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HEALTH RISK ASSESSMENT TO CALCIUM IN DRINKING WATER OF RURAL RESIDENTS IN TARHADI AND ABHANPUR VILLAGE, MAHARASHTRA (INDIA)

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ABSTRACT

The present study was designed for the determination of essential trace element calcium in drinking water from natural sources likes Abhanpur Dam, Bore-Well (Tarhadi and Abhanpur village) and River (Tapti) of Tarhadi and Abhanpur villages(Maharashtra).sample were estimated as per Bureau of Indian standards (10500) for calcium concentration of calcium in sample water in Abhanpur dam, Bore-well and River(Tapti) was found the safe limits of World health organization guidelines for calcium and also study to evaluated and suggested that Bore-well (Tarhadi and Abhanpur) is the rich source of calcium and population consuming water from Bore -Well (Tarhadi and Abhanpur) would be less prone to calcium deficiency and risk associated with it as compared to population consuming Water from other Sources like River (Tapti) and Bore-well(Tarhadi and Abhanpur).

KEYWORDS: Calcium, Water, Safety levels, Dam (Abhanpur), River (Tapti), Bore-well.

INTRODUCTION

Calcium is the most Abundant the essential trace element in the Human body; make up about 15-20% of the total body Weight [<http://healthyeating.safegate.com/role-calcium-body-nutrition-1265.html>]. Calcium is essential to maintaining total Body health [Pista Pravina, Apr-Jun 2013]. the total Body Weight of an adult approximately 1.2Kg and 98% of the calcium in Bones [Pista Pravina, Apr-Jun 2013, Manuel Olivares, Ricardo Uauy]. The major function as a primary Structural constituent of the skeletons, Calcium is also important for the muscle Contraction and relaxation (including Normal Heart Rhythm). it also important for the Regulation of multiple enzymes and hormonal responses, Blood clotting ,nerve transmission, Vascular contraction and vasodilatation [Manuel Olivares, Ricardo Uauy]. calcium is a mineral that is an essential parts of bones and teeth [Guidelines for drinking water Quality ,2006]. normal range of calcium in drinking water as per Bureau of Indian standards (10500) is 75-200mg/L [Drinking water specification Jan 2006].

Calcium is used in treatment of Premenstrual syndrome, Leg Cramps in Pregnancy, High blood pressure in Pregnancy [<http://ods.od.nih.gov/factsheets/calcium-Health-professional>]. calcium is used in treatment and prevention of low calcium levels and resulting bone conditions including rickets, osteomalacia and osteoporosis [A. Prentice 2007].

Deficiency of calcium causes osteopenia while if untreated can lead to osteoporosis .the risk of bone fractures also increases, especially in older individuals calcium deficiency also causes rickets. [<http://ods.od.nih.gov/factsheets/calcium-Health-professional>]

Hence overall objective of this present study is to quantitatively estimation the amount of essential trace element calcium in the drinking water [Guidelines for drinking water Quality 2006]. to ensure the required and safe levels of calcium in drinking water to fulfill the requirement of body as per Bureau

of Indian standards specification (IS 10500) From different natural sources such as River (Tapti), Bore-Well (Tarhadi and Abhanpur) and Abhanpur Dam.

MATERIALS AND METHODS

1. Collection of water samples-

Different samples of water such as Bore-well (Tarhadi and Abhanpur) River (Tapti) and Abhanpur Dam of Tarhadi and Abhanpur region was selected for the Study water samples were collected with care to ensure that no contamination occurring at time of collection or prior to estimation .plastic bottles of 500ml capacity were used for trace element estimation .washed with Nitric acid (4%) rinsed five times with distilled water ;dried and filled with water leaving no air space and tightly closed with plastic closures to prevent any leakage .Each container was clearly marked with name and date of sampling.

2. Sampling from Bore-well (Tarhadi and Abhanpur)-

To the discharge tap of mechanical pump fitted to bore-well .water was pumped to waste for four to five minute and the collection of samples.

3. Sampling of River and Abhanpur Dam-

For collection of water samples from Dam and River, Bottles hold in hand near base and plugging its neck downward below the surface and turned until the neck points moderately upward, the mouth being directed against the present.

4. Evaluation of water samples-

Evaluation of water samples was carried out as per Bureau of Indian standards (10500) for the safe water quality parameter of calcium. [Drinking water specification Jan 2006]

RESULTS

Concentration of calcium in all water samples were found the safe limits of world health organization guidelines and concentration of calcium was found greater than normal in water samples of Bore-well (Tarhadi and Abhanpur) in Tarhadi and Abhanpur region.

Table no.1 concentration of calcium content in water samples of Abhanpur Dam, River (Tapti) and Bore-well (Abhanpur and Tarhadi) of Tarhadi and Abhanpur region.

Concentration of calcium in mg/L				
Sample no.	River(Tapti)	Bore-well(Tarhadi)	Abhanpur Dam	Bore-well(Abhanpur)
1	112.70	166.69	62.63	170.34
2	106.04	174.24	69.40	153.69
3	111.23	178.02	82.64	188.49
4	109.50	190.40	59.40	179.31
5	115.39	188.05	74.89	190.53

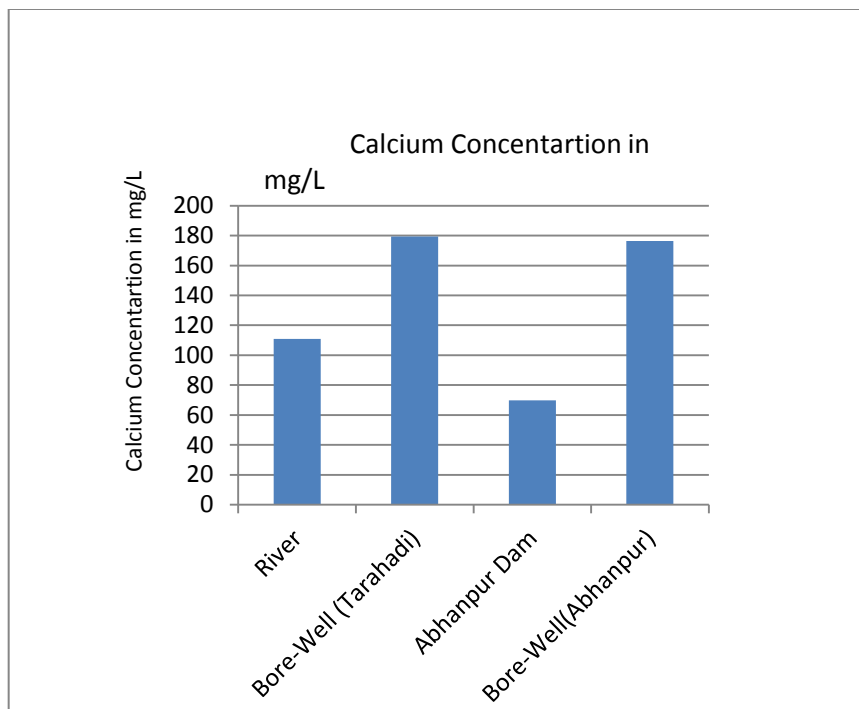


Fig.no.1 Concentration of calcium in water samples of River (Tapti), Bore-Well (tarhadi), Abhanpur Dam and Bore-well (Abhanpur) of Tarhadi and Abhanpur region.

DISCUSSION

Quantitative estimation of calcium in water samples from natural sources of Tarhadi and Abhanpur region found that concentration of calcium is within acceptable safe limits as per World Health organization guidelines of calcium and concentration of calcium was found high in water samples of Bore-well (tarhadi and Abhanpur) compared to River (Tapti) and Abhanpur Dam therefore this study it can be suggested that population consuming water from Bore-well (Tarhadi and Abhanpur) from getting more calcium as compared to population consuming water from River (Tapti) and Abhanpur Dam. Population consuming water from Bore-well (tarhadi and Abhanpur) will be less prone to calcium deficiency like Rickets, Osteomalacia and Osteoporosis.

CONCLUSION

Quantitative estimation of calcium in water samples from natural sources of Tarhadi and Abhanpur region showed that concentration of calcium is within acceptable safe limits as per WHO guidelines and population consuming water from sample Bore-well (tarhadi and Abhanpur) will be less prone to calcium deficiency and Health risk associated with it.

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Conflict of Interest- None.

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