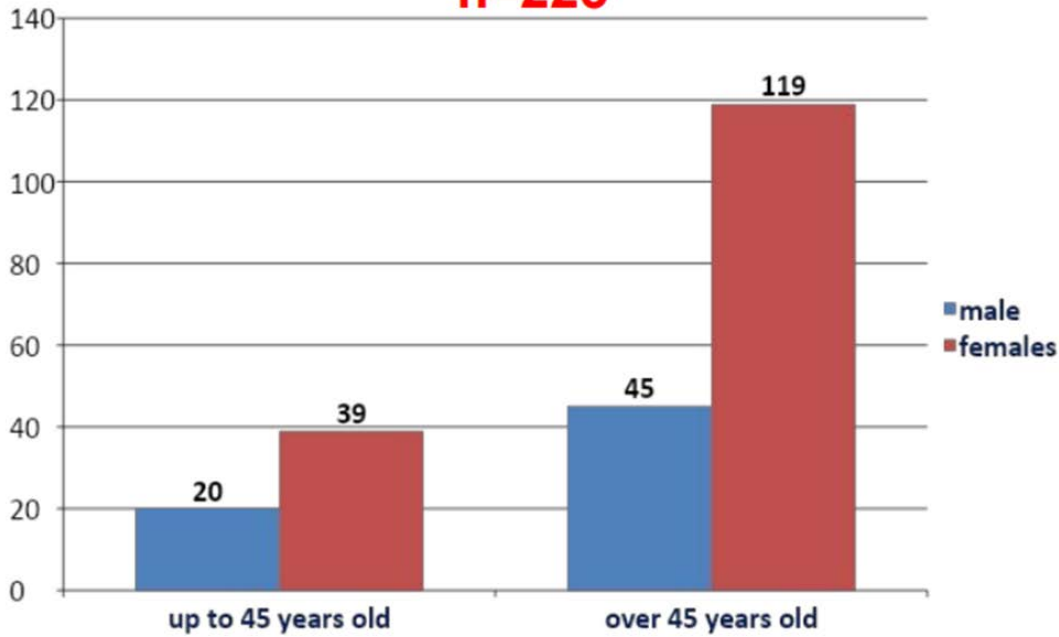
Notably, 28.28% of the total cohort reported a familial history of diabetes mellitus, indicative of genetic predispositions. A substantial majority of patients (86%) were classified as overweight or obese, with obesity grade 1 constituting the predominant classification (41.1%). Aberrant waist circumference measurements were prevalent in 38.1% of patients, indicative of central adiposity. Blood pressure spectra ranged from normotensive to hypertensive levels, with a notable proportion of patients falling within the 130-140 mmHg range. Elevated fasting glucose levels (> 5.6 mmol/L) were documented in 13.4% of patients, while postprandial hyperglycemia (> 7.8 mmol/L) was observed in 12.5% of patients.

More details about the results were as follows:

4.1 Demographic Characteristics:

Among the 223 patients enrolled in the study, 45 were male and 119 were female, indicating a notable gender disparity in the manifestation of impaired carbohydrate metabolism, with females being disproportionately represented.

Age distribution n=223

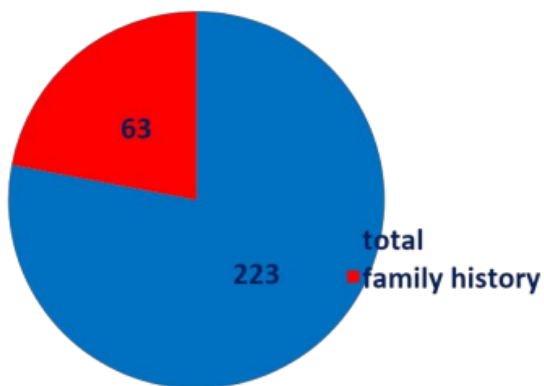


4.2 Familial History of Diabetes Mellitus:

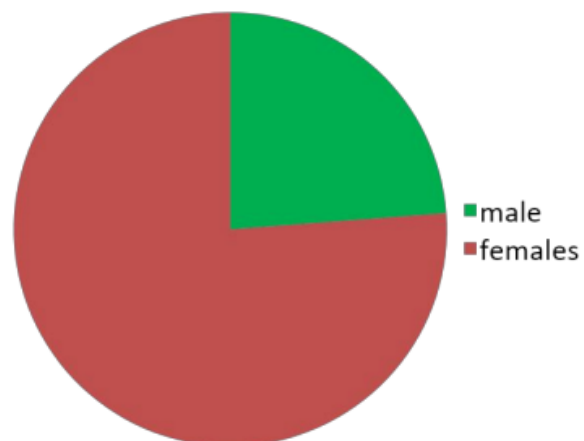
A noteworthy proportion (28.28%) of the total patient cohort reported a familial history of diabetes mellitus, suggestive of a genetic predisposition to the disorder within the study population.

Family history of diabetes

Number of participants

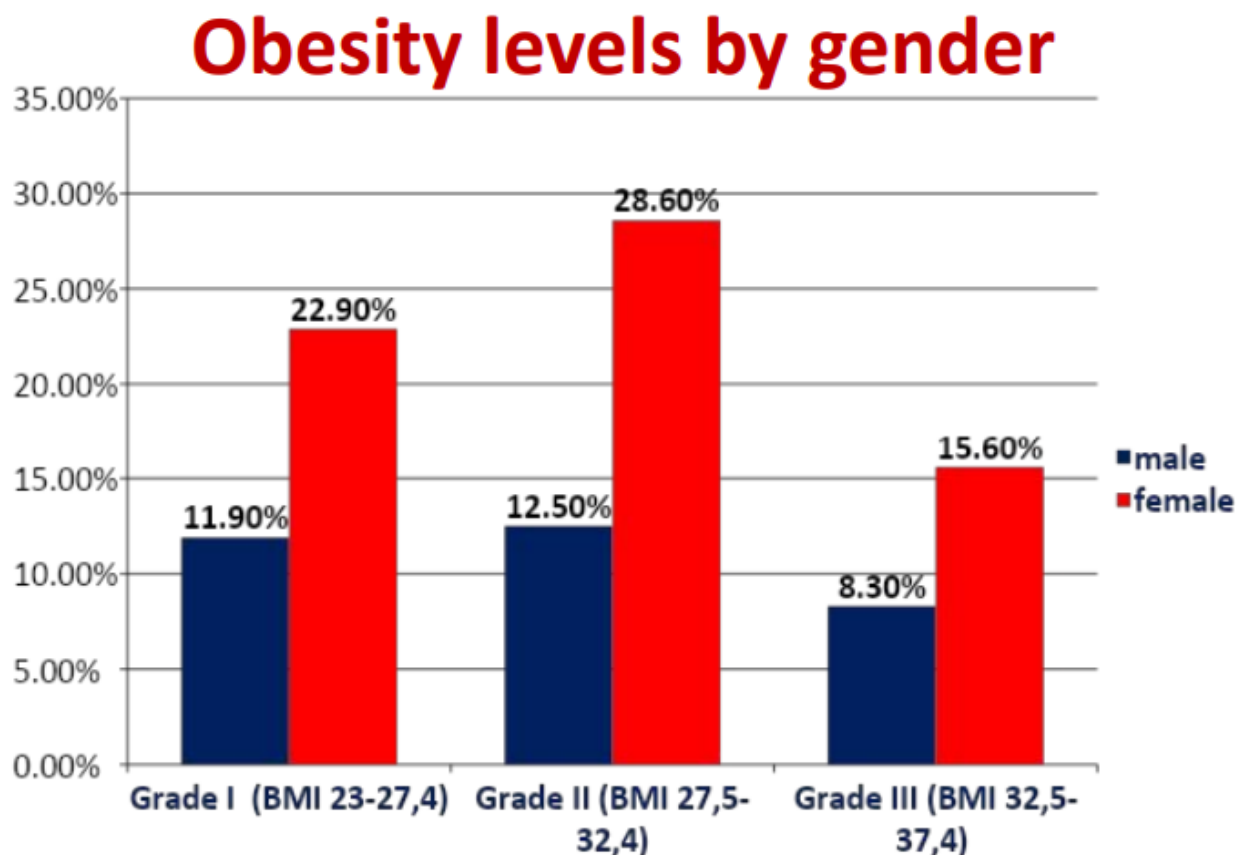


gender



4.3 Anthropometric Measurements:

The majority of patients (86%) were classified as overweight or obese according to established criteria. Within this group, obesity grade 1 was the most prevalent classification, comprising 41.1% of the cohort. Additionally, aberrant waist circumference measurements, indicative of central adiposity, were observed in 38.1% of patients.



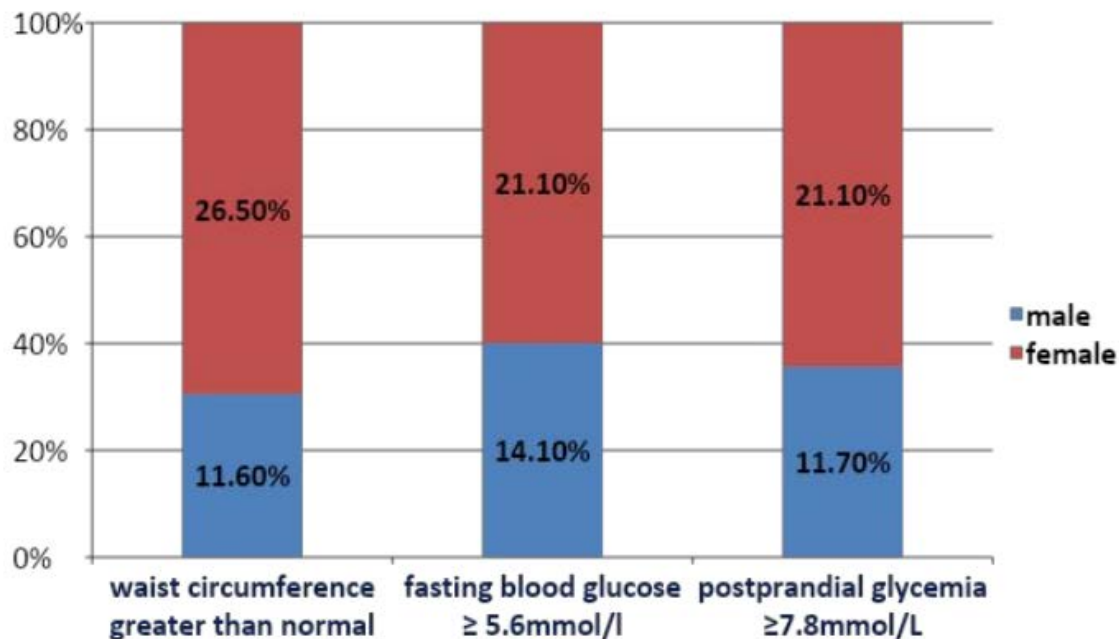
4.4 Blood Pressure Profiles:

Blood pressure readings varied across the normotensive to hypertensive spectrum, with a notable proportion of patients falling within the 130-140 mmHg range for systolic blood pressure. This observation underscores the potential coexistence of impaired carbohydrate metabolism and hypertension within the study population.

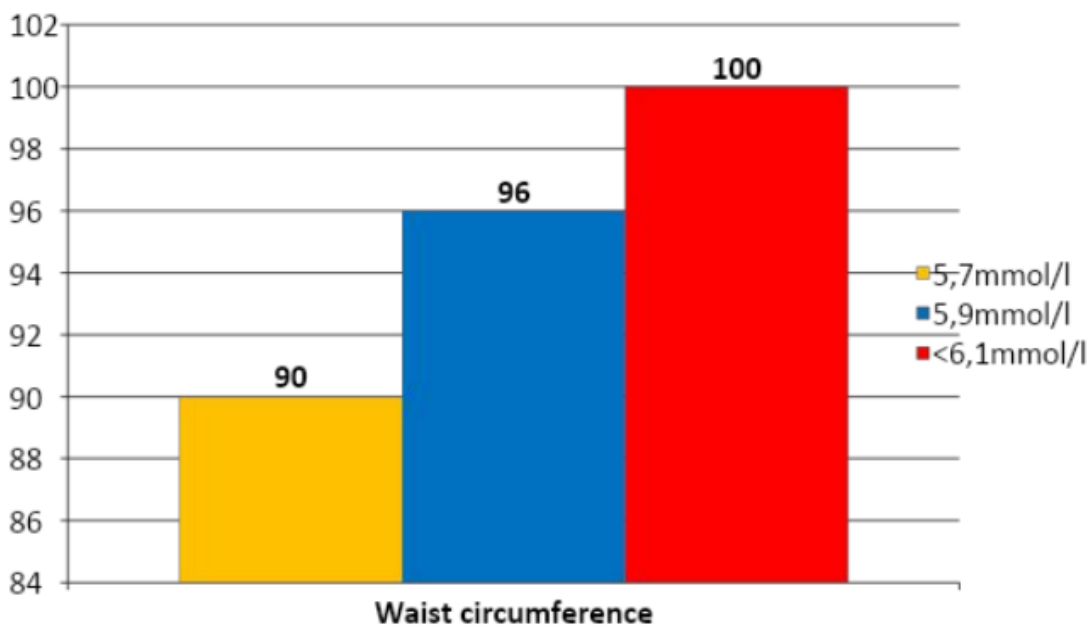
4.5 Glucose Metabolism Parameters:

Elevated fasting glucose levels (> 5.6 mmol/L) were documented in 13.4% of patients, indicative of impaired fasting glucose. Furthermore, postprandial hyperglycemia (> 7.8 mmol/L) was observed in 12.5% of patients, reflecting compromised glucose tolerance within the cohort.

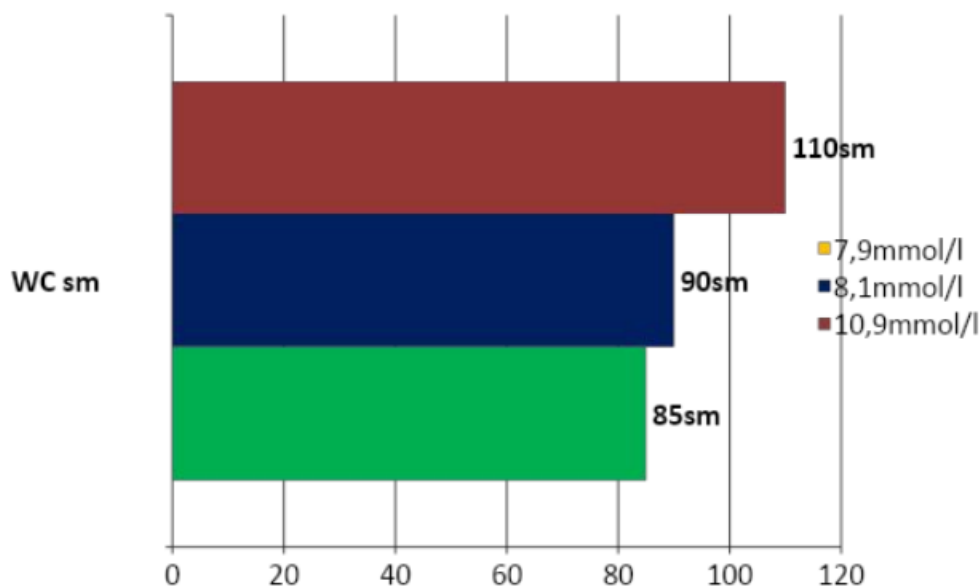
WC, glycemic level and Gender



Dependence of glycemic level (fasting blood glucose) on waist circumference in men (cm)



Dependence of glycemic level on waist circumference in woman (cm)



Discussion:

The findings of this study underscore the alarming prevalence of impaired carbohydrate metabolism among Asian individuals in Kyrgyzstan, elucidating several pertinent aspects of this condition. Gender disparities, familial predispositions to diabetes mellitus, age-related susceptibilities, elevated adiposity rates, and central adiposity indices collectively contribute to the heightened risk of metabolic derangements within this demographic. Notably, the observed gender disparity, familial clustering of diabetes mellitus, association with adiposity, and perturbations in blood pressure and glucose regulation underscore the multifactorial nature of metabolic disorders. Timely detection and evidence-based interventions are paramount to attenuate the escalating burden of diabetes mellitus and its attendant complications within this population, contributing to a deeper understanding of the epidemiology and clinical implications of impaired carbohydrate metabolism. These results inform targeted interventions and preventive strategies for at-risk individuals, emphasizing the need for holistic approaches to metabolic health in this vulnerable population.

Conclusion

Impaired carbohydrate metabolism emerges as a compelling public health concern among Asian individuals in Kyrgyzstan, necessitating multifaceted interventions to promote healthful lifestyle behaviors, facilitate early disease detection, and enhance access to high-quality healthcare services. Collaborative endeavors among healthcare stakeholders, policymakers, and community advocates are indispensable in addressing the multifaceted challenges associated with impaired carbohydrate metabolism and curtailing its deleterious ramifications on individual and population health.

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