MICROBIOLOGICAL AND PARASITOLOGICAL EXAMINATION OF WATER FROM VALE VERDE DISTRICT, MINAS GERAIS, BRAZIL

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ABSTRACT

Noticing the importance of the water potability to the public health. Our group has taken the initiative to the develop a research projectand test the water from Vale Verde district, with the purpose of determinate the quality and check its potability, enabling the district population the knowledge of the daily consumption of water which is used to recreation and food cultivation. Thus, our study determinates the action to be made, with the purpose of educate the people about the importance of sanitary education, aiming to preventing several diseases, whose transmission happens through drinking contamined water by bacteria and parasites.

KEYWORDS: Test, Potability, Water, Microorganisms.

1. INTRODUCTION

Water is an essential substance for the development of life. It represents approximately 70% of the body weight of a human being, participating in several physiological functions of the body, and is considered a universal solvent because it is possible to dissolve a large amount of substances[1].

In these contexts, water is essential for the maintenance and development of life and the best method to ensure their quality for consumption is to avoid contamination with animal waste and human, which can contain large variety of bacteria, viruses, protozoa and helminths. Failures in effective treatment and protection expose the community to the risk of contracting intestinal parasites and other infectious diseases[2].

Consuming contaminated water that does not meet the potability standards, creates risk factors and health problems to human health. The water can be harmful when you have pathogens and chemicals that can be harmful to the body, triggering diseases[3]. To consider potable water, the physical, chemical and microbiological parameters shall be in accordance with Administrative Rule N. 2.914 of December 12, 2011 the Ministry of Health of Brazil, which provides control procedures and quality surveillance water for human consumption and its potability standards[4].

Groundwater may be removed from artesian wells, which are relatively impermeable, making it difficult to contamination or be removed free wells that are near the surface and more susceptible to contamination. The tanks are used due to their low cost drilling. In Vale Verde district, the health unit, dental clinics, schools, restaurants, bars, cafeterias, food products industries, and private homes, use the water collected in shallow wells, it is treated inadequately, without knowledge of their quality bacteriological and parasitological. All respondents use water for drinking, cooking and bathing.

Almost 100% of the final destination of the sewage generated in the district are the pits, the "open air" or cast into the stream that cuts through the district. These actions contribute to the contamination of groundwater by pathogenic microorganisms and/ or harmful substances and chemicals the health of residents.

The general objective is through microbiological parasitological analysis is to determine the quality of water used for drinking, recreation and food cultivation in the Vale Verde district, Mina Gerais, Brazil. As a specific purpose it is intended, as soon as the outcome, determine initiatives to be taken to mitigate potential contamination of the population. In case of being unfavorable, inform the public and instruct there measures to be taken in order to improve the quality of water they consume, and alerting agencies and authorities so that action is taken.

2. MATERIAL AND METHODS

It was evaluated water from Vale Verde district, located in the State of Minas Gerais, Brazil. The same has 2088 inhab. in an area of 28.0 km^2, density of 74.57 inhab./ Km^2 according to the 2000 Demographic Census

(IBGE).

Data relating to the characteristic of the wells were obtained through household surveys, with the application form prepared with closed questions. Data on water quality were obtained by bacteriological analysis (describing the presence or absence of coliforms total/ fecal-thermotolerant, among other bacteria), and parasitological analysis (to identify larvae, trophozoites, cysts and parasites eggs). Water quality was evaluated by results obtained in bacteriological analyzes, compared with the values recommended in Administrative Rule N. 2.914 of December 12, 2011 the Ministry of Health of Brazil.

Eight samples were taken at different points, all samples were collected in sterile jars (sterilized by autoclaving) without manual contact and/ or any contaminant, and were taken to the laboratory for analysis. Samples were analyzed for microbiological character and parasitological aiming the characterization of the presence of total fecal coliforms, and cysts, trophozoites, eggs and larvae of parasites. Each sample was analyzed separately by the same methods. For microbiological analyzes were used the method of chromogenic substrate using as Colilert® reagent. To carry out the parasitological analysis was used Hoffmann Method, Pons and Janer (Lutz) (spontaneous sedimentation).

3. RESULTS

We found that 62.5% of households consumed water did not receive any treatment. Having originated from shallow wells 75% excavated manually, up to 20 meters deep 37.5%, which raised the water was made by pumping 87.5%. We highlight the percentage of households where the distance between the well and the closest pit is less than 10 meters 37.5% (See Table 1).

Table 2. Characteristics of wells where water samples were collected for laboratory analysis in the Vale Verde district, Ipaba - MG, 2014.

Characteristics	%	Total
Type of water well		
Manual excavation	65.5	5
Drilling with drill	25	2
Unknown	12.5	1
Well´s depth		
Up to 5 m	12.5	1
5-10 m	25	2
10-20 m	37.5	3
Over 20 m	25	2
Type of water harvesting		
Pumping	87.5	7
Manually	12.5	1
Distance between the well and the nearest septic tank		
5 – 10 m	37.5	3
10 – 20 m	12.5	1
over 20 m	37.5	3
Unknown	12.5	1

As for the final disposal of domestic sewage from households where the survey was conducted, 50% intended in tanks and 50% in river (See Table 2).

Table 2. Origin of the water, pretreatment and disposal of sewage in the Vale Verde district, Ipaba - MG, 2014.

The water used for human consumption receives pre-treatment?		
Yes	37.5 %	3
No	62.5%	5
Water source used for human consumption		
Yes	75%	6
No	25%	2
Domestic sewage Disposal of		
Yes	50 %	4
No	50%	4

Analyzing the microbiological content of the samples, it was found that 100% of the samples were contaminated by fecal coliforms and total, in 37.5% of samples found the parasites: *Giárdia lambia, Entamoeba histolytica*, and *Entamoeba coli;* 25% *Isospora belli;* 12,5% were identified parasites *Balantidium coli*, *Strangyloides stercoralis* and *Entamoeba sp*.

Table 3: Distribution of parasites found in the Vale Verde district, Ipaba - MG, 2014.

Local	**Found parasites**
Sample 1	*Entamoeba histolytica; Giárdia lambia*
Sample 2	*Balantidium coli; Entamoeba coli; Entamoeba histolytica* *Giárdia lambia; Isospora belli; Strangyloides stercoralis*
Sample 3	*Entamoeba histolytica; Entamoeba sp; Giárdia lambia; Isospora belli*
Sample 4	*Entamoeba coli; Entamoeba histolytica*

4. DISCUSSION

The wells studied were superficial, shallow type, drilled manually, located in unconfined aquifer, located up the bedrock. In the study all samples contained the presence of coliform bacteria, indicating that the water is unsafe for human consumption. The presence of fecal coliform bacteria indicates the possibility of contamination by feces and therefore pathogenic microorganism.

5. CONCLUSION

Water contamination of groundwater located in the Verde Valley District Minas Gerais, Brazil is proved by the results of microbiological and parasitological analysis of water samples collected in the district wells. The water does not meet the potability standards recommended in Administrative Rule 2. 914 of 12 December 2011, of the Ministry of Health of Brazil. Thus, the consumption of water is a risk factor to health. It is necessary to evaluate the quality of groundwater in other areas of the district, as on-site consumption of groundwater is high and widespread.

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