The Incidence of Tiphoidal Salmonellosis in Pediatric Department of Shkodra Regional Hospital Diuring the Period January – December 2010

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Abstract: *Typhoid fever is a systemic disease characterized by fever and abdominal pain caused by dissemination of S. typhi or S. paratyphi. In contrast to other Salmonella serotypes, the etiologic agents of enteric fever (S. typhi and S. paratyphi) have unknown hosts other than humans. Thus, enteric fever is transmitted only through close contact with acutely infected individuals or chronic carriers. Rather, most cases of disease result from ingestion of contaminated food or water. Over the past four decades, with the advent of improvements in food handling and water/sewage treatment, enteric fever has become a rare occurrence in developed nations. Children under 1 year of age appear to be most susceptible to initial infection and to the development of severe disease. Enteric fever is endemic in most developing regions and is related to rapid population growth, increased urbanization, inadequate human waste treatment, limited water supply, and overburdened health care systems. Morbidity and mortality are increased in outbreaks associated with antibiotic-resistant strains, presumably because of inadequate or delayed treatment. In this article we have considered all hospitalized cases in pediatric department of Regional Hospital of Shkodra, with acute diarrhea. All cases diagnosed as salmonelosis typhoid's and portables are diagnosed with culture proven because we don`t effort the serology method cause of expensive kits and provisions) in our hospitals. It is impossible to have this information because the hospital has not the high technology laboratory. It has very old equipments in the current laboratories and we use only the culture proven instead. The elaboration of datas is made by a simple method, descriptive and cumulative. Some dates analyzed with Microsoft Office Excel method are presented through graphics.*

Key words: *diarrhea, infection, morbidity, mortality, salmonella, sewage, water.*

Introduction

Infections of the gastrointestinal tract are caused by a wide variety of enteropathogens, including bacteries, viruses, and parasites. Clinical manifestations depend on the organism and host response to infection and include asymptomatic infection, watery diarrhea, bloody diarrhea, chronic diarrhea and extra intestinal manifestations of infection. (Pickering. L, et al. 2003, pg. 1273-1278). Typhoid fever is a systemic disease characterized by fever and abdominal pain caused by dissemination of S. typhi or S. paratyphi. In contrast to other Salmonella serotypes, the etiologic agents of enteric fever (S. typhi and S. paratyphoid) have unknown other hosts except human being. (Lesser, C. et al. 2005, pg.897-899) Thus, enteric fever is transmitted only through close contact with acutely infected individuals or chronic carriers. About 2 to 5% of patient become chronic carriers, in women 3 times more frequent than men and especially patients with preexisting cholecistitis and cholelitiasis in particular. (Merck. 1982, pg. 67-70) Rather, most cases of disease result from ingestion of contaminated food or water. Health care workers occasionally acquire enteric fever after exposure to infected patients, while laboratory workers can acquire the disease after laboratory accidents. The incubation period for S. typhi ranges from 3 to 21 days. This variability is most likely related to the size of the initial inoculum and the health and immune status of the host. Over the past four decades, with the progress of improvements in food handling and water/sewage treatment, enteric fever has become a rare occurrence in developed nations. Children under 1 year old appear to be most susceptible to initial infection and to the development of severe disease. Enteric fever is endemic in most developing regions and is related to rapid growth of population, increased urbanization, inadequate human waste treatment, limited water supply, and overburdened health care systems. Morbidity and mortality are increased in outbreaks associated with antibiotic-resistant strains, presumably because of inadequate or delayed treatment. The incidence has decreased markedly in developed countries. In the United States, about 400 cases of typhoid fever are reported each year, giving an annual incidence of less than 0.2 cases/100,000 habitants, which is similar to that in Western Europe and Japan. In

Southern Europe, the annual incidence is 4.3–14.5 cases/100,000 habitants. (Cleary. Th et. al. 2003, pg. 916-918). Enteric fever is a misnomer, in that the hallmark features of this disease fever and abdominal pain are variable. While fever is documented at presentation in more than 75% of cases, abdominal pain is reported in only 20 to 40%. Gastrointestinal symptoms are quite variable. Patients can present with either diarrhea or constipation. Diarrhea is more common among patients with AIDS and among children under 1 year old. (Cleary. Th. et. al. 2003, pg. 916-918). Thus, a high index of suspicion for this potentially lethal systemic illness is necessary when a person presents with fever and a history of recent travel to a developing country. The most prominent symptom of this systemic infection is prolonged fever. A prodrome of nonspecific symptoms often precedes fever and includes chills, headache, anorexia, cough, weakness, "Rose spots," the rash of enteric fever due to S. typhi or S. paratyphi, sore throat, dizziness, and muscle pains. Approximately 1 to 5% of patients with enteric fever become long-term, asymptomatic, chronic carriers who shed S. typhi in either urine or stool. Since the clinical presentation of typhoid fever is relatively nondescript, the diagnosis needs to be considered in any febrile traveler returning from a developing country. A diagnosis can also be based on positive cultures of stool, urine, rose spots, bone marrow, and gastric or intestinal secretions. Unlike blood cultures, bone marrow cultures remain highly (90%) sensitive despite ≤ 5 days of antibiotic therapy. (Lesser, C. et al. 2005, pg. 897-899). Culture of intestinal secretions (best obtained by a non invasive duodenal string test) can be positive despite a negative bone marrow culture. If blood, bone marrow, and intestinal secretions are all cultured, the yield of a positive culture is >90%. Stool cultures, while negative in 60 to 70% of cases during the first week, can become positive during the third week of infection in untreated patients. Although the majority of patients (90%) clear bacteria from the stool by the eighth week, a small percentage become chronic carriers and continue to have positive stool cultures for at least 1 year. Several serologic tests, including the classic Widal test for "febrile agglutinins," are available; however, given high rates of false-positivity and false-negativity, these tests are not clinically useful. Polymerase chain reaction and DNA probe assays are being developed. The first – line of antibiotic therapy options for Typhoid Fever are: Ciprofloxacin 500 mg PO bid for 10 days or Ceftriaxone 1–2 g IV or IM for 10–14 days. The 1 to 4% of patients who develop chronic carriage of Salmonella can be treated for 6 weeks with an appropriate antibiotic. (Lesser, C. et al. 2005, pg. 897-899).

Material and methods

In this article we have into consideration all the hospitalized cases in pediatric department of Regional Hospital of Shkodra with acute diarrhea, according to the selected group of pediatric ages, both genders, place of residence rural vs. urban areas. All the cases diagnosed as salmonellosis typhoid's and portables are diagnosed with culture proven, because we don`t effort the serology method cause of expensive kits and provisions in our hospitals. It is impossible to have this information because the hospital has not the high technology in the laboratories. It has very old equipments in the current laboratories and we use only the culture proven instead. The elaboration of the datas is done by a simple method, descriptive and cumulative. Some dates analyzed with Microsoft Office Excel method are presented through graphics. The data are taken from the Statistic Office of Shkodra Regional Hospital.

Results and discussion

From all the data collected we can see that the largest number of acute diarrhea appears in the warmer months, from June to October with a peak in July and August (with 19% of all hospitalized cases, figure 1). The majority of hospitalized cases belong to males in 63% of all cases (figure 2).

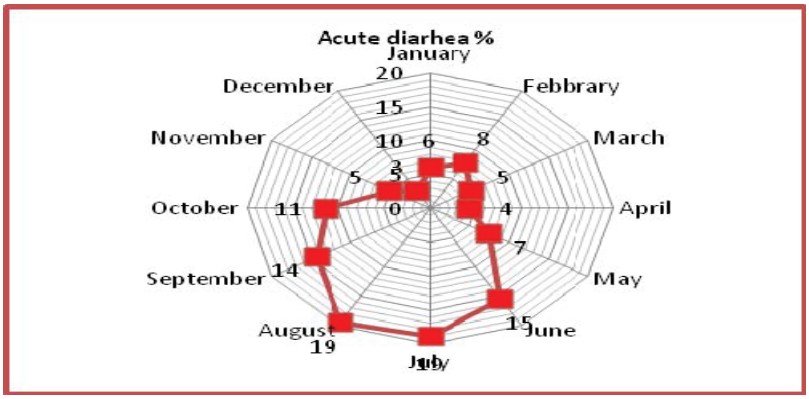

Figure 1. The incidence rate cases monthly hospitalized with acute diarrhea

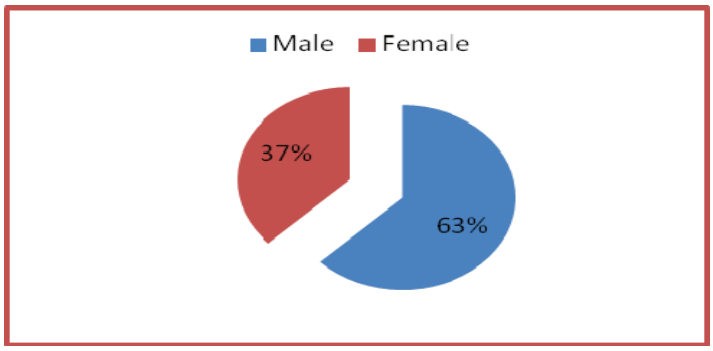

Figure 2. The incidence rate of hospitalized cases according to the gender

As we can see from the figure 3, the residence areas of the majority of hospitalized cases with acute diarrhea are from rural areas. Respectively, 68% are from rural areas and 32% are from urban areas. This fact is justified with the low level of health education of parents of these children and also because of bad hygienic condition in their houses.

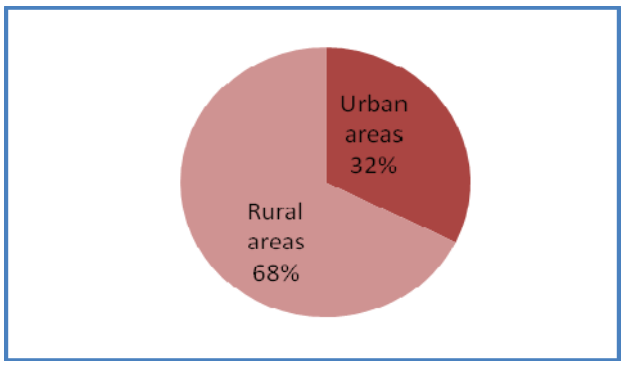

Figure 3. The residence area of hospitalized cases with acute diarrhea

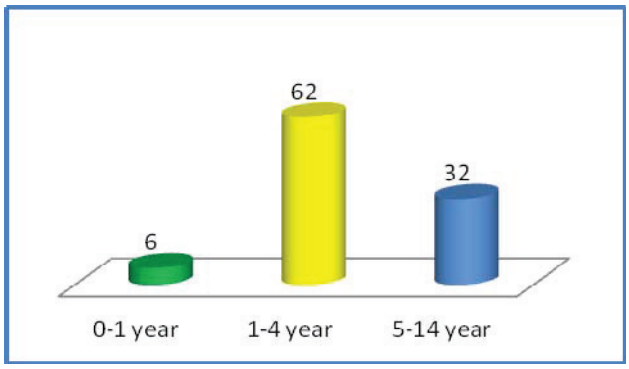

Figure 4. The incidence of hospitalized cases with acute according to the age groups diarrhea

In figure 4 we have presented the spread of hospitalized cases with acute diarrhea according to the age groups. We can see that the 62% of cases belong to age groups of 1- 4 years old. Generally in infants and young children under 5 year enteric fever is relatively rare in this age group in endemic areas. Although clinical sepsis can occur, the disease is surprisingly mild at presentation, making the diagnosis difficult. Mild fever and malaise misinterpreted as a viral syndrome occur in infants with culture-proven typhoid fever. Diarrhea is more common in young children with typhoid fever than in adults, leading to a diagnosis of acute gastroenteritis. (Cleary. Th. et. al. 2003, pg. 916-91). This fact is represented in the figure 5 where we can see that only 29% of all the cases are diagnosed with salmonellosis.

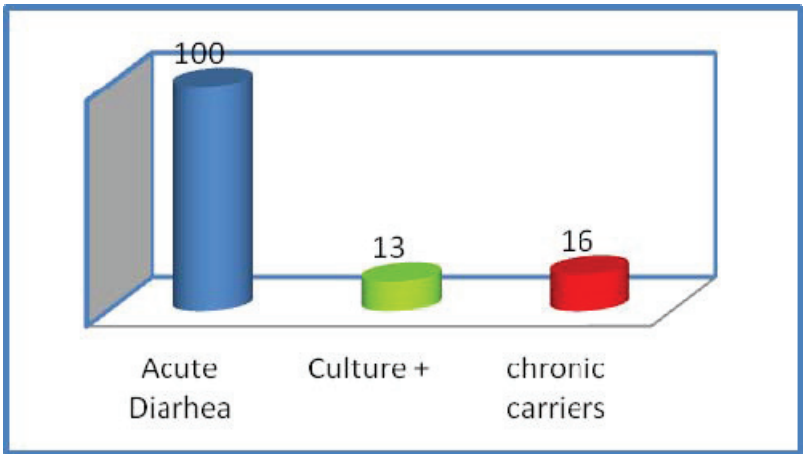

Figure 5. The incidence of hospitalized cases with acute diarrhea and salmonellosis during January - December 2010

In table 1, we have presented the total hospitalized cases in the Shkodra's hospital and the total case of salmonellosis, according to the gender and age groups. Also in figure 6 we can see that most hospitalized cases with salmonellosis are male of 1-4 years old are most affected by salmonellosis. They presented the 69% of total cases (figure 7).

Table 1. The hospitalized cases according the gender and age groups in the Regional Hospital of Shkodra during January - December 2010 (Data SOSHRH, 2010)

	Age group / Gender	0-1 year	1-4year	5-14 year
Total cases hospitalized	Male	258	1473	1268
	Female	147	930	943
Total cases with salmonellosis	Male	7	70	25
	Female	4	46	17

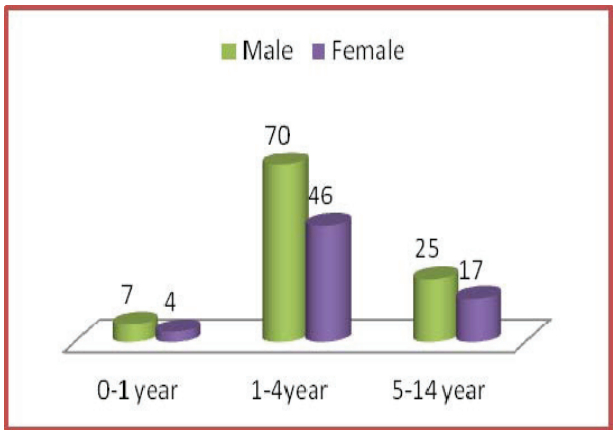

Figure 6. Cases of salmonellosis according to the gender and age groups

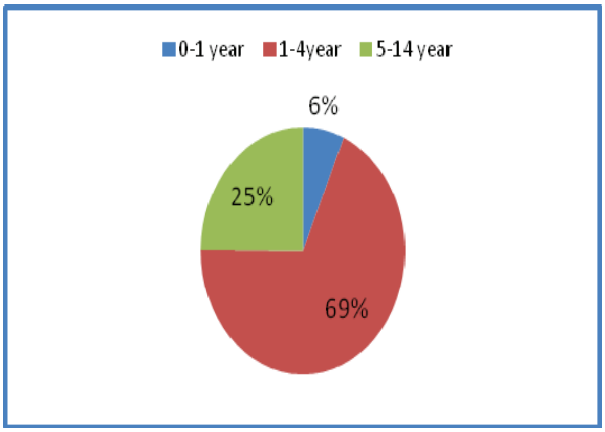

Figure 7. The distribution of cases with salmonellosis according to the age groups

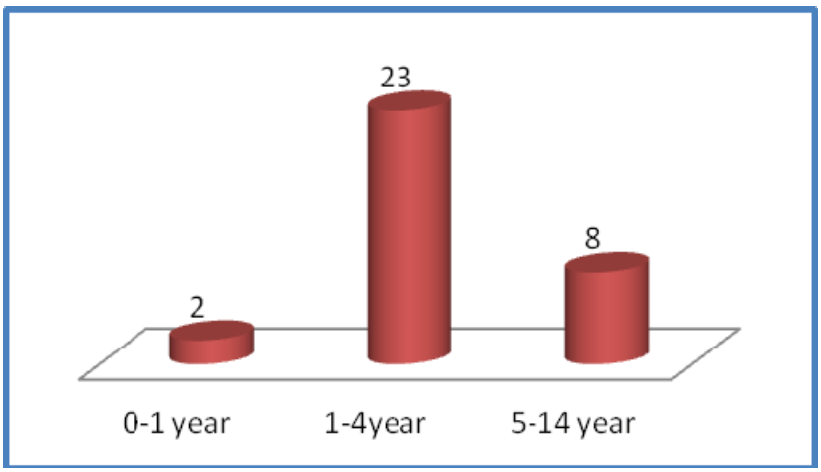

Figure 8. The incidence rate of salmonellosis per 1000 children hospitalized in Shkodra Regional Hospital during January - December 2010

On the graphics above we can evident that the highest number of cases of salmonelosis are present in children younger than 5 years old. We can see the higher incidence rate of salmonellosis according to the age group. On the other hand the incidence rate of acute salmonelosis and chronic carriers per 100000 habitants is very high compared with the other European countries. All these are presented in figure 8, 9, 10. The annual incidence rate of salmonellosis is 68/100000

habitants, for acute cases is 30/100000 habitants and chronic carriers is 39/100000 habitants. The rate is suspected to be higher because in this article we have represented only the pediatric cases and this is only a part of all the popullation.

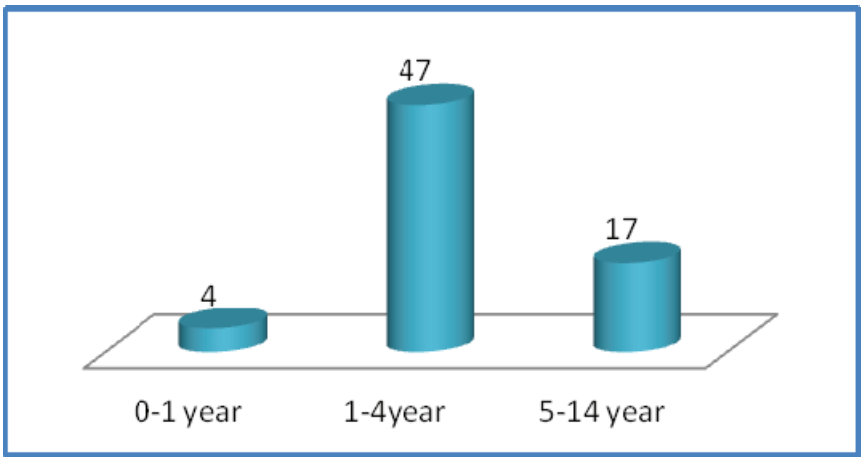

Figure 9. The incidence rate of salmonellosis per 100000 habitants

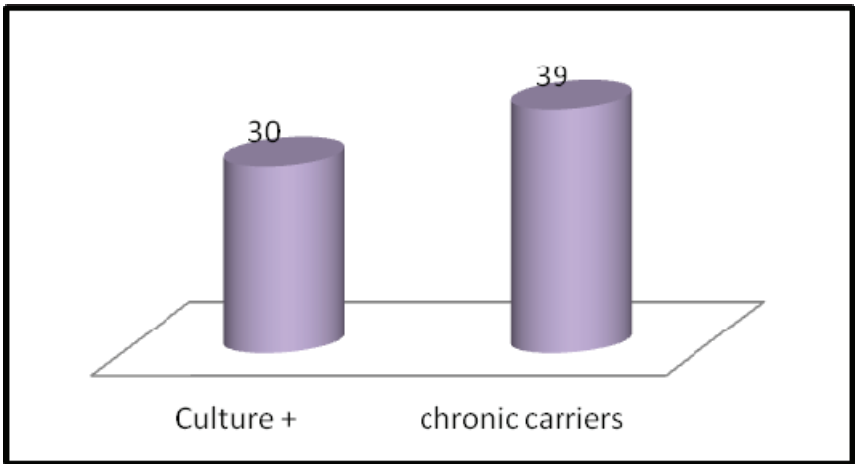

Figure 10. The annual incidence rate of salmonellosis per 100000 habitants

In figure 11, we have presented typhoid salmonellosis cases through months. We can see that the highest number of chronic carriers of cases are hospitalized in January and the acute case are hospitalized during the period August – October, period related to high atmospheric temperature.

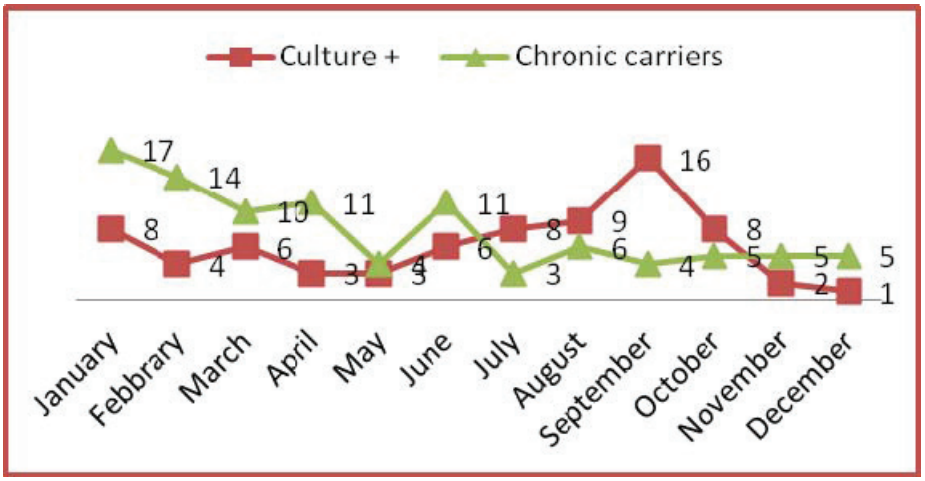

Figure 11. The cases of typhoid salmonellosis hospitalized during January - December 2010

Conclusions and Recommendations

From this study we can conclude that the largest number of acute diarrhea and the acute cases of salmonelosis appears in the warmer months but, the highest numbers of chronic carriers of cases are hospitalized in January. The majority of hospitalized cases belong to males and the residence areas of majority of hospitalized cases are from rural areas. The most hospitalized cases affected by salmonellosis are children male of 1-4 years old. These data represent higher level of salmonellosis in children younger than 5 years old. On the other hand the incidence rate of acute salmonelosis and chronic carriers per 100000 habitants is very high, compared this with the other European countries. The annual incidence rate of salmonellosis is 68/100000 habitants, for acute cases is 30/100000 habitants and for chronic carriers is 39/100000 habitants.

In endemic areas, essential to control enteric fever is to improve sanitation and clean running water. To minimize person-to-person transmission and food contamination is necessary: personal hygiene measures, hand washing, and attention to food preparation practice. In addition, since 1 to 5% of patients with S. typhi infection become chronic carriers, it is important to monitor patients (especially those employed in child care or food handling) for chronic carriage and to treat this condition if indicated. Efforts to eradicate S. ser. Typhi from carriers are recommended, because human beings are the only reservoir of S. ser. Typhi. When such efforts are unsuccessful, carriers should be prevented from working in food- or water-processing activities, in kitchens and in occupations related to patient care. These individuals should be made aware of the potential contagiousness of their condition and of the importance of hand washing and attentive personal hygiene. (Cleary. Th et. al. 2003, pg 916-918).

Theoretically, it is possible to eliminate salmonellae that causes enteric fever since the bacteria survives only in human hosts and it is spread by contaminated food and water. However, given the high prevalence of the disease in developing countries that lack good facilities for sewage disposal and water treatment, this goal is currently unrealistic. Thus, travelers to developing countries should be advised to monitor their food and water intake carefully and to consider vaccination. The minimal ages for vaccination with the Ty21a, ViCPS, and Vi-rEPA vaccines are 6 years, 2 years, and 6 months, respectively. (Cammie F. et al. 2005, pg.897-899). In a trial in 2 to 5 year old children, the vaccine provided 90% efficacy and was very well tolerated, with no serious adverse reactions. The Centers for Disease Control and Prevention (CDC) currently recommends vaccination for persons traveling to developing countries who will have prolonged exposure to contaminated food and water or close contact with indigenous populations in rural areas. The only recommendations for domestic vaccination include people who have intimate or household contact with a chronic carrier or laboratory workers who frequently work with S. typhi. (Lesser, C. et al. 2005, pg.897-899)

Purification of drinking water, pasteurization of milk, prevention of chronic carriers from handing food, and complete patient isolation techniques are the most successful prophylactic measures. (Merck. 1982, pg. 67-70)

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