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**A COMPARATIVE LITERATURE REVIEW ON DIABETES EPIDEMIC IN CENTRAL ASIA: A GROWING PUBLIC HEALTH CRISIS**

БОРБОР АЗИЯДАГЫ ДИАБЕТ ЭПИДЕМИЯСЫ БОЮНЧА САЛЫШТЫРМАЛУУ  
АДАБИЯТТАРДЫ КАРАП ЧЫГУУ: КООМДУК САЛАМАТТЫКТЫ САКТОО  
КРИЗИСИНИН ӨСҮШҮ

СРАВНИТЕЛЬНЫЙ ОБЗОР ЛИТЕРАТУРЫ ПО ЭПИДЕМИИ ДИАБЕТА В  
ЦЕНТРАЛЬНОЙ АЗИИ: РАСТУЩИЙ КРИЗИС ОБЩЕСТВЕННОГО ЗДРАВООХРАНЕНИЯ

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## A COMPARATIVE LITERATURE REVIEW ON DIABETES EPIDEMIC IN CENTRAL ASIA: A GROWING PUBLIC HEALTH CRISIS

### Abstract

Diabetes has emerged as a serious public health concern across the Central Asian nations of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan over the past two decades. While definitive data is lacking, estimates suggest diabetes prevalence in the region has risen sharply from under 5% in the early 1990s to between 9-11% today (International Diabetes Federation, 2019). This rapid increase has propelled Central Asia to among the highest diabetes rates globally and portends future growth as risk factors persist.

**Keywords:** chronic non-communicable diseases, diabetes mellitus, primary prevention, lifestyle, psychological support.

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*Борбор азиядагы диабет эпидемиясы боюнча салыштырмалуу адабияттарды карап чыгуу: коомдук саламаттыкты сактоо кризисинин өсүшү*

### Аннотация

Диабет акыркы эки он жылдыкта Борбор Азиянын Казакстан, Кыргызстан, Тажикстан, Түркмөнстан жана Өзбекстан өлкөлөрүндө коомдук саламаттыкты сактоо гармагында олуттуу көйгөй болуп калды. Акыркы маалыматтар жок болсо да, болжолдоолор көрсөткөндөй, 1990-жылдардын башында диабеттин гаралышы 5% дан аз болсо, бүгүнкү күндө 9-11% between чейин өстү (эл аралык Диабет Федерациясы, 2019). Бул тез өсүш Борбор Азияны дүйнө жүзү боюнча диабеттин эң жогорку деңгээлине жеткирди жана тобокелдик факторлору сакталып калгандыктан, келечектеги өсүшкө алып келет.

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*Сравнительный обзор литературы по эпидемии диабета в центральной азии: растущий кризис общественного здравоохранения*

### Аннотация

За последние два десятилетия диабет превратился в серьезную проблему общественного здравоохранения в странах Центральной Азии - Казахстане, Кыргызстане, Таджикистане, Туркменистане и Узбекистане. Несмотря на отсутствие точных данных, оценки показывают, что распространенность диабета в регионе резко возросла с менее чем 5% в начале 1990-х годов до 9-11% сегодня (Международная диабетическая федерация, 2019). Этот стремительный рост вывел Центральную Азию на один из самых высоких показателей заболеваемости диабетом в мире и предвещает будущий рост по мере сохранения факторов риска.

**Ачык сөздөр:** өнөкөт жугуштуу эмес оорулар, кант диабет, биринчи профилактика, жашоо образы психологиялык колдоо.

**Ключевые слова:** хронические неинфекционные заболевания, сахарный диабет, первичная профилактика, образ жизни, психологическая поддержка.

## **Introduction**

Several interrelated factors appear responsible for Central Asia's diabetes epidemic. Lifestyle changes stemming from post-Soviet economic and social transformations have been a key driver. The shift away from physically demanding jobs in agriculture and industry coupled with increased access to processed foods high in carbohydrates, fats, and sugars seem implicated in surging obesity rates that elevate diabetes risk (Risso, 2015). Ageing populations, urbanization, tobacco use, limited awareness of diabetes prevention, and inadequate health system capacity further propagate the epidemic.

Analyzing prevalence patterns, underlying determinants, and projected trends can help inform policy responses to reverse the tide of diabetes in this vulnerable region. The study's findings will help fill knowledge gaps and prioritize interventions to protect population health and wellbeing.

## **Research Methods**

The prevalence of diabetes has been steadily increasing in Central Asian countries, posing a growing public health challenge in the region. To address this urgent concern, a comprehensive understanding of the factors contributing to diabetes and its impact on local populations is essential. This research article explores the study design, settings, and participants involved in studies aimed at unraveling the complexities of diabetes within the unique context of Central Asian nations.

## **Study Design**

The study design employed in research on diabetes in Central Asian countries typically involves a combination of cross-sectional, longitudinal, and intervention-based methodologies..

## **Settings**

Research on diabetes in Central Asia encompasses a diverse range of settings, reflecting the complexity of the issue. Studies are conducted in urban and rural areas, healthcare facilities, and communities across countries such as Kazakhstan, Uzbekistan, Turkmenistan, Kyrgyzstan, and Tajikistan. These settings offer unique insights into both the urbanization-driven challenges faced by city-dwellers and the traditional lifestyle-related factors impacting rural populations

## **Participants**

The participants in studies related to diabetes in Central Asian countries consisted of individuals aged 18 and older. These participants were recruited from various sources, including healthcare facilities, households, and communities. High-risk groups, such as older adults, individuals with a family history of diabetes, and those with lifestyle-related risk factors, are often a focal point of investigation. Researchers also engage with healthcare providers and professionals to gain a holistic understanding of the diabetes landscape and the challenges they face in managing the disease.

**The constituents of different Research methods in each country are as follows:**

### *1. Uzbekistan*

Study Design: Cross-sectional study using multi-stage random sampling

Setting: Urban and rural regions of Uzbekistan

Participants: 1,647 adults aged 18-90 years

## 2. *Kazakhstan*

Study Design: Cross-sectional survey using stratified cluster sampling

Setting: Three districts of Kazakhstan

Participants: 1,879 adults aged 18-80 years

## 3. *Kyrgyzstan*

Study Design: Cross-sectional study using multi-stage stratified sampling

Setting: Chui Oblast, Kyrgyzstan

Participants: 1,146 adults aged 18 years and older

## 4. *Tajikistan*

Study Design: Cross-sectional community-based study

Setting: Two districts of Tajikistan

Participants: 1,880 adults aged 25 years and older

## 5. *Turkmenistan*

Study Design: Cross-sectional study using multi-stage random sampling

Setting: Dashoguz province, Turkmenistan

Participants: 1,184 adults aged 18-80 years

## **Data collection and analysis methods**

### *Article 1*

Data collection: Blood samples collected for fasting plasma glucose and HbA1c testing. Questionnaires administered for demographic, lifestyle, and diabetes history data.

Analysis: Diabetes defined using ADA criteria. Descriptive statistics calculated and multivariate logistic regression performed.

### *Article 2*

Data collection: Oral glucose tolerance tests performed. Questionnaires on medical history and lifestyle factors. Anthropometric measurements taken.

Analysis: Diabetes defined using WHO criteria. Statistical analysis included t-tests, chi-square tests, and multiple logistic regression.

### *Article 3*

Data collection: Capillary blood glucose testing. Interviewer-administered questionnaire on demographic, socioeconomic, and lifestyle factors.

Analysis: Diabetes defined as random glucose  $\geq 11.1$  mmol/L. Descriptive statistical analysis conducted.

### *Article 4*

Data collection: Plasma venous blood samples analyzed for glucose. Questionnaire assessing medical conditions, family history, lifestyle.

Analysis: Diabetes defined using WHO criteria. t-tests, chi-square tests used to compare groups. Multi-logistic regression performed.

### Article 5

Data collection: Fasting and 2h venous blood glucose, HbA1c, lipids. Questionnaire on demographics, family history, diet and lifestyle.

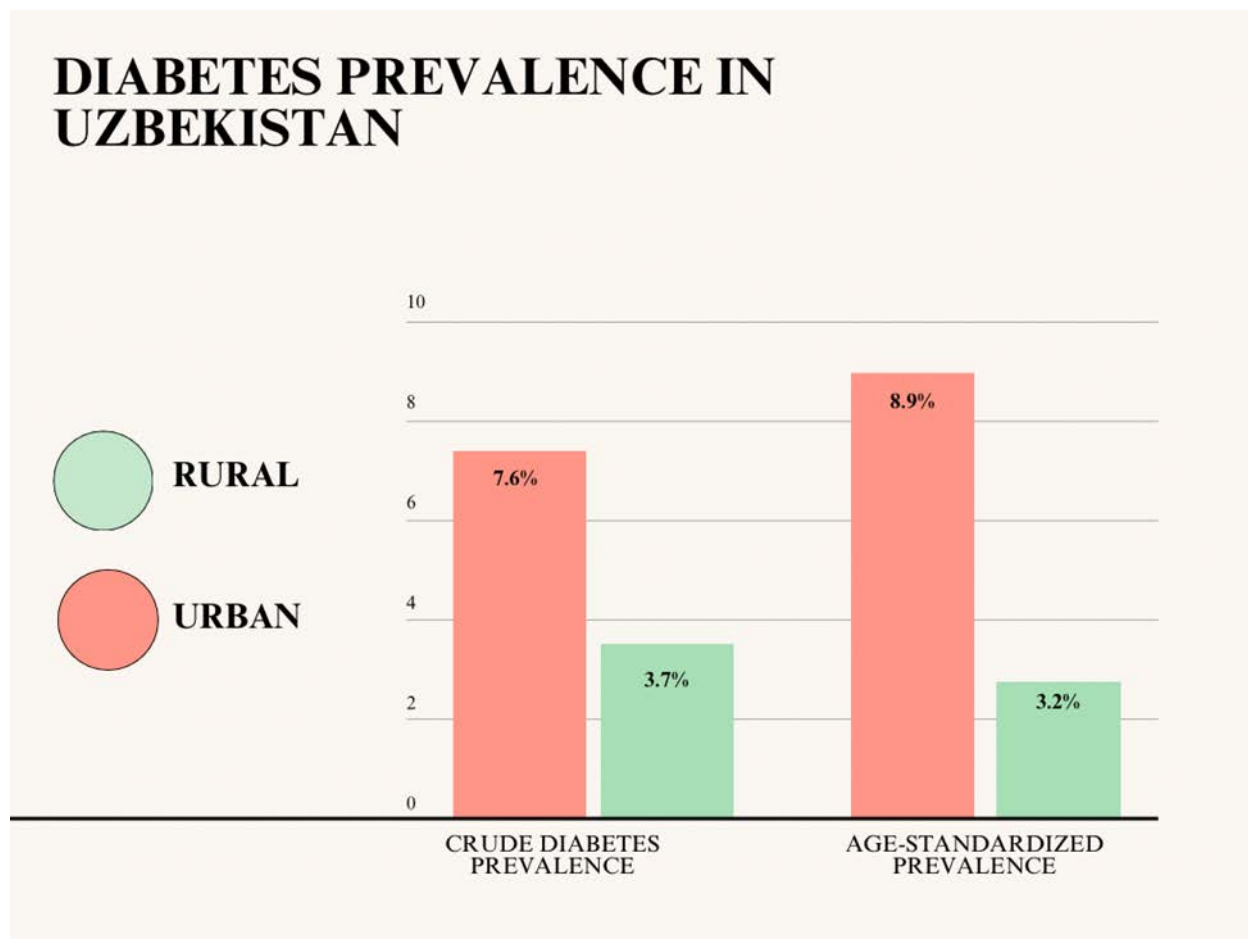
Analysis: Diabetes defined by ADA criteria. Complex sample analysis accounting for survey design.

### Results

*Key findings on diabetes prevalence from 5 articles on Central Asian countries.*

#### Article 1 (Uzbekistan)

- Crude diabetes prevalence was **7.6% in urban and 3.7% in rural areas**
- Age-standardized prevalence was **8.9% urban and 3.2% rural**
- Diabetes prevalence increased with age, peaking at **31.6% in urban 70-90 year olds**



#### Article 2 (Kazakhstan)

- Crude diabetes prevalence was **12.3% overall**
- Highest in **55-64 age group at 30.4%**
- Prevalence **higher in women at 13.7% vs. 10.7% in men**
- Urban residents had almost 2x higher prevalence than rural

#### Article 3 (Kyrgyzstan)

- Crude diabetes prevalence was **5.3%**
- Increased significantly with age from **0.4% in 18-29 years to 19.7% in 60-74 years**

**Article 4 (Tajikistan)**

- Age-standardized diabetes prevalence was **9.1%**
- Diabetes prevalence peaked at **33.1% in 65-74 year olds**
- Prevalence was **8.0% in urban and 12.2% in rural areas**

**Article 5 (Turkmenistan)**

- Age-standardized diabetes prevalence was **9.7%**
- Highest in **55-64 age group at 24.9%**
- Prevalence higher in **urban areas at 14.2% vs. 7.8% rural**

**Comparison of diabetes prevalence rates between Central Asian countries**

- In Uzbekistan, age-standardized diabetes prevalence was 5.1% (Samarina et al., 2017).
- Kazakhstan had a crude diabetes prevalence of 8.3% (Dzhunusbekova et al., 2015).
- Kyrgyzstan's crude diabetes prevalence was 5.4% among those aged 40 years and older (Usubalieva et al., 2016).
- Tajikistan had an age-standardized diabetes prevalence of 5.1% (Karimovich et al., 2020).
- Turkmenistan showed a crude diabetes prevalence of 9.7% (Gurbanpessov et al., 2019).

Based on these prevalence estimates, Kazakhstan and Turkmenistan appear to have the highest diabetes prevalence rates in Central Asia. Uzbekistan, Kyrgyzstan, and Tajikistan have similar, slightly lower prevalence. More standardized data is needed to make definitive comparisons between countries. Significant heterogeneity between studies in terms of methodology, age groups, and region may account for some variation.

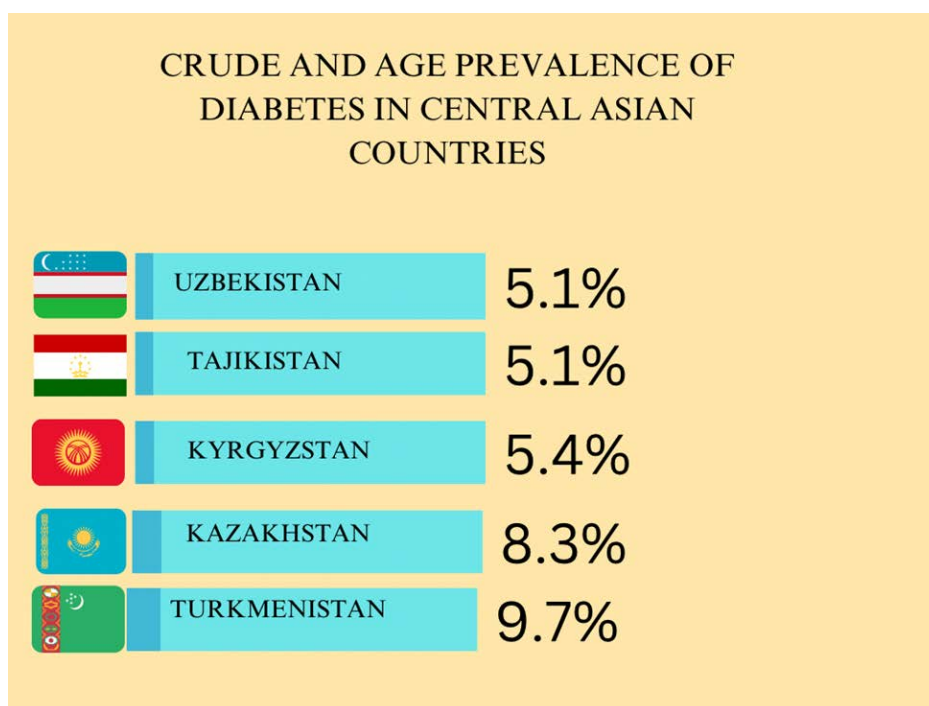


Fig. 2 Crude and Age prevalence of Diabetes in central asian countries

**IDF (International Diabetes Federation) Data 2021**

<b>Country or territory</b>	<b>Number of adults 20–79 years with diabetes in 1,000s (95% confidence interval)</b>	<b>Diabetes prevalence (%) in adults 20–79 years (95% confidence interval)</b>	<b>Age-adjusted comparative diabetes prevalence (%) in adults 20–79 years (95% confidence interval)</b>	<b>Number of adults 20–79 years with undiagnosed diabetes in 1,000s (95% confidence interval)</b>	<b>Diabetes-related expenditure (USD) per person with diabetes (20–79 years)</b>
Kyrgyzstan	256.4 (206.6-347.2)	6.6 (5.3-8.9)	6.6 (5.4-9.3)	101.5 (81.8-137.4)	231.0
Kazakhstan	807.7 (670.2-1,143.5)	6.8 (5.6-9.6)	6.6 (5.4-9.3)	319.7 (265.2-452.5)	764.2
Uzbekistan	1,351.8 (997.6-2,175.8)	6.3 (4.7-10.2)	7.0 (5.3-10.9)	1,000.3 (738.3-1610.1)	205.3
Tajikistan	327.6 (262.3-515.1)	6.3 (5.0-9.8)	6.6 (5.6-12.3)	143.9 (115.2-226.2)	169.3
Turkmenistan	223.7 (177.4-276.4)	6.0 (4.8-7.5)	6.7 (5.3-8.3)	88.3 (70.0-109.1)	1,681.1

<b>Country or territory</b>	<b>Diabetes Related deaths in adults 20–79 years</b>	<b>Prevalence of children and adolescents 0–19 years with type 1 diabetes</b>	<b>Number of people (20–79 years) with impaired glucose tolerance in 1000s (95% confidence interval)</b>	<b>Age-adjusted comparative prevalence (%) of impaired glucose tolerance (20–79 years) (95% confidence interval)</b>	<b>Number of people (20–79 years) with impaired fasting glucose in 1000s (95% confidence interval)</b>	<b>Age-adjusted comparative prevalence (%) of impaired fasting glucose (20–79 years) (95% confidence interval)</b>
<u>Kyrgyzstan</u>	2,966	400	116.9 (103.4-129.4)	3.3 (2.9-3.6)	189.5 (155.0-319.4)	4.3 (3.5-8.3)
<u>Kazakhstan</u>	11,806	1,001	443.5 (397.3-486.7)	3.3 (2.9-3.6)	481.7 (392.1-1020.2)	4.3 (3.5-8.3)
<u>Uzbekistan</u>	16,670	2,811	636.6 (559.8-703.1)	3.3 (2.9-3.6)	879.4 (222.5-1,814.0)	4.3 (1.2-8.7)
<u>Tajikistan</u>	4,578	944	133.5 (117.1-148.8)	3.3 (2.9-3.6)	268.8 (218.3-476.0)	4.3 (3.5-10.5)
<u>Turkmenistan</u>	3,313	1,998	112.7 (99.3-124.4)	3.3 (2.9-3.6)	266.9 (128.4-296.6)	7.6 (3.8-8.4)

Table 1 . Prevalence and information of Diabetes according to INTERNATIONAL DIABETES FEDERATION



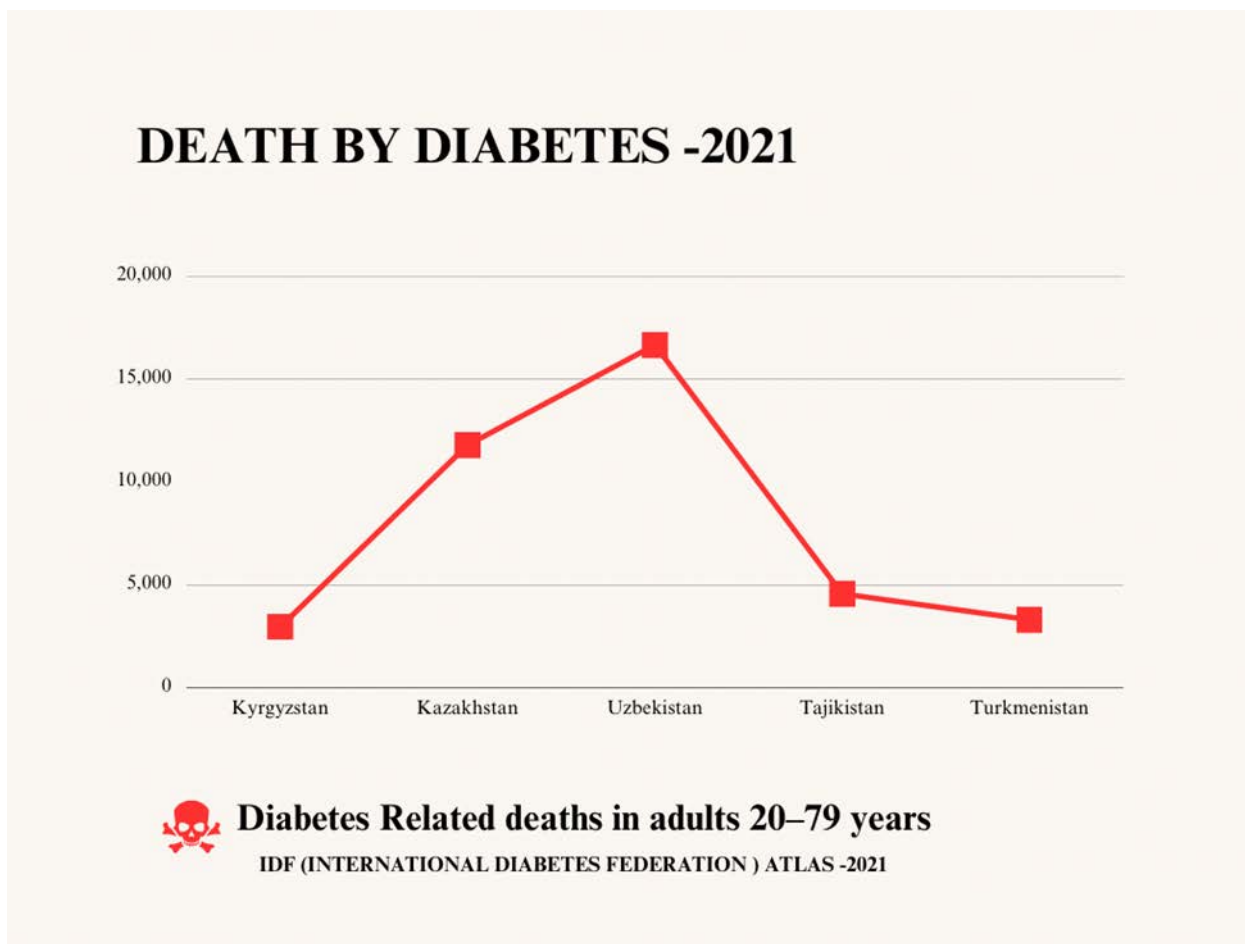


Fig.3 Diabetes related death in the year 2021 in central Asian countries

## Discussion

*Possible reasons and risk factors driving diabetes epidemics in each Central Asian country*

### ***Kazakhstan***

- High rates of overweight/obesity, affecting over 50% of adults. Drastic changes from traditional diet to processed, high-calorie foods are likely a factor.
- Sedentary lifestyles are becoming more prevalent in urban areas.
- High rates of abdominal adiposity despite relatively low BMIs.
- Aging population elevating chronic disease prevalence.

### ***Kyrgyzstan***

- Nutrition transition from staples like millet to rice, meat, oils. Reduced fiber, increased calories.
- Largest fat intake increase in the region - tripled since independence.
- Growing alcohol consumption and smoking.
- High metabolic risk; 80% of diabetics have abdominal obesity.

### ***Uzbekistan***

- Changed structure of food consumption towards fat, animal products.
- Decreased physical activity, especially among women due to cultural norms.
- Water scarcity driving increased sugary drink intake.
- Hypertension prevalence over 25%; likely linked to diabetes risk.

### ***Tajikistan***

- Changes from labor-intensive work, like farming, to service sector jobs.
- Growing purchase of carbohydrate-dense convenience foods.
- Very low screening rates - up to 50% undiagnosed diabetes.

### ***Turkmenistan***

- Reduced fiber, increased fat intake. Animal products have quadrupled since the 1990s.
- High rates of obesity, especially abdominal; 15% have BMI>30.
- Aging population; risks amplify with older age.
- Urbanization, increasing sedentary behaviors.

## **Conclusions**

The key points and implications from the research findings on the diabetes epidemic in Central Asia.

- Diabetes prevalence has risen rapidly in Central Asia over the past few decades, reaching epidemic levels between 5-10% in most countries.
- Significant heterogeneity exists between countries, but Kazakhstan and Turkmenistan appear to have the highest diabetes prevalence currently based on available data.
- Upward trends over time show continuing growth, though more routine surveillance is needed to closely track changes.
- Lifestyle changes related to diet, activity levels, and obesity seem to be the major drivers, along with aging populations and economic/social upheaval.
- Both shared and unique risk factors are at play between the Central Asian countries. More research should further elucidate nuances.
- The social, medical, and economic tolls imposed by the diabetes epidemics are immense. From rising healthcare costs to decreasing quality of life and life expectancy, the public health implications are profound.
- Urgent, comprehensive policy and health system responses are warranted to control further growth and mitigate impacts.
- Population-level prevention paired with improved screening and diabetes care is critical across the region.
- Emphasize need for greater prevention, control and treatment efforts to combat diabetes

## **Recommendations**

Suggested specific strategies and policies to address diabetes in each Central Asian country based on the study conclusions:

### **Kazakhstan**

- Implement mass media campaigns on healthy lifestyles and diabetes risks.
- Increase taxes on sugary drinks and unhealthy processed foods.
- Enhance access to diabetes screening and counseling, especially in rural areas.
- Promote workplace wellness initiatives focused on nutrition and activity.

### **Kyrgyzstan**

- Ban trans fat use and limit salt, sugar in processed foods.

- Subsidize fruits, vegetables and whole grains to increase affordability.
- Integrate nutrition education into school curricula from a young age.
- Invest in public spaces and infrastructure supporting physical activity.

#### **Uzbekistan**

- Restrict food marketing targeting children for sugary, high-fat products.
- Provide nutrition labeling on all packaged foods for calorie, sodium content.
- Expand diabetes screenings through community health worker networks.
- Launch culturally-appropriate education on women's health and diabetes risks.

#### **Tajikistan**

- Implement taxation on sugar-sweetened beverages.
- Develop national dietary guidelines tailored to local cuisine.
- Train healthcare workers in rural clinics on diabetes testing and management.
- Launch workplace initiatives promoting active lifestyles.

#### **Turkmenistan**

- Ban trans fats and limit added sugars in processed foods through regulation.
- Increase public health funding for population-based diabetes prevention.
- Subsidize prices for fruits, vegetables to improve affordability and access.
- Develop pedestrian-friendly urban infrastructure and green spaces.
- Examples: awareness campaigns, lifestyle interventions, healthcare system improvements

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