

**RESPIRATORY AND CHRONIC ILLNESSES ASSOCIATED WITH THE
ARAL SEA ECOLOGICAL CATASTROPHE: A CROSS-SECTIONAL PILOT
STUDY ON PUBLIC HEALTH CRISES**

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Abstract: *The desiccation of the Aral Sea represents one of the most devastating anthropogenic environmental disasters in modern history, severely impacting public health across Central Asia. This cross-sectional pilot study investigates the direct and indirect consequences of this ecological crisis on human health in Western Uzbekistan, specifically within the Khorezm region and the Republic of Karakalpakstan. Utilizing a structured, face-to-face questionnaire format, empirical data were collected from 80 randomly selected local participants. The results indicate an alarming prevalence of multi-system pathologies: 80% of the surveyed population suffered from chronic symptoms associated with iron-deficiency anemia, while 65% to 70% reported persistent fluctuations in blood pressure and arterial hypertension. Paradoxically, the study revealed a critical secondary nutritional crisis among the pediatric demographic. Driven by loss of appetite and the collapse of local organic agricultural systems due to soil salinization, children have increasingly transitioned to hyper-processed foods, sweets, and fast food, triggering a sharp rise in childhood obesity*

Keywords: *Aral Sea Crisis; Public Health; Anemia; Hypertension; Childhood Obesity; Amu Darya River; Central Asia.*

INTRODUCTION

The desiccation of the Aral Sea stands as one of the most severe anthropogenic environmental catastrophes of the modern era. As the sea receded, it left behind a vast, salt-encrusted desert known as the Aralkum, which frequently generates toxic dust and salt storms. These environmental changes have directly degraded the quality of life and public health in Western Uzbekistan, particularly affecting the populations of the Khorezm region and the Republic of Karakalpakstan. Recent observations indicate that the local population is increasingly vulnerable to chronic multi-system pathologies. Notably, there is a remarkably high prevalence of iron-deficiency anemia, respiratory diseases (such as chronic bronchitis and bronchial asthma), and cardiovascular disorders, including fluctuating blood pressure and arterial hypertension. The continuous inhalation of saline dust combined with compromised drinking water quality serves as a catalyst, triggering a cascade of secondary medical complications and complex pathologies among the inhabitants of the disaster zone. The hypersalinity of the remaining water body and the exposure of the seabed have transformed the former marine environment into a volatile source of mineralized dust. Due to the constant and powerful wind currents prevailing across the Ustyurt Plateau, these toxic particles—composed of crystalline salt, fine sand, and residual agricultural chemicals—are continuously aerosolized and transported directly into residential areas. This chronic atmospheric pollution poses an immediate threat to the most vulnerable segments of the population: pregnant women and children. The teratogenic effects of this environmental distress are increasingly evident

in maternal health, correlating with a rising incidence of congenital disabilities and developmental abnormalities in newborns. Furthermore, pediatric health in the region has deteriorated significantly, marked by a disturbing escalation in aggressive pediatric malignancies (cancer) and intractable respiratory tract pathologies. The persistent infiltration of saline-chemical dust into households creates an environment where early-life exposure severely compromises long-term human development and survival.

Methodology

To assess the immediate public health realities, a cross-sectional pilot survey was conducted among the local population in the worst-affected zones of the Khorezm region and the Republic of Karakalpakstan. A total of 80 participants were randomly selected and interviewed using a structured, face-to-face questionnaire format. This direct interaction ensured a high response rate and minimized data ambiguity. The questionnaire was specifically designed to evaluate the prevalence of primary and secondary clinical symptoms associated with long-term exposure to the Aral Sea environmental degradation. The investigation focused on three core health metrics self-reported by the residents: the prevalence of iron-deficiency anemia, chronic fluctuations in blood pressure (hypertension), and systemic constitutional symptoms such as a severe loss of appetite (anorexia). Data gathered from these face-to-face interviews were categorized and quantitatively analyzed to determine the correlation between environmental exposure and the severity of these chronic conditions.

Results

The empirical data collected from the 80 face-to-face interviews revealed alarming health trends and socio-demographic shifts in the surveyed region. Firstly, environmental displacement is highly evident, as a significant portion of the original population has migrated to distant regions to escape the ecological crisis. Among the remaining residents, chronic health pathologies are heavily prevalent. Quantitative analysis showed that an astonishing 80% of respondents (8 out of 10) suffer from symptoms directly correlated with iron-deficiency anemia. Furthermore, 65% to 70% of the participants (6 to 7 out of 10) reported frequent or chronic fluctuations in blood pressure and arterial hypertension. A critical and paradoxical finding of this study relates to pediatric health and nutritional behavior. The systemic loss of appetite was predominantly observed in the pediatric group. Due to the lack of access to fresh, organic, and locally grown agricultural products—caused by soil salinization and water scarcity—there is a dramatic dietary shift. Children are increasingly dependent on hyper-processed foods, industrial sweets, and fast food. Consequently, instead of typical undernutrition, this toxic dietary shift has triggered a sharp rise in childhood obesity. The replacement of natural food systems with artificial, calorie-dense products is compounding the existing environmental health crisis with a secondary metabolic epidemic.

Discussion

The findings of this pilot study underscore that the Aral Sea crisis transcends national borders, representing a collective transboundary threat to the entire Central Asian region. The atmospheric dispersion of toxic dust from the Ustyurt Plateau affects neighboring nations, confirming that unilateral ecological measures are insufficient. To directly mitigate the

primary driver of this crisis, regional hydro-politics must prioritize redirecting a substantial volume of the Amu Darya River flow back into the Aral Sea basin. Furthermore, the dual burden of environmental illness and metabolic shifts (such as childhood obesity from fast food) requires immediate state-backed interventions. Local health policies should transform from passive treatment to proactive socioeconomic support. To counteract soil salinity and the lack of organic agriculture, governments must establish robust distribution networks providing free, nutrient-dense organic food supplies to vulnerable households. Additionally, expanding decentralized, free medical assistance programs and providing subsidized or free sanatorium vouchers for respiratory rehabilitation are vital steps to alleviate the chronic disease burden among the local population. Furthermore, powerful wind currents across the Ustyurt Plateau continue to aerosolize toxic, saline-chemical dust into residential zones, correlating with elevated rates of congenital disabilities in newborns and pediatric malignancies. The findings underscore that the Aral Sea crisis is a transboundary Central Asian challenge. Addressing this emergency requires regional geopolitical cooperation to redirect the Amu Darya River flow and aggressive state-backed humanitarian interventions, including free organic food distribution, free medical checkups, and subsidized sanatorium rehabilitation.

Conclusion

In conclusion, the desiccation of the Aral Sea has evolved from a purely ecological disaster into a complex socio-medical emergency. This study highlights a critical shift in public health dynamics, where traditional environmental pathologies like anemia and hypertension are now compounded by nutritional changes and childhood obesity. Addressing this crisis demands a two-pronged approach: regional geopolitical cooperation to restore the Amu Darya water balance, and aggressive domestic social security initiatives. Providing free medical checkups, sanatorium rehabilitation, and clean food alternatives is no longer just a healthcare choice, but a necessary humanitarian strategy to preserve human capital in the Aral Sea basin.

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