

Original Research Report

## Identification of Salmonella in Islamic Boarding School in Bath Water Sumbergempol Sudistrict

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**Abstract:** Salmonella is a bacterium that causes typhoid fever. *Salmonella* is able to live in water, dry waste, dust and if these bacteria live in a suitable living place then the bacteria multiply reach infective dose. The bathroom water is usually used for various things one of them gargling it allows the pathogenic bacteria left in the mouth and swallowed into the digestive tract so causing abdominal pain and fever. The purpose of this study is to determine whether there is *Salmonella* bacteria in the bath water bath in the boarding school. This research is a descriptive research. Which was held on 7 to 10 May 2018 at the Microbiology Laboratory DIII Health Analyst STIKes Hutama Abdi Husada Tulungagung. Population in this research is all boarding school existing in Sumbergempol District, sampling technique in this research is total sampling, which obtained as many as 6 samples of boarding school. The instruments used are sterile tube, measuring pipette, incubator, plate, plate agar medium, aquadest, oven and laboratory equipment required. The results obtained that from 6 samples, 1 positive *Salmonella* bacteria and 5 samples of *Salmonella* bacteria. The results of the research are then analyzed descriptively. Based on the results of the study it can be concluded that 16.67% positive *Salmonella* identified and 83.33% negative or unidentified *Salmonella*. The presence of *Salmonella* in the bathroom tub is caused by a bathroom tub that has a distance with a septic tank less than 10 meters. Research on the identification of bacteria other than *Salmonella* is also needed to know the presence or absence of other bacteria that exist in the water bath tub boarding school District Sumbergempol.

**Keyword:** Islamic Boarding School, Bath Water, *Salmonella Bacteria*.



## 1. Introduction

Islamic boarding school is an Islamic religious education institution that grows and is recognized by the surrounding community with a boarding system. In Islamic boarding schools, santri receive religious education through a study system or madrasa which is entirely under the sovereignty of leadership of a person or how many Kiai [1]. In general, an Islamic boarding school describe universal community life. All students are in one local accommodation with a variety of social levels. Both in terms of power relations, policies, health and all life support facilities are in boarding schools.

Various common environment-based diseases that are often a problem in Islamic boarding school such as scabies (diarrhoea scabies), ARI, are still commonly found. This is caused by an unhealthy environment. The sanitary conditions in Islamic boarding schools will be closely related to the number of communicable diseases. Skin disease is a disease that attacks the skin surface of the body and is caused by various causes of poor personal hygiene, viruses, bacteria, allergic reactions and low endurance. Besides environmental sanitation, the availability of clean water facilities in boarding schools gives a very great for students' health problems. Recognizing the importance of clean water facilities in the boarding school environment to ensure reduced transmission and the development of disease [2].

The emergence and spread of infectious disease in plant, animal and human populations is a problem around the world; water is a common element in the ecology of many pathogens affecting these populations. Waterborne pathogens can pose threats to drinking water supplies, recreational waters, source waters for agriculture and aquaculture, as well as to aquatic ecosystems and biodiversity. Water sources are vulnerable to contamination from many origins, to include humans and animals [3].

Based on observations made at the Islamic boarding school in Sumbergempol sub-district, it is known that in general, the bathroom at the Islamic boarding school sub-district in Sumbergempol looks less clear water, a lot of moss in the walls of the tub and rarely cleaned. This causes the water cleanliness is not maintained. There are several well documented waterborne zoonotic bacterial pathogens, including *Salmonella spp.*, *E. coli*, *Campylobacter spp.*, and *Yersinia spp.* The prevalence of these organisms depends on the nature of the source and the water supply, excreta and other waste disposal processes, and environmental and climatic factors [4]. Bathroom water is usually used for various things, one of which is gargling so that *Salmonella* bacteria can be left in the mouth and swallowed into the digestive tract.

In general *Salmonella paratyphi* is transmitted through the stool, and the result is that the infection occurs. When eating food contaminated with waste, especially in places lacking sanitation, as this situation is common in developing countries where the sewage is poor discharge and the result that washing or preparing food will be in direct contact with contaminated water, salmonella can be transmitted between people as a result of lack of health care [5].

*Salmonella* colonizes the gastrointestinal tract, the organisms are excreted in feces from which they may be transmitted by insects and other animals to a large number of places and are generally found in polluted water. Salmonellae do not originate in water; therefore their presence denotes fecal contamination. Humans and animals that consume polluted water may shed the bacteria through fecal matter continuing of the cycle of contamination [6]. Salmonellosis is an acute, gastroenteritis, typically acquired orally through contaminated water or comestibles. Annually, there are an estimated 1.3 billion cases of *Salmonella* gastroenteritis, leading to approximately 3 million deaths worldwide [7]. *Salmonella* is a bacterium that causes typhoid fever. Fever caused by *Salmonella* is an acute infectious disease in the form of bleeding, liver damage, spinal cord, meningitis. During a bacterial infection, it multiplies in phagocytic mononuclear cells and continues to be released into the bloodstream [8].

Typhoid fever attacks people in all countries. Typhoid fever is commonly found in developing countries where personal hygiene and environmental sanitation are poor. But in developed countries, the prevalence of typhoid fever is stable with low numbers. Case prevalence varies depending on location, local environmental conditions, and community behaviour. Who mentions there are around 900,000 cases in Indonesia, of which around 20,000 sufferers have died. Typhoid fever is an acute infectious disease in the small intestine with symptoms of fever one week or more accompanied by disorders of the digestive tract [9]. In East Java, the incidence of typhoid fever, in health centres and hospitals is 4000 and 1000 cases per month, with a mortality rate of 0.8% [10].

The presence of Salmonella bacteria in the bathroom in the Boarding School in the Sumbergempol District area is unknown. Therefore, researchers are interested in conducting research with the title "Identification of Salmonella in Bathing Boarding Schools in Sumbergempol District".

## 2. Methods

This research is descriptive research. Which was held on 7 to 10 May 2018 in the Microbiology Laboratory of Health Analyst STIKes DIII Hutama Abdi Husada Tulungagung. The population in this study were all bathwater in the Islamic Boarding School in Sumbergempol District. The sampling technique in this study is a total sampling. The total sampling technique is a sampling technique with all members of the population used as a sample, this is often used when the sample population is relatively small or less than 30 samples. This research was conducted with 1 variable and did not require a hypothesis and only in the form of a picture

## 3. Result and Discussion

From the results of research that has been carried out in the boarding school bathtub in Sumbergempol District, the following results are obtained as shown in Table 1.

**Table 1. Salmonella Examination Results in the Boarding School Bathing Bath in Sumbergempol District.**

Hasil pemeriksaan	Frekuensi (n)	Presentase (%)
Positif	1	16,67 %
Negatif	5	83,33 %
Jumlah	6	100 %

Based on Table 1 it is known that the percentage of Salmonella identification results on 6 samples obtained positive results as much as 1 sample (16.67%) namely Islamic boarding school E, while negative results obtained as many as 5 samples (83,33%) namely Islamic boarding school A, Islamic boarding school B, Islamic boarding school C, Islamic boarding school D and Islamic boarding school F. The presence of Salmonella in sample E is caused by the bathtub E which has a close distance to the septic tank. Salmonella in the septic tank is caused by Salmonella including coliform bacteria originating from the digestive tract. *Salmonella* is a genus of rod-shape, gram negative, non spore-forming, predominantly motile Enterobacteria with diameters around 0.7 to 1.5µm, lengths from 2 to 5 µm and flagella that move in all directions (i.e petrichous). They are chemorganotrophs, obtaining their energy from oxidation and reduction reactions using organic sources and are facultative anaerobes. Most species produce hydrogen sulfide [11]. The majority of Salmonellae are lactose fermenters, hydrogen sulfite producers, oxidase negative, and catalase positive. Other biochemical properties that allow identification of Salmonella include the ability to grow on citrate as a sole carbon source, decarboxylate lysine, and hydrolyze urea [6]. Salmonella spp. is a recognized human pathogen and its waterborne transmission has been well documented [12]. *Salmonella spp.* detection in waterways indicates the spread of the agent in the environment, highlighting the importance of faecal contamination of the water environment in the spread of salmonellosis [3]. Microbes that are coliforms and the most common ones that cause infections are *Escherichia coli* and *Salmonella*. *Escherichia coli* is a normal digestive tract flora and *Salmonella* is a pathogenic bacterium in the digestive tract. The existence of *Salmonella* can pollute the bathroom water tub [13]. This is in accordance with previous studies that explain the factors that influence the presence of bacteria such as the distance of the septic tank with a clean air source of less than 10 meters, the condition of the septic tank which is not airtight and in accordance with the soil which has air

absorption the higher the more bacteria the longer the more increased [14]. The presence of Salmonella bacteria in water indicates that the water is not suitable for direct use. Water can also play a role as a medium for disease transmission. Water is a good medium and environment for the life of good microorganisms such as Salmonella, because of the emergence of an understanding of what is called a water-borne disease [15]. This is in line with previous studies wherein the study area showed that the distance of the well with a septic tank an average of 6.95 meters caused the presence of bacteria in the well water [16]. There were no Salmonella bacteria in the bath of sample A, sample B, sample C, sample D, and sample F were caused because in the bathroom so often cleaned, the air looked clean, there was no sediment in the air and also septic tank of more than 10 meters. Source of contamination consisting of human faeces placed in holes can penetrate the surface of groundwater. Positive samples are obtained at a distance of 4 to 6 meters from the source of contamination [17].

Water is an important requirement for life on earth, especially for humans. Water plays an important role in the process of body interaction, where the air is a universal solvent and all types of substances can dissolve in the air. Clean and healthy water is a qualification that is needed to meet these needs. 416 / MENKES / PER / IX / 1990 concerning Clean and Healthy Water Quality Needs consisting of Clean and not turbid water, no colour and any taste, does not contain deposits, does not contain chemicals containing heavy metals, enough iodine, Air pH between 6.5-9.2, does not contain pathogenic bacteria and contains beneficial substances that are beneficial to human health. As we know, water has a large role as a medium of disease transmission, because water is a good medium for nesting and developing the disease vector. The use of water that does not meet the requirements especially in terms of bacteriological quality can cause health problems. These health problems can be in the form of infectious or non-communicable diseases. Infectious diseases that are spread by water directly are called water-borne diseases.

Research on the identification of bacteria other than Salmonella is also needed to find out what bacteria are in the water like a bathroom in the Islamic boarding school Subdistrict Sumbergempol. Similar research is also needed in the bathroom water tub at Islamic boarding schools in other districts.

#### 4. Summary and Conclusion

From the results of the study and discussion, it can be concluded that from the 6 samples taken in the bathwater in the Islamic boarding school Sumbergempol subdistrict obtained 1 positive sample of Salmonella. The existence of Salmonella in the sample is caused by the bathtub which has a short distance to the septic tank. Salmonella in the septic tank is caused by Salmonella including coliform bacteria originating from the digestive tract. While the negative results of Salmonella obtained as many as 5 samples. The absence of Salmonella bacteria in the 5 bathtub samples was caused because the bathrooms were often cleaned, the water looked clean, there was no sediment in the water and the septic tank distance was more than 10 meters.

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