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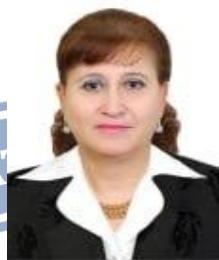
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REGIONAL DISTRIBUTION OF SALMONELLOSIS CAUSED BY S. ENTERITIDIS IN THE KHOREZM REGION DURING 2014-2024.

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Аннотация:

В данной статье проанализированы современные эпидемиологические особенности сальмонеллёзов, в частности инфекций, вызванных *Salmonella enteritidis*, на примере Хорезмской области. В исследовании использованы ретроспективные эпидемиологические и статистические методы на основе официальных статистических данных за 2014–2024 годы, результатов бактериологических лабораторных исследований, а также материалов обследования эпидемических очагов.

Результаты показали, что показатели заболеваемости сальмонеллёзом во времени изменялись неравномерно, сформировав четыре эпидемиологических периода: относительно высокий уровень в начальные годы, последующее снижение, минимальные показатели в годы пандемии и повторный рост в последние годы. Территориальный анализ выявил, что заболеваемость преимущественно выше в урбанизированных районах, особенно в городе Ургенч, тогда как в сельской местности она остается на более низком уровне.

Согласно полученным данным, в распространении сальмонеллёзов важную роль играют пищевой фактор, развитие птицеводства, санитарно-гигиенические условия, а также торгово-логистическая система. Обоснована необходимость совершенствования профилактических мероприятий, включая усиление контроля за безопасностью пищевых продуктов, расширение ветеринарных мер, развитие лабораторной диагностики и активизацию санитарно-просветительной работы среди населения.

Ключевые слова: сальмонеллёз, *Salmonella enteritidis*, эпидемический процесс, территориальное распределение, пищевой фактор, Хорезмская область.

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XORAZM VILOYATIDA 2014–2024-YILLARDA *Salmonella enteritidis* KELTIRIB CHIQARGAN SALMONELLYOZ KASALLIGINING HUDUDLAR BO‘YICHA TAQSIMLANISHI

Annotatsiya: Mazkur maqolada salmonellyozlarning, xususan, *Salmonella enteritidis* bilan bog‘liq infeksiyalarning zamonaviy epidemiologik xususiyatlari Xorazm viloyati misolida tahlil qilingan. Tadqiqotda 2014–2024 yillar davomida qayd etilgan rasmiy statistik ma‘lumotlar, bakteriologik laboratoriya natijalari hamda epidemik o‘choqlarni tekshirish materiallari asosida retrospektiv epidemiologik va statistik usullar qo‘llanildi. Natijalar shuni ko‘rsatdiki, salmonellyozlar bilan kasallanish ko‘rsatkichlari vaqt bo‘yicha notekis o‘zgarib, to‘rtta epidemiologik davr shakllangan: dastlabki yillarda nisbatan yuqori daraja, keyingi davrda pasayish, pandemiya yillarida minimal ko‘rsatkich hamda so‘nggi yillarda qayta o‘shish kuzatilgan. Hududiy tahlil esa kasallanishning asosan urbanizatsiyalashgan hududlarda, ayniqsa Urganch shahrida yuqori



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ekanligini, qishloq hududlarida esa nisbatan past darajada ekanligini ko'rsatdi. Tadqiqot natijalariga ko'ra, salmonellyozlarning tarqalishida oziq-ovqat omili, parrandachilikning rivojlanishi, sanitariya-gigiyena sharoitlari hamda savdo-logistika tizimi muhim rol o'ynaydi. Profilaktika choralarini takomillashtirishda oziq-ovqat xavfsizligi nazoratini kuchaytirish, veterinariya tadbirlarini kengaytirish, laborator diagnostikani rivojlantirish hamda aholi o'rtasida sanitariya-ma'rifiy ishlarni kuchaytirish zarurligi asoslab berildi.

Kalit so'zlar: salmonellyoz, Salmonella enteritidis, epidemik jarayon, hududiy taqsimlanish, oziq-ovqat omili, Xorazm viloyati

Abstract. Today, salmonellosis is one of the most widespread zoonotic and food-borne infections that pose a serious threat to the health of the world's population. According to the World Health Organization and numerous epidemiological studies, non-typhoid salmonella, including Salmonella enteritidis, is one of the main causes of food-related acute intestinal infections on a global scale [6; 19.] Currently, the number of patients with salmonellosis is steadily increasing in various countries [17; 18].

The incidence of salmonellosis in the Republic of Uzbekistan has regional characteristics, and in recent years, an increase in the proportion of S. enteritidis has been observed. In studies conducted at the republican level, the predominance of this serovar among salmonellosis was noted [10; 15].

In particular, the complexity of the epidemiological situation in the Khorezm region and the Southern Aral Sea region is explained by environmental factors, the rapid development of poultry farming, and insufficient food control [1; 5].

Currently, the poultry industry in Uzbekistan is developing at a high rate [4; 9]. This, in turn, causes the incidence of many zoonotic diseases. Among zoonotic diseases, salmonellosis of poultry is an infectious disease of many farm and wild birds, characterized by damage to the gastrointestinal tract and respiratory system in young organisms and septicemia, and in adult birds by diseases of the reproductive organs, clinically asymptomatic or chronic. In addition, the causative agent of this disease - salmonella - causes food poisoning in humans. In many countries, including Uzbekistan, salmonellosis is widespread in poultry and farm animals [16].

Keywords: salmonellosis, Salmonella enteritidis, epidemiological features, food factor, seasonality, Khorezm region.

Research objective. Improvement of their prevention by assessing the modern epidemiological characteristics of salmonellosis caused by S. Enteritidis.

Obtained results. Considering that Salmonella enteritidis currently leads in the structure of salmonellosis, we analyzed the manifestation of the epidemic process of salmonellosis in the Khorezm region (2014-2024) (see Fig. 1). When analyzing the long-term dynamics based on data for 2014-2024, we can see that four epidemiological periods have formed, in which morbidity rates are not the same, but differ from each other. Period 1: 2014-2015. During this period, the morbidity rate remained relatively high: the absolute indicator decreased from 26 to 21 cases, and the intensive indicator decreased from 1.5 to 1.2. That is, a slow downward trend is observed. Stage 2: 2016-2019. At this stage, a stable and pronounced decrease was noted. In 2016, it decreased to 8



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(0.5), in 2017-2018 - from 10 (0.6-0.5), and by 2019 - to 5 (0.3). This period is the period of relative stabilization and decline to the lowest level from an epidemiological point of view. In these years, the incidence is practically non-existent: in 2020 - 0 cases, and in 2021 - only 1 case (the intensive indicator is practically 0). This is the period of the minimum level, indicating a temporary weakening of the epidemiological process. At the final stage, a sharp increase is observed: in 2022 - 26 cases (1.3), in 2023 - 23 cases (1.2), in 2024 - 24 cases (1.2). These indicators are significantly higher compared to the previous low period and represent a state of reactivation (recurrent dynamics). In conclusion, in the long-term dynamics: a general downward trend is observed in 2014-2019, the lowest level in 2020-2021, and starting from 2022, a resurgence is observed. This situation indicates that morbidity rates fluctuate under the influence of periodicity and external factors during the epidemic process. Especially after 2022, growth indicates the formation of a new stage of risk against the backdrop of the previous statistical decline.

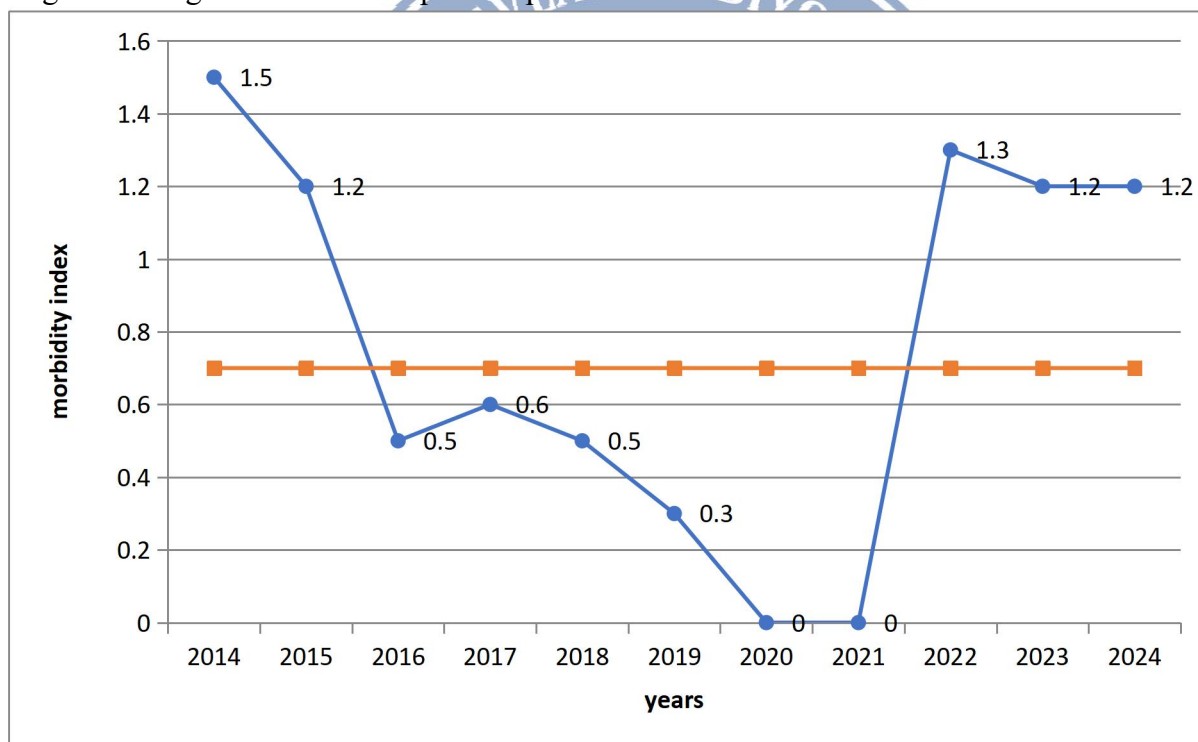


Figure 1. Long-term dynamics of salmonellosis incidence caused by *Salmonella enteritidis* (2014-2024).

When analyzing the distribution of salmonellosis by region, an uneven distribution of morbidity indicators across the regions of the republic was revealed (Fig. 2). The difference between regions indicates a different intensity of the epidemic process. As a result of the analysis of the distribution of morbidity by region, an uneven territorial distribution of the epidemiological process was revealed. The data obtained showed that some administrative units were formed as high-risk areas for morbidity. The highest intensive indicator was recorded in the city of Urgench and amounted to 1.9. This indicator is sharply higher than in other regions and is explained by the density of the population in urban conditions, the large volume of food turnover, and the large number of public catering facilities. This region acts as the main center of the epidemiological



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process. The Yangiaryk district (1.6) also belongs to the group of high indicators. The high indicator in this region may be associated with the circulation of agricultural products, water factors, and household hygiene conditions. The average level of intensity was observed in the following regions: Urgench district (0.9), Koshkupyr district (0.8), Khazarasp district (0.8), Shavat district (0.8), Khiva district (0.7). The epidemiological process in these regions is active, but not acute. Food hygiene and home-cooked meals may not be adequately controlled as the main transmission factor. Low intensity was noted in the following regions: Pitnak city (0.4), Bagat district (0.3), Gurlan district (0.3), and Khanka district (0.2). Although the incidence rate in these regions is low, the circulation of infection has not completely stopped.

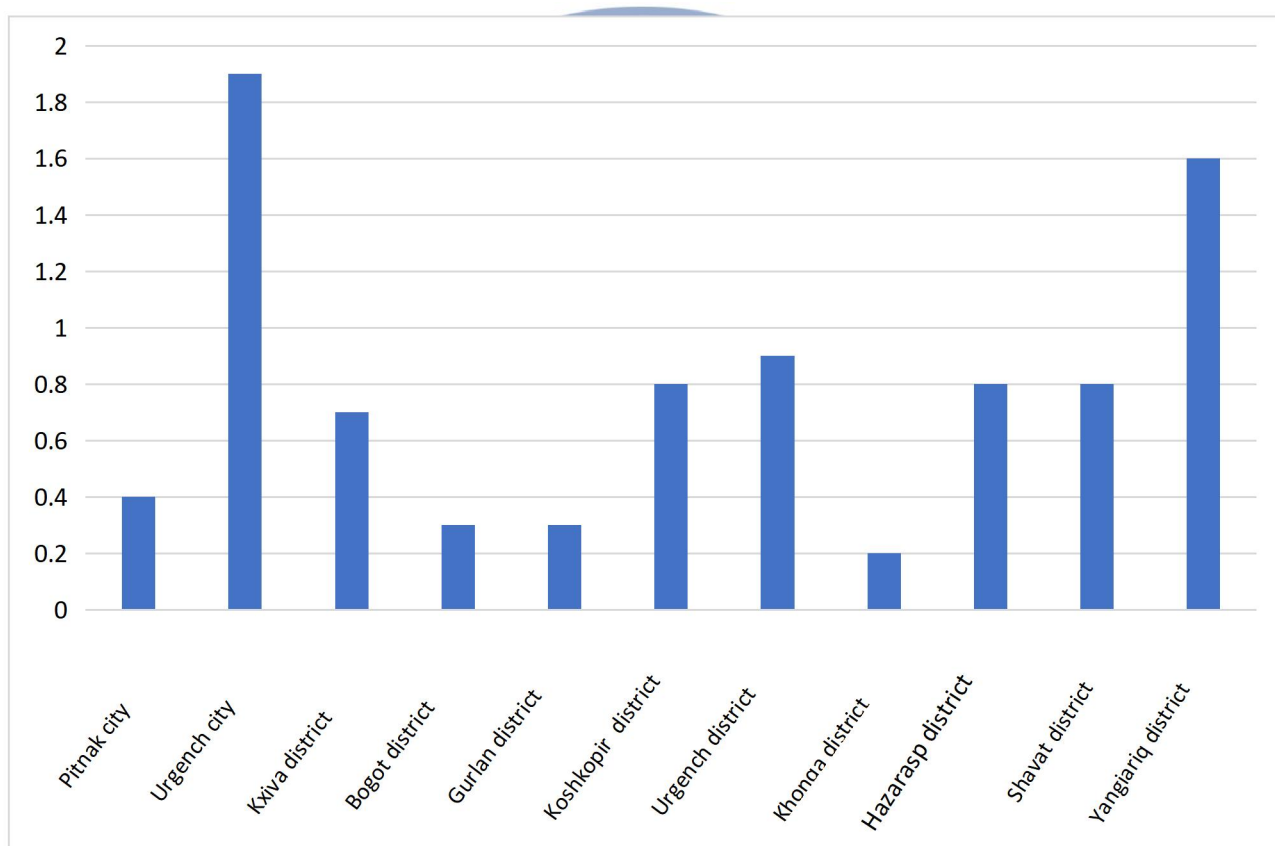


Figure 2. Distribution of salmonellosis morbidity by region in the Khorezm region (2014-2024). per 100 thousand population

General conclusion, regional differential analysis shows that the epidemiological load mainly falls on the urbanized center - the city of Urgench and adjacent territories. Suburban areas were formed as a medium-risk zone, and remote and sparsely populated areas as a relatively low-risk zone. This confirms the connection between the mechanism of food transmission and the trade and logistics chain, characteristic of salmonellosis.

Conclusions. According to the results of the conducted retrospective epidemiological analysis, it was established that during 2014-2024, the epidemic process of salmonellosis caused by *Salmonella enteritidis* in the Khorezm region was variable over time and unevenly distributed



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across regions. As a result of analyzing the long-term dynamics, the formation of four main epidemiological stages in morbidity indicators was observed: a period characterized by a relatively high level of morbidity in 2014-2015, a stable decline in 2016-2019, a minimum level in 2020-2021, and a repeated increase in morbidity indicators in 2022-2024. This situation indicates the periodicity of the epidemic process and its formation under the influence of external socio-economic and environmental factors.

The results of the regional analysis showed that the epidemiological load of salmonellosis mainly falls on urbanized areas. Especially in the city of Urgench, the high morbidity rate may be associated with population density, a large volume of food turnover, and the wide development of public catering networks. A moderate level of morbidity was recorded in suburban areas, while a low level of intensity was observed in some remote areas. This confirms that the mechanism of food transmission and the trade and logistics chain, characteristic of salmonellosis, have a significant impact on the epidemiological process.

Based on the research results, it was established that a comprehensive epidemiological approach plays an important role in improving the prevention of salmonellosis. General preventive measures include strict adherence to sanitary and hygienic requirements at the stages of production, storage, and sale of food products, strengthening veterinary control in poultry farms, systematic monitoring of food security, and expanding sanitary and educational work among the population.

At the same time, the improvement of special preventive measures plays an important role in the stable control of the epidemic process of salmonellosis. Currently, due to the lack of a universal vaccine widely used for humans, veterinary and preventive measures aimed at reducing the source of infection are considered a priority. In particular, the use of vaccines against *Salmonella enteritidis* in poultry farms, strengthening bacteriological control in incubation farms, timely implementation of veterinary and sanitary measures in foci of infection, and improvement of epizootic monitoring can significantly reduce the risk of infection transmission from animals to humans.

Furthermore, expanding laboratory diagnostic capabilities within the epidemiological surveillance system, strengthening microbiological monitoring of food products and environmental objects, and early detection and comprehensive analysis of epidemic outbreaks are crucial. When these measures are implemented comprehensively, it is possible to reduce the spread of salmonellosis and ensure a stable epidemiological situation in the region.

Thus, the results of the conducted research will serve as an important scientific and practical basis for determining the modern epidemiological features of *Salmonella enteritidis*-associated salmonellosis in the Khorezm region and improving their prevention, and will be of great importance in planning future epidemiological monitoring and preventive measures in this direction.

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