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EPIDEMIOLOGICAL ANALYSIS OF MENINGOCOCCAL INFECTION MORBIDITY IN THE REPUBLIC OF UZBEKISTAN

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ABSTRACT

This study presents a retrospective epidemiological analysis of meningococcal infection morbidity in the Republic of Uzbekistan. The aim of the study was to examine long-term trends in disease incidence as well as spatial patterns of its distribution across administrative territories. During the analysis, statistical data on registered cases of meningococcal infection throughout the country were reviewed, and temporal changes in incidence rates were assessed. The territorial analysis revealed elevated incidence levels in certain cities and districts, indicating an uneven spatial distribution of the epidemiological process.

The findings demonstrate the dynamic character of the epidemiological situation with regard to meningococcal infection and persistently elevated morbidity in specific regions. This underscores the necessity of strengthening preventive measures and improving early case detection. The results are of practical importance for enhancing epidemiological surveillance and developing targeted prevention strategies for meningococcal infection.

KEYWORDS

Meningococcal infection, children, prevention.

Introduction

Meningococcal infection remains a significant public health concern worldwide, carrying substantial epidemiological and social implications [2]. In recent years, shifts in the serogroup composition of meningococcal infection have been observed, with these changes associated with increased morbidity rates. Serogroups W, Y, and others of Neisseria meningitidis warrant particular attention. Long-term surveillance conducted in Uzbekistan indicates that meningococcal infection occurs predominantly in sporadic form, with serogroup A historically predominant. However, the emergence of new strains with enhanced virulence, together with increasing antibiotic resistance, has complicated the epidemiological situation [3]. Research into the epidemiological and geographical features characteristic of the distribution of various meningococcal serogroups is ongoing. According to Abramtseva et al. [1], serogroup A is frequently associated with epidemic outbreaks, whereas serogroups B, C, and Y are primarily manifested through sporadic cases [1].

Aim of the Study

To conduct a retrospective epidemiological analysis of meningococcal infection morbidity in the Republic of Uzbekistan over the period 1991–2025, and to identify the characteristics of its temporal dynamics and territorial distribution.

Materials and Methods

Epidemiological (retrospective) and statistical (Fisher's exact test) methods were employed in the study. Official data on registered meningococcal infection cases were obtained from the Committee for Sanitary-Epidemiological Welfare and Public Health of the Republic of Uzbekistan and served as the primary source of information.

Results

A retrospective epidemiological analysis of meningococcal infection morbidity in the Republic of Uzbekistan revealed considerable variability in long-term incidence rates over the period 1991–2025, with several distinct periods of elevated morbidity identified.

The first upsurge cycle was recorded during 1991–1995, representing a period of markedly elevated morbidity, with incidence rates ranging from 1.6 to 1.8 per 100,000 population. This trend is attributable to the intensive circulation of the pathogen within the population and a high transmission rate. During 1996–2000, a consistent decline in morbidity was observed: rates decreased steadily from 1996 onwards, reaching 0.4 per 100,000 by the year 2000. This reduction may be linked to the intensification of preventive measures and improvements in sanitary-epidemiological surveillance.

Between 2001 and 2005, morbidity underwent partial stabilisation, with rates remaining at a low level; a brief increase was noted in 2001. From 2006 to 2014, the incidence continued to decline, falling from 0.2 to zero per 100,000 in certain years. During January–December 2019, more than 100 cases of meningococcal infection (MI) were registered nationwide, equating to 0.4 per 100,000 population, with the majority concentrated in the city of Tashkent.

The prolonged decline in meningococcal infection rates observed over more than 30 years of the inter-epidemic period in Uzbekistan has led to a reduced level of alertness among healthcare professionals towards this infection. Delayed diagnosis and late hospitalisation frequently result in untimely medical intervention, ultimately leading to serious complications for the patient.

In 2020, the quarantine restrictions introduced in response to the global COVID-19 pandemic exerted a discernible impact on the epidemic process of meningococcal infection. The strict quarantine measures resulted in the majority of the population remaining predominantly at home. The population began to adhere more rigorously to sanitary and hygiene regulations. However, the panic-driven, unsystematic use of antibiotics affected the quality of bacteriological diagnostics and contributed to a reduction in reported cases.

By 2024–2025, meningococcal infection morbidity had declined to 0.09–0.06 per 100,000 population; however, a sharp increase was observed during the first four months of 2026 (Figure 1). This suggests a recent resurgence of epidemic activity and warrants dedicated epidemiological investigation.

[Figure 1. Long-term dynamics of meningococcal infection morbidity in the Republic of Uzbekistan (1991–2025), per 100,000 population]

An analysis of the territorial distribution of meningococcal infection morbidity in the Republic of Uzbekistan over 1991–2025 reveals an uneven spread of the epidemic process across the country. The highest incidence was recorded in the city of Tashkent, with an average rate of 0.74 per 100,000 population (Figure 2). Differences in morbidity levels across administrative territories underscore the significant role of urban infrastructure, population density, and socio-economic factors in the spread of the infection.

Within the city of Tashkent, elevated meningococcal infection rates were concentrated in several districts, with Shaykhontohur, Uchtepa, and Olmazor districts standing out in particular. The elevated indicators recorded in these districts may primarily be associated with the presence of large construction sites, a high concentration of labour migrants and temporary workers, and increased population density—factors that create favourable epidemiological conditions for rapid transmission of the infection.

[Figure 2. Territorial analysis of meningococcal infection morbidity in the Republic of Uzbekistan (1991–2025), per 100,000 population]

Conclusions

1. According to the retrospective analysis, the highest meningococcal infection morbidity rates were recorded during 1991–1995, followed by a gradual decline leading to very low levels during 2006–2014. A partial increase was noted in 2019, while a decrease occurred in 2020 under the influence of quarantine measures. Morbidity remained low during 2024–2025.
2. Morbidity exhibited an uneven territorial distribution, with the highest rates recorded in the city of Tashkent. Within the city, elevated indicators were identified in the Shaykhontohur, Uchtepa, and Olmazor districts.
3. Overall, the analysis demonstrates the spatially uneven distribution of meningococcal infection morbidity across the country and the potential for renewed epidemic activity in recent years.

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