DRINKING WATER BACTERIOLOGICAL EXAMINATION IN VIZAINAGARAM DISTRICT,ANDHRA PRADESH

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Abstract

Water is one of the indispensable resources for the continued existence of all living. Things including man, however in recent periodconsumption of drinking water contaminated with faecal originated pathogenic bacteria have increased which is responsible for the onset of water borne disease with outbreaks especially in developing countries. In the present study for a period of one year, 253 drinking water samples from different mandals in Vizainagaram district, Andhra Pradesh were assessed for the bacteriological quality and pot ability.

Keywords: pot ability, indispensable sources, contaminated, bacteriological quality

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1. Introduction

Water is the essential prerequisite of agriculture and industrial production, the source of food needed for thesurvival of life. Thus, life on earth is entirely and exclusively dependent on water. Even though water covers more than 70% of the earth; only 1% of the earth's water is available as a source of drinking and most part of it is in pollulated and contaminated form, Water-related diseases continue as a major health problemglobally.Diseases caused by drinking of water contaminated by human or animal excretions, which contain pathogenic microorganisms. Include cholera, typhoid, amoebic and bacillary dysentery and other diarrhea diseases. An estimated 1.8 million deaths (4 million cases) in 2010 due to gastroenteritis (WHO) 88% due to unsafe water and poor sanitation. Current WHO bacteriological guidelines 4 for drinking-water recommend zero fecal coli forms per 100 ml of water. The majorities of the populations in developing countries are inadequately supplied with potable water and are thus bound to use water from sources like shallow wells and bore holes that have high potential of contamination and provide the unsafe water for domestic and drinking purposes (WHO, 2011). The present study was aimed to investigate thebacteriological water quality changes of various potable sources in Vizainagaram district.

2. Materials And Methods

2.1 Study area

Vizainagaram is a north coastal town in Andhra Pradesh anddistrict head quarter of Vizainagaram district. Vizainagaram is located at 18.42N .84.01E and spreads across an area of 2,254 sq mi. The district is skirted to a distance by Kandivalasagedda, Vamsadhara and Bahuda at certain stretches of their course white aline of heights of the great Eastern Ghats run from the north east. The district is bounded by Vizinagaram District in the South and west, the state of Orissa lies to the north of Vizainagaram, while the Bay of Bengal is the eastern boundary of the district. The climate of Vizainagaram district is more or less chacterized as humid .The highest temperature recorded in Vizainagaram was 38.5°C (110°F) and in the winter as low as 19.6 have been recorded. Lot of rainfall is brought in the region by the south -west and north –eastmonsoon winds. The average rainfall in
the district in the region is quite high. According to 2011 census, Vizainagaram has a population of about 2,699,471 (rural area 83.84%, urban 16.16 %.) Vizainagaram has secured 360 rank in the sanitation ratings byMoUD(Ministry of Urban Development) in 2010.Prominently people in Vizainagaram district uses open wells and hand pumps. According to recent AP health department statistics (2009 – 12), approximately there are
18312 ways of water resources in Vizainagaram. Approximately 3980 open wells and 705 ponds which are
unsafe to drink water., Overall work plan of this study is to find different sources of pollution, kind of pollution to drinking water and its microbiological study.Bacteriological analyses were performed according to the standard methods prescribed by APHA (1995) and AWWA (1995).

2.2 Sample Collection

A total of 253 samples water samples were collected randomly over a period of one year from April 2010 toMarch 2011, from different mandals in Vizainagaram district.Water samples were collected in 200 ml capacity sterilized containers from various sources generally bore well supplies and Public water supplies by following standard water collection techniques. These water samples were transported to microbiology lab within twohours of collection.

2.3 Total Coliform Bacteria/fecal Coliform Bacteria

The MPN of total coliforms bacteria were determined by multiple tube fermentation technique prepared each of
separate sets of 10 tubes of Lactose broth (LB). Inoculate each of the 10 tubes of 10 ml double strength LB with 10 ml of the undiluted water sample. These LB tubes along with inverted Durham tubes were incubated at 35 °C± 0.5 °C for 24 and 48 ± 2 hrs after inoculation. Tubes were examined for gas production at the end of 24/48 hrs incubation. Gas production was measured by gas displacement in the inverted vial and also effervescence produced when the tube was gently shaken. Positive tubes with gas formation and turbidity were sub-cultured into BGB (Brilliant Green Lactose bile broth and E.C. Broth having 10ml broth with inverted Durham tubes by means of 3 mm loop. All BGB tubes were incubated at 35 °C and E.C. Broth tubes at 44.5 °C for 48 hrs and examined for gas production. The number of coliforms per 100 ml of water was then calculated fromthe distribution of positive and negative tubes in the test by referring to MPN table. Presence of coliform bacteria is anindication that disease causing bacteria also may be present and that water is unsafe for drinking.

2.4 Results of Bacteriological Analysis of Drinking water

The Bacteriological analysis results are presented in Table 1.The highest coliform bacteria 18 MPN/100 ml was recorded in Akulakatta village of Badangi mandal sample being bore water supply and the least coliform bacteria 2MPN/100 ml from

Baguvalsa village of Garividi mandal, sample being from bore well. The values 7MPN/100 ml, 8 MPN/100 ml, 8 MPN/100 ml, 9 MPN/100 ml, 10 MPN/100 ml, 13MPN/100 ml, 15 MPN/100ml and 17 MPN/100 ml, were detected in samples collected from B.g.palem village of Garividi mandal, Avagudem village of Garividi mandal, Arthamuru village of Garividi mandal, Bangarrajupeta village of Denkada mandal, Amakam village of Denkada mandal, Akkivaram valasa village of Denkada mandal, Badangi village of village of Badangi mandal, and Anavaram village of Badangi mandal.

Table 1: Bacteriological Analysis of Drinking water of different water sources

S.no	Lab Ref no	Mandal / Village	Source	Coliform MPN/100ml
1	030	Badangi / Akulakatta	BW	18
2	035	Badangi / Anavaram	OW	17
3	037	Badangi / Badangi	BW	15
4	040	Denkada / Akkivaram	BW	13
5	048	Denkada / Amakam	BW	10
6	010	Denkada / Bangarrajupeta	BW	9
7	045	Garividi / Arthamuru	BW	8
8	016	Garividi / Avagudem	BW	8
9	033	Garividi / B.g.palem	PWS	7
10	024	Garividi / Baguvalsa	BW	2

BW= bore well, PWS =Public water supply, OW =other water, MPN= Most Probable Number

3. Discussion

It has been prearranged that the microbial density in potable drinking water should be zero in 100 ml of water sampled (WHO, 2003). The finding of microbes of faecal source in the current study revealed that the water was not secure and might serve up as a latent basis for the conduction of these microbes to persons who drink this water. Majority of the Bore well water studied were without protective covers and buckets used in taking water from all the Bore wells from all locations were left carelessly on the ground after fetching water and were not the wells they can seeps down and the sanitation around the bore well and public water supply were not maintained in proper way this conditions may pose potential health problems to those using the water from such unhygienic surroundings. In this study it was scrutinized that the majority of bore wells were not accurately protected thus exposing them to pollute from human and animal wastes as well as surface runoff. Community healthinterventions to develop the water quality with chlorination, use of ceramic filter technology, boiling and as well as developing the whole hygiene inside the inhabited locality should be instituted. Developing hygiene has been revealed to have better impacts as it leads to improve the water quality at the source (Esrey, 1996.)

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4. Conclusion

Bacteriological quality of drinking water showed that contamination of the water was rising frighteningly and that it has shaped severe risk to human health and surroundings. These outcomes obviously indicate that the quality of the water\consumed in district Vizainagaram is threat for spread of communicable diseases and additional healthiness issues. Contamination of these water sources will continue unless effort is put into pollution prevention. Pollution control strategies should include; Public health training, awareness of methods of transmission of pathogens, and organized waste disposal system, along with practical steps at Community and Government levels in addressing the issue must not be ignored.

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