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CHARACTERISTICS OF EPIDEMIC SALMONELLOSIS OUTBREAKS IN VARNA REGION IN ORGANIZED CHILDREN'S COLLECTIVES FOR THE PERIOD 2014-2018

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ХАРАКТЕРИСТИКА ЭПИДЕМИЧЕСКИХ ВСПЫШЕК САЛЬМОНЕЛЛЕЗА В ВАРНЕНСКОЙ ОБЛАСТИ В ОРГАНИЗОВАННЫХ ДЕТСКИХ КОЛЛЕКТИВАХ ЗА ПЕРИОД 2014-2018 ГГ.

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ABSTARCT

Introduction: Salmonellosis is one of the most common bacterial diseases in the world. In the European Union (EU), over 100,000 human cases are reported each year. Among infectious diseases in childhood, the most common after acute respiratory viral diseases are acute intestinal infections, with a leading pathogen of the genus Salmonella

Aim: To study the epidemic outbreaks of salmonellosis registered in the territory of Varna and the region in organized children's groups for the period 2014-2018

Materials: Analyzes of intestinal morbidity in Varna region for the period 2014-2018, provided by the Regional Health Inspectorate (RHI) - Varna. Publications in scientific databases, PubMed, Scopus, Medline, Google Scolar

Methods: Documentary methods, descriptive statistics methods, benchmarking, epidemiological study. All results are presented in graphical and tabular form.

Results: For the period 2014 - 2018 a total of 5 epidemic outbreaks of Salmonellosis in three years - 2014, 2015 and 2018 were registered in organized children's groups in the territory of Varna and the region. A total of 52 sick persons were registered. 427 contact points were identified and investigated. The sources of infection were detected in four out of five epidemic outbreaks. They represent 5.15% of the contagious agents in contact - mainly pedagogical, service and kitchen staff. No transmission factors identified.

Conclusion: The prevention of salmonellosis is one of the urgent problems of public health. Food quality control coupled with anti-epidemic measures carried out in outbreaks of infection is a priority in the prevention of intestinal infections.

Аннотация

Резюме: Сальмонеллез - одно из самых распространенных бактериальных заболеваний в мире. В Европейском союзе (ЕС) ежегодно регистрируется более 100 000 случаев заболевания людей.Среди детских инфекционных заболеваний наиболее распространенными после острые респираторные вирусные заболевания являются: острые кишечные инфекции с ведущим возбудителем рода Salmonella

Цель: Изучить эпидемические вспышки сальмонеллеза, зарегистрированные в городе Варна и области в организованных детских группах за период 2014-2018 гг.

Материалы: Анализы кишечной заболеваемости в Варненской области за период 2014-2018 гг., Предоставленные Областной инспекцией здравоохранения (ОИЗ) -Варна. Публикации в научных базах данных, PubMed, Scopus, Medline, Google Scolar.

Методы: документальный, используются методы описательной статистики, сравнительный анализ, эпидемиологические исследования. Все результаты представлены в графической и табличной форме.

Результаты: за период 2014г.-2018г.в организованных детских коллективах на территории Варны и области зарегистрировано 5 эпидемических вспышек сальмонеллеза за три года - 2014, 2015 и 2018 гг. Заболели 52 человека, выявлено и протестировано 427 контактных лиц. В четырех из пяти эпидемических вспышек были обнаружены источники инфекции, которые составляют 5.15% заразных среди

контактировавших - в основном педагогического, обслуживающего и кухонного персонала. Коэффициенты передачи не установлены.

Заключение: Профилактика сальмонеллеза - одна из самых актуальных проблем общественного здравоохранения.Контроль качества пищевых продуктов в сочетании с противоэпидемическими мерами, проводимыми во время вспышек инфекции, является приоритетом в профилактике кишечных инфекций.

Keywords: epidemic outbreak, nutritional toxicity salmonellosis, organized children's groups, study.

Ключевые слова: эпидемическая вспышка, сальмонеллез, организованные детские группы, исследования, пищевые отравления.

Introduction: Salmonellosis is one of the most common bacterial diseases in the world. In the European Union (EU), over 100,000 human cases are reported each year. Among infectious diseases in childhood the most common after acute respiratory viral diseases are acute intestinal infections. The spectrum of pathogens that cause intestinal infections is increasing every year due to new bacteria and viruses. The group of pathogens united by the name Salmonella continues to be one of the leading places in the world as well as in our country. Salmonella causes gastrointestinal diseases in animals, birds, fish. People, including many young children and newborns, are also prone to salmonellosis. Salmonella is often the cause of epidemic outbreaks (in families, confined groups) and, if untimely and improperly treated, results in a fatal outcome. Over 2,000 serovars of Salmonella have been reported, but human and animal diseases usually cause 8-10 of them, with 2-3 prevalent. According to localization and pathogenesis, they are divided into 3 main types:

Typho-paratyphoid diseases. They cause systemic infections and are pathogenic:

• *Salmonella typhi - causes typhoid fever in humans.*

• *Salmonella paratyphi A - causes paratyphoid A.*

• *Salmonella paratyphi B and C - cause salmonellosis in animals and*

paratyphoid B and C in humans.

Food Toxic Infections. With leading representatives:

- Salmonella typhimurium
- Salmonella enteritidis

Septicemia and localized infections [10,11,15]

The cause of salmonellosis is the consumption of food and water contaminated with salmonella. [16] Most human foodborne infections are with Salmonella Enteritidis and Salmonella Typhimurium. [3,6] The subspecies Salmonella enterica serovar Enteritidis (S. Enteritidis) is the world's leading cause of salmonellosis and is often implicated in over 60% of human salmonellosis cases in Europe [7]. Of the non-typhoid salmonella, over 200 serovars are pathogenic to humans, often causing gastroenteritis and local infection and bacteraemia [19]. Nontifoid salmonella is the leading cause of bacterial diarrhea and is also thought to cause gastroenteritis in 150 million individuals and 57,000 deaths each year [9].The S. Enteritidis reservoir is mainly poultry, which often carry asymptomatic infections that cross the human pathogen through the food production chain. Particularly underpowered or raw eggs and frozen poultry are at high risk for humans. As non-typhoid self-colonies form colonies in the gastrointestinal tract of different animals, they are often found in cases where humans have been contaminated by the consumption of contaminated agricultural, fishery and animal products, including poultry, eggs, ground beef, milk, vegetables and fruits [18, 21]. Chickens and eggs are the reservoir and the main source of salmonellosis. [22] In addition, there have been reports of transmission through a variety of processed foods, including chocolate bar, peanut butter, orange juice and smoked salmon [8,12,13,17]. More rarely, these infections are associated with the transmission of the causative agent to a family or an organized collective by a sick person to others by contact. The incubation period of gastroenteritis caused by non-typhoid salmonella infection is approximately 6-72 hours and 12-36 hours on average. The most common symptoms include acute diarrhea, abdominal pain, fever (fever), and vomiting, which last 4-7 days and resolve without treatment in most cases [14,20,22,23]. However, infants, the elderly, and those who are immunocompromised due to dehydration and complicated infection may require hospitalization and antibiotic treatment [19].

Epidemic outbreaks of intestinal pathogens are known, most often recorded in organized children's collectives (pre-school kindergartens), where nutrition is organized, food is prepared in the common mother kitchen and spilled by objects (27-36.9% of all outbreaks) [4] However, the transmission factor, similar to our study, cannot always be, identified.

Aim: To study the epidemic outbreaks of salmonellosis registered in the territory of Varna and the region in organized children's groups for the period 2014-2018

Materials: Analyzes of intestinal morbidity in Varna region for the period 2014-2018, provided by the Regional Health Inspectorate (RHI) - Varna. Publications in scientific databases, PubMed, Scopus, Medline, Google Scolar

Methods: Documentary methods, descriptive statistics methods, benchmarking, epidemiological study. All results are presented in graphical and tabular form.

Results: For the study period, a total of 5 epidemic outbreaks were reported - one in 2014 and in 2018 and three in 2015. Three of the investigated outbreaks were reported in Varna and two in the district. The reported epidemic outbreaks are in four kindergartens (UK, FDK) and one in a catering establishment on the territory of Varna. The patients are mainly children, respectively 7 in the United Kindergarten (UK), 21 in Full day kindergarten (FDK) and 13 people at a catering establishment during a private party.(Fig.1)

The summer seasonality of infection and the detection of explosions is established.

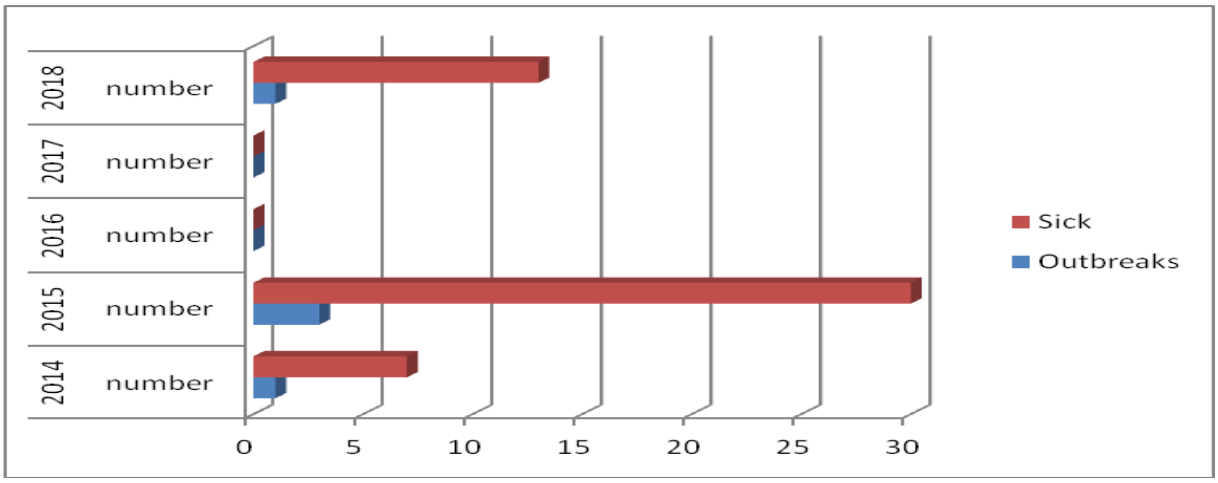

Fig. 1 Salmonellosis outbreaks (number) and number of cases in them in Varna region for 2014-2018

The number of patients ranged from 7 (in 2014) to 12 (in 2015) in the blast. Sources of infection have also been identified - people from kindergarten staff or kitchen unit staff in 4 of the blasts in 2014 and 2015. The source and factors of transmission of the infection have not been identified at the explosion registered in 2018. (Tab.1, Tab.2)

Tab.№1

Registered epidemic outbreaks of salmonellosis in organized groups, Sick People - Outbreaks and general sick people in Varna region for 2014-2018

Year	2014	2015	2016	2017	2018
Outbreaks number	1	3	0	0	1
Sick People - Outbreaks	7	30	0	0	13
Sick people - total	90	182	79	49	65

[1]

Tab.№ 2

Number of contacts and number of salmonellosis positive ones

Year	2014		2015		2018		Total		%
	Number	Positive	Number	Positive	Number	Positive	Number	Positive	
Children	50	0	239	16	12	0	311	16	5.14
Personnel	23	2	81	4	12	0	116	6	5.17
Total	73	2	330	20	24	0	427	22	5.15

[1]

In 2014. a registered epidemic outbreaks was investigated on the territory of the Varna region in the United Kindergarten (UK). 7 children are ill the kindergarten with complaints of fever, abdominal pain and diarrhea with impurities of blood and mucus. 5 of the children are hospitalized at the Infectious Diseases Clinic and 2 were treated outpatient. Salmonella, D., was isolated from the microbiological examination of faeces in 4 of the diseased and hospitalized children. Contacting the sick children is 50 children in the kindergarten and 23 service personnel. All contacts are examined. A positive result for Salmonella was obtained from 1 teacher and 1 assistant teacher who were removed from work and were treated outpatiently. Considering the clinical picture, the explosion and the results of the microbiological tests, it is considered that it is an outbreak of Salmonellosis, D. The suspected source of infection is Salmonella carrier by the servicing staff, with a probable contact path of life spread of infection

For 2015 r.are registered 3 epidemic outbreaks of proven Salmonella agent.

The first epidemic outbreaks was registered in a United Kindergarten (UK)in Varna. A total of 9 children are ill, 6 children have been caused by Salmonella, D. The children have complaints of fever, abdominal pain, fatigue, vomiting and frequent diarrhea and 2 of them have been treated in hospital. 81 contact children were identified. Microbiologically, they were tested for intestinal infection and the results were negative.Two healthy Salmonella and E. Carley infectious agents have been found, who are employed by the kindergarten. A check was also made in the kindergarten food block and samples were taken from the food for microbiological analysis, with no discrepancies found. In view of the clinical picture, the outbreak and the microbiological results, it is considered that it is an explosion from Salmonella D, with a household route of infection spread with a source of infection - service personnel

The second epidemic outbreaks was registered at an Full day kindergarten (FDK) in Varna. There are a total of 9 children with abdominal complaints, abdominal pain, fever, upper and lower dyspeptic syndrome. A microbiological study was conducted of all 155 contact children, Salmonella was isolated in 16 of them (Salmonella gr. D in 15 children and Salmonella gr. C in 1 child). A survey of all service personnel was carried out - 35 persons, with no contagious agents being detected. Four of the sick children have been treated at the Infectious Diseases Clinic and the others are outpatients until negative results are obtained. In view of the clinical picture, the tracer flow and the results of the assigned studies, it was considered to be an explosion with Salmonella causative agent D, with a contact-bit propagation path and a probable source - infectious carriers - children.

The third epidemic outbreaks was registered by an Full day kindergarten in the Varna region. 9 children and 2 people are ill service personnel**.**Complaints begin 3-4 hours after consuming dinner (vegetable breaded schnitzel and yogurt) with complaints of vomiting, abdominal pain and diarrhea with mucus and later fever. In the course of the study, microbiological studies were carried out on 12 more children and 7 persons from the personel. Negative results for intestinal support have been reported. In 2 people working in the kindergarten, a staphylococcus aureus of nasopharyngeal secretion has been isolated. Salmonella enteritis was isolated from the study of feces of hospitalized children, and salmonella enteritis was also isolated from laboratory food testing. All employees of the catering company (29 employees) for intestinal infections and nasopharyngeal secretions were also examined. In 2 persons working in the company from fecal samples Salmonella D. is isolated. Taking into account the explosion and the results of the studies, it was considered to be an outbreak of food poisoning caused by Salmonella enteritis, a source of infection proven by the catering company, staffing factor and contaminated food and faecal - oral route of transmission.

In 2018, a salmonellosis blast was registered after a privately organized children's party in Varna. According to the study, the food products were purchased from Hypermarkets in Varna, the cake is made from registered Pastry shop in the city of Varna. According to the written explanations provided to the party organizer and the epidemiological study, the food was prepared on the day of the party at the parents' home, at home. All conditions for transportation, delivery, storage of the food were met. When arranging the food assortment on a block table at the establishment, mothers with their children who had already arrived at the party were actively involved. Disposable tableware and disposable tableware are used. No tableware and utensils used at the establishment. During the private party the establishment was closed to customers. The offered culinary production of the private party was consumed in due time by the attendees, in view of which no food samples were taken from the cited by the pastry shop and grocery stores. In the course of the epidemiological study, it was found that 24 people (12 children and 12 adults) were present at the private party. Eleven individuals who attended the private children's party had no complaints and had negative results from microbiological testing for DSC. 13 persons were ill, of whom 5 children and 3 adults had a positive result for Salmonella D (61.5%). . Contact for Salmonella D positive children and adults - 22 people, without complaints, with negative results from microbiological testing for DSC.Водещи симптоми при всички заболели са болки в корема, повръщане с различна кратност, фебрилитет и диарийни изхождания с лека и средна тежест на проявление, около 12 часа след консумация на храната.

Three of the children were hospitalized at St. Marina Infection Hospital - Varna. With positive laboratory results for Salmonella Group D and Campylobacter.

The epidemiological study and the epidemic examination of parents and children were conducted extremely difficult, with moments of lack of assistance, with hiding information and difficulties in specifying the children and adults present at the holiday, and subsequently in the active search for the patients' contacts. Due to the clinical picture, the nature of the explosion, the results of the microbiological tests of children and adults attending the private children's party, the consumption of the same home-cooked food by persons with symptoms, it is considered to be a food explosion with Salmonella. "D", with unknown source of infection, most likely alimentary pathway of spread and transmission factor – food.

The epidemiological studies carried out are in cooperation with the Regional Directorate for Food Safety(RVS)-Varna. In epidemiological studies, contacts for the detection of infectious agents are very thoroughly searched. Of the 437 faecal samples examined, 22 salmonella strains were proven, averaging 5.15%. No significant difference was found in the percentage of positive samples in children and adults contact or 5.14% / 5.17%. Measures have been prescribed concerning the active monitoring of diseased and contact, hand and environmental disinfection, until the end of the outbreaks. The RICs receive daily case reports concerning the additional case and hospitalizations. All employees with symptoms or findings, such as asymptomatic infectious agents, are removed from work and treated outpatiently. They return to work after negative results have been confirmed. [2].

Conclusions:Five epidemic outbreaks in organized children's groups registered in the Varna region in three years -2014,2015,2018 have a total of 50 people ill, 427 contact persons detected and examined. The etiological decoding of salmonellosis in epidemic outbreaks in children is up to a group - in four outbreaks of group D and only in 2015 has S.Enteritidis isolated. Tips a thorough epidemiological study in 80% of the blasts revealed the sources of infection in organized children's groups in Varna region.

Salmonella infection is a common cause of gastroenteritis and bacteremia worldwide. Consumption of contaminated water and food and close

contact with colonized animals are common risk factors for acquisition. The prevention of salmonellosis is one of the urgent problems of public health. Carrying it through food is leading in the epidemiology of the disease. Food quality control coupled with anti-epidemic measures carried out in outbreaks of infection: timeliness, volume and timing of their implementation are a priority in the prevention of intestinal infections. In order to prevent the spread of foodborne infections, an integrated system of cooperation and surveillance must be put in place and necessary steps taken to prevent future epidemic outbreaks. [24].

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