



Pathogenic Bacteria Contaminated of Drinking Water in the Valley LAah of Bani Qais Hajjah -Governorate.

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Abstract

Pathogen contamination drinking water is a serious issue for almost all types of ambient water bodies, making its recognition and understanding essential. Microbiological water analysis is mainly based on the concept of fecal indicator bacteria. We collected a sample of the research consisting of the drinking water that existed in the region of Wadi La'a, Directorate, Bani Qais, which is located in the south of Hajjah Governorate. The pollution of this water led to the spread of diseases, which are characterized by symptoms of diarrhea, vomiting, and cold limbs and after that, the patient dies. We examined the samples in a laboratory for the main treatment of water in Hajjah Governorate. According to the standards of analysis in the World Health Organization (WHO), this depends on them for determining the quality of potable water. The results of bacterial examination for the samples (pathogenic) showed that there were 20 bacterial colonies per 100 ml in fecal coliforms of *Escherichia coli* and 9 bacterial colonies per 100 ml in total coliforms of three species: *Salmonella typhi*, *Shigella sp*, *Vibrio cholerae*. The results of the chemical analysis showed that the concentration of iron in the drinking water is 0.8 mg / L higher than the permissible iron concentration in the world organization, which is 0.3 mg / l. As for the physical examination, the results revealed that it was at the level allowed in the (WHO).

Keywords: Contamination; drinking water. Hajjah –Governorate.

Introduction:

Contaminated water affects about 250 million people each year from countries around the world and that leads to the deaths of 15- 20 million in developing countries, especially diarrhea that is the fundamental reason for the occurrence of the death of more than a million people mostly children under the age of five years due to loss of access to potable water–borne pathogenic factors reasons cholera or dysentery and others. The common water contaminants that affect human health are the waste of humans and animals that contain microorganisms which are harmful to health (Gray, Feidler, Ostarcevic, & Dharmabalan, 2007). The live bacteria in surface water naturally and so–called water germs thoroughbreds and the intervention of other bacteria in water from different sources like washing soil, floods and rain and what they contain called spores and bacteria is the intestinal fecal contamination functions (World Health Organization, 1993), and look intestinal bacteria and fecal intestinal function more convenient to determine the natural water contamination by germs, nurse Alan presence means having germs or microorganisms pathogenic to humans (Entry IA, Farmer N, 2000). It spreads germs in the water torrents and day: *Azotobacter*, *Nitrobacteria*, *Vibrio cholera*, *Escherichia coli*, *Shigella sp*, *Salmonella typhi* and *clostridium sp*. (Hurst CJ, 1994).

The Directorate of Bani Qais, was the subject of this study, and this province is considered one of the remote areas in Hajjah. It was noticed during the study that the people of this Directorate take the drinking water from the valley of La'a by digging a small hole and then take the water for drinking. Animals drink water from the same spot, that water and germinate and float in the same valley, in addition to the people of these areas wash their clothes in the same valley, it noted that the water washing clothes that pass in the same direction of drilling water, which the water is taken of it include drinking water and other household uses and buffets and pension. We can limit the epidemic in the areas that drink from these low-level and the symptoms of the epidemic are as follows: diarrhea and the cold and cold in the limbs and then the occurrence of death (WHO 2004).

Materials and Methods

Analysis Microbial

The analysis is performed on bacteriological water samples, to determining drinking water quality standards (WHO 2004). Total coliform bacteria are defined as gram-negative, rod-shaped, non-sporing forming, facultative anaerobic bacteria that ferment lactose with the production of acid and gas when incubated within 24-48 h at 37 °C. The total coliform group includes several of

bacteria such as *E.coli*, *Klebsiella*, sp *Shigella*, sp and *Salmonella*, sp (Hurst CJ, 1994).

Membrane Filter Method

In addition to the multiple tube test, the membrane filter method has been recognized by the United States Public Health Service as a reliable filter disk that is 150 micrometers thick, has pores of 0.45 diameter bacteria larger than 0.47 micrometer, cannot pass through for analysis of fecal coliform and total coliform. The amount of water sample used was 100 mL.

To test the sample of water, the water is passed through one of these filters. All bacteria present in the sample are retained directly on the filter's surface. The membrane filter is then placed on an absorbent pad saturated with liquids nutrient medium 2 ml Endo MF broth is used and incubated at 37 °C for 22 to 24 hours. The organisms on the filter disk form colonies that can be counted under the microscope. Coliforms exhibit a characteristic golden metallic sheen.

Physical Analysis

Temperature

The temperature sampling, as measured in the used thermometer, was between 22-23 °C as a nutrition temperature in the sampling place.

Electrical Conductivity

Electrical conductivity is a measure of the ability of an aqueous solution for the delivery of

an electric current. The conductivity of drinking water is associated with an increased concentration of mineral salts dissolved in it. The conductivity is recorded as Siemens per meter mS/m or Micro semen per centimeter uS/cm.

pH measuring

The pH using three solutions of standard electrode calibration between (pH 4, pH 7, and pH 8) to the standard water sample and adjusts the meter to read pH standard water for point of initial and then the pole still and rinse with distilled water.

Chemical Analysis

Total Dissolved Solids

The total dissolved solids ions in sample water such as (Fe, Cu, F, and NH₃) exist in sample soluble salts derived by Spectrophotometer DR/ 2800.

Turbidity

The unit used to measure the turbidity is the Nephelometric Turbidity Unit (NTU).

Results and discussion

Microbial Analysis

Table 1 shows the effectiveness of the analysis of bacterial when examining dishes agar nutrient promised bacterial colonies, and the existence of many types of harmful bacteria. It also shows a total coliform 9 of the type *Escherichia coli*, which causes dehydration, diarrhea and

thrown at the children in particular. The number of diseases were 20 colonies of bacteria in fecal coliform of three types: *Salmonella typhi*, *Shigella sp.*, *Vibrio cholera*, which cause typhoid,

gastroenteritis, cholera, fever, diseases that affected the lives of many people in valley LAah of Bani Qais Hajjah Directorate through drinking contaminated water that contained these types of bacteria (Table 1)>

Table 1: The results of bacteriological analyses of drinking Water in the valley LAah of Bani Qais Hajjah.

<i>Parameter</i>	<i>Unit</i>	<i>Value</i>	<i>WHO</i>
Total	100ml	9	0
Fecal	100ml	20	0

The results of this research are compatible with the previous results which confirmed that it is the bacteria which spread in flood waters and rivers. The most important of these microorganisms which are transmitted by contaminated water are *Salmonella typhi*, *Vibrio cholera* and *Escherichia coli* (Straub TM, Pepper IL, Gerba CP, (1993) & Grimes, D. J., 1991). For decades, public health officials and scientists have evaluated water quality by enumerating fecal coliforms and *Escherichia coli* levels in rivers, lakes, estuaries and coastal water (Pandey, & ML, S., 2012, Pandey, et al., 2012 & Pandey, P. & Soupir, M. 2013). Water-borne diseases (diarrhea and gastrointestinal illness) caused by various bacteria such as *Escherichia coli* and *Salmonellosis*, viruses and protozoa have been contaminated in drinking water (Griffiths, C. et al.,

2012). Fecal contamination of water occurs from agricultural lands that use animal manure, runoff from urban surfaces, and direct discharge of untreated sewage (Shrestha, R. et al., 2019). In addition, coastal rivers draining largely from undeveloped water sheds with extrusive riparian wetlands can be a natural source of fecal pathogens to coastal water (Staley, Z. et al., 2014 & Wilkes, et al., 2013)

Physical Analysis

Temperature

Sample temperature ranged between 21.4-23.0 °C where the weather was cool in the sampling place. The investigation shows that within normal limits to the degree of natural water temperature (Table 2).

Table 2: The results of physical tests of drinking water in the valley LAah of Bani Qais Hajjah.

<i>Parameter</i>	<i>unit</i>	<i>value</i>	<i>WHO</i>
<i>pH</i>	<i>mg</i>	7-8	6.5-8.5
<i>Temperature</i>	<i>°C</i>	21.4	
<i>E.c</i>	<i>Uscm</i>	66.9	

Electrical Conductivity

The electrical conductivity value in this sample, which amounted to 66.9 and the study, is tabulated in Table 2. Net Kay has all the test results within the allowable limit in the World Health Organization (Straub TM, Pepper IL, Gerba CP, 1993).

Measuring pH

pH is a measurement of electrically charged particles in a substance. It indicates how acidic or alkaline (basic) of a substance is. Table 2 shows the results of measuring pH, which

ranged from pH 7.0 to 8.0, where the value lies within normal limits for surface water.

**Chemical Analysis
Turbidity**

Turbidity is a measure of the degree to which the water loses its transparency due to the presence of suspended particulates. Table 3 shows the amount of turbidity measure of the purity of water. The turbidity value is 1.5 NTU that is in good agreement with WHO value. This value reflects the purity and less contamination of water.

Table 3: The results of chemical analyses of drinking water in the valley LAah of Bani Qais Hajjah

<i>Parameter</i>	<i>Unit</i>	<i>Value</i>	<i>WHO</i>	<i>Remarks</i>
<i>Turbidity</i>	<i>NTU</i>	1.5	5	<i>We Note of contamination may exceed the allowable percentage in (WHO 2004)</i>
<i>T.D.S</i>	<i>mg/L</i>	308	1000	
<i>Iron</i>	<i>mg/L</i>	0,8	0,3	
<i>Copper</i>	<i>mg/L</i>	0,08	1-2	
<i>Fluoride</i>	<i>mg/L</i>	0,21	1,5	
<i>Ammonia</i>	<i>mg/L</i>	0,07	1	

Total Dissolved Solids

Table 3 shows the measured amount of total dissolved solids in the sample of water. Fe, Cu, F and NH₃ was in the arrangement 0.8, 0.08, 0.12, and 0.3, a large proportion of these elements, but harmful if it increases the proportion of the water, which makes it unsuitable for drinking. From the results, the iron showed higher concentration than the limit allowed in the World Health Organization (Straub TM, Pepper IL, Gerba CP, 1993).

Conclusion

The study showed that the cause of the deaths in the region of study was due to the use of polluted drinking water from Wadi La'a by digging a small hole and then taking the water from them and drinking in association with the animals that are watering and troughs in the same valley. The symptoms of the epidemic diarrhea and cold in the limbs were caused by the presence of large bacterial pollution water. In addition to that, the percentage of total soluble salts such as iron, copper, fluoride and ammonia exceeded the limit allowed in the World Health Organization. Microbiological analysis of drinking water should be carried out by assaying the presence of *Escherichia coli* by the culture methods. Financial resources should be devoted to a better un-

derstanding of the ecology and behavior of human and animal fecal bacteria in environmental waters.

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