

Community Perception on Fluoride and Related Health Problems in a Fluorotic Area in Ethiopia

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SUMMARY: An exploratory qualitative survey was conducted to describe the knowledge, attitude and perception of the community regarding fluoride and related health problems in an area with endemic fluorosis. The study was carried out in Wonji-Shoa Sugar Estate, an agro-industrial community in southeastern Ethiopia.

To this effect, six Focus Groups were identified, each of 8-10 participants, to represent the various segments of the population in the area. Then a series of six Focus Groups Discussions were carried out in a community setting led by the investigators.

The results showed that the health consequences of consuming untreated water are fairly understood. However, there is still a knowledge gap and a wrong perception concerning fluoride and its health consequences particularly among. This study has also showed a positive attitude of the community towards taking an active part in future efforts in providing the community with a safe water supply. It is recommended to provide health education to the community with emphasis to the women from the lower socioeconomic segment of the community and to address the perception issues further in future large-scale studies using a combination of qualitative and quantitative methods.

Key words: Fluoride, community perception, Ethiopia, Wonji-Shoa area, focus group discussions, health education.

INTRODUCTION

Chronic exposure to excessive fluoride may cause toxic damage to osseous tissues, which manifests as dental and skeletal fluorosis. The toxic effects interfere with the mineralisation process and the defects that result are in general irreversible. In the majority of affected communities, fluorosis is attributed to ingestion of excessive fluoride from drinking water¹.

In Ethiopia by 1990, about 150 communities and natural water bodies had been tested for fluoride levels by the Ethiopian Water Supply and Sewerage Authority and several other institutions and individual researchers²⁻⁷. Of the 65 localities studied in the Rift Valley, 47 had fluoride levels above 1.5 mg/L, 31 of them with concentrations of 5 mg/L and above, and 7 between 20 mg/L and 177 mg/L. Of the 85 localities in lowlands outside the rift system and in the Ethiopian highlands, 11 had concentrations

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above 1.5 mg/L, 3 of them, all in the high lands above 1,800 m elevation, around 5 mg/L.

In view of the increased emphasis on safety of drinking water, public health and water managers are confronted with an important question relating to the priority of fluorosis in the perspective of other complex life threatening problems that are common in the less developed countries. Moreover, if the WHO recommendation of 1.5 mg/L as the maximum permissible concentration of fluoride in drinking water⁸ is to be used as a standard, most of the boreholes in the affected regions would be closed down. The problem is further aggravated by limited budgets, which renders the feasibility of established defluoridation technologies or provision of alternative waters uncertain in the majority of the areas. In addition, since the economic cost of endemic fluorosis to human beings is largely indirect, the possibility of recognition as an area of immediate need by the governments in the less developed countries seem unlikely.

However, given that endemic fluorosis is an important public health concern in the area^{7,9,10} as in the planning of public health strategies one should explore the possibility of mobilising the community at risk to use possible less technical methods to protect themselves. For this to be feasible, some understanding of the knowledge, attitude and perception of the affected communities is required.

The objective of this study is, therefore, to assess the knowledge, attitude and perception of the community about fluoride and fluoride related health problems with a view of identifying entry points for preventive intervention.

METHODS

The study was conducted in the Wonji-Shoa Sugar Estate (WSSE) in the Rift Valley region of Ethiopia. The region has a number of agro-industrial establishments the most important are the WSSE and the Metahara Sugar Estates. WSSE is an agro-industrial community situated 10 km from south of Nazareth City and 110 km southeast of the capital Addis Ababa. At present the estate stretches over an area of 50 square km. The WSSE community has an estimated population of around 20,000 organised in sixteen villages, two factory villages and fourteen plantation villages. The community of the estate has largely depended on well water with high fluoride contents ranging from 1.7 mg/L to 17.7 mg/L. Both dental fluorosis and skeletal fluorosis has been reported from WSSE^{7,9,10}.

Six Focus Groups were identified representing the various segments of the population in the area, cf. Table 1. Participants were invited to take part on a voluntary basis. In each focus group, 8 - 10 persons participated. Qualitative research technique was used, as a series of six Focus Group Discussions (FGDs). The FGDs were conducted among men (3 groups) and women (3 groups). The two groups of women and two groups of men were from plantation sites representing the low socio-economic segments of the community, while one group of women and one group of men were

representing the higher socio-economic or educated segment of the community. The study was carried out in June 2000.

TABLE 1 Grouping of in the Focus Group Discussions.

	I	II	III	IV	V	VI
Focus Group						
Higher/Lower socioeconomy & education	L	L		L	L	
			H			H
Gender Men/Women	W	W	W	M	M	M

Table 2 Focus Group Discussion Guide – discussion themes

9. What are the major and priority health problems in your locality?
10. How do you assess the sources, adequacy, safety and quality of the water supply in your locality?
11. What health related problems do exist due to the water that you use in the locality, particularly dental and skeletal complications?
12. Knowledge, perceptions and attitude of the community regarding dental and skeletal problems due to the water use?
13. Discuss any health, social and economic consequences due to the dental and skeletal problems as a result of the water consumption.
14. Did any of you hear about the term “fluoride”? Explain what it does to your health.
15. Have you ever been taught or informed about fluoride-related problems and their consequences here in the locality?
16. What do you think should be done to solve fluoride-related problems? How far are you ready to participate in any endeavour to find solutions for these problems?

The discussions took place in community settings, where the participants were comfortable. Quiet and private locations were selected for this purpose. The co-principal investigators of the study moderated the discussions. Participants were maximally stimulated to express their opinions freely. The discussions were conducted in the local language, Amharic.

A pre-structured discussion guide was used to lead the discussion cf. Table 2. All discussions were tape-recorded and later transcribed and analysed manually by the investigators. The transcribed information was categorised and summarised for presentation in the narrative form.

RESULTS

Major and priority health problems in the locality. Across all the groups malaria stood as the most important health problem. This was then followed by other water born parasitic diseases i.e. amoebiasis, bilharziasis, giardiasis, and by respiratory problems. The men groups and the women from the higher socio-economic segment of the community mentioned teeth discoloration and bowing and stiffness of the back, stiffness of the joints as next priority health problems. The women groups from the plantation villages failed spontaneously to consider teeth discoloration, bowing of the back and difficulty in turning the head as important health problems.

Community perception towards drinking water. All groups mentioned three types of water: a) treated borehole water supplied in pipe for drinking, b) untreated borehole water supplied in pipe for other domestic purposes and c) raw river water flowing in irrigation canals. It was emphasised that the supply of treated water, type a, was often discontinued and people are forced to consume mainly water b and to less extend c. The discontinuation sometimes lasts for months and even years in some camps.

When available, the treated water supply was considered to be adequate. Women groups from the plantation sites particularly emphasised that water was not at all a mention-worthy problem in their locality. They went to such an extent and said that *“one can never choose water like one can not choose his-her mother”*. Whereas women from the higher socio-economic segment of the community have complained about the unavailability of treated and safe water continuously. They incriminated the water types b and c cause diarrhoeal diseases. They also attributed the teeth problem and bowing of the back to the use of the untreated pipe water, type b, and not to the use of water a or c.

The two groups from higher socio-economic segment of the community said that in order to protect their children from teeth discoloration they, whenever possible, bring water from Addis Ababa.

Perceived health problems of water use. Across all groups it was felt that the treated pipe water, in the contrary to the two other water types, was very safe for consumption. The water type c, coming along the irrigation canals from the Awash River was assumed to cause bilharziasis, and malaria. The water type b, piped untreated borehole water, was assumed to cause giardiasis, amoebiasis and other intestinal problems as well as discoloration, fragility and loosening of teeth and bowing and stiffness of the back.

All, except the women from the plantation sites, were quite knowledgeable about the existence of the dental and skeletal problems arising due to drinking water from the untreated sources. The women from the plantation sites were clearly ignorant regarding the fluorosis problems.

There was a consensus in most groups from the plantation sites that tooth discoloration is so rampant that it has never been considered as something abnormal in their communities. The teeth problems were reported to start at early ages and are

extremely widely prevalent. Yet, it is not commonly perceived as a major problem because of the wide spread prevalence to the extent that it has become the identity of being a resident of Wonji in other parts of the country. Their only concern was in those severely affected the teeth were weak and fragile and this creates difficulty in chewing hard food. On the other hand those groups from the higher socio-economic segment of the community had a clear concern and worry that theirs and their children's teeth were discoloured and anaesthetically looking. That is why some of the residents particularly those with a higher socio-economic status brought water from places as far as Addis Ababa for drinking purposes. These are the few households who can afford. For most this was just unthinkable. Concerning functionality, all agreed that healthy teeth should be able to chew "anything edible", be it soft or hard food like dry bread, sugar cane and the like.

It was also mentioned by most groups that prolonged consumption of the untreated pipe water led to the bowing of the back, stiffness of the joints in the later ages of life. These were said to be very much prevalent among the factory workers and among the old.

Fluoride and fluorosis: Though water was ascribed to be the cause of the teeth and skeletal problems described by most of the discussants, when a question was raised about the exact etiologic agent, the opinions were diverse. Some said that this is due to the rusting of the pipes, others said it is just due to the nature of the untreated pipe water, many said that they had no idea at all. A few of them mentioned that it might be because some "minerals" which are found in water in large amount. The word "fluoride" was hardly known among the various participants, particularly the women and also the men from the plantation sites. The well-off men were very much knowledgeable on this issue. Discussants from the plantations particularly the women were completely ignorant. They were repeatedly probed for it, yet they were not able respond. Most men and women from the higher socio-economic group were well conversant about the term fluoride, problems related to very high levels of it in the water and about its health consequences.

Health workers from the hospital as well as others have carried out several campaigns on health education. The topics were mainly about malaria, environmental health, tuberculosis, vaccination and so on. But most of the FGD participants said that the fluoride related problems have either been avoided or mentioned shortly. Almost none of the discussion groups mentioned to have been actively taught about fluoride related problem at all.

Health and socioeconomic consequences: Most of the participants did not think that the teeth discoloration is a problem. Yet the younger ones said that, when going to other areas, they were singled out as people from Wonji. The girls particularly felt a bit ashamed of having such discoloured teeth. They often had to cover their mouth while laughing. There were also many who could not eat hard foods and their teeth were often foul smelling, very fragile and painful. Older people were reported to be at

risk of bowing and stiffness of the back and the joints and this interferes with their day to day activities.

There was some difference among the seasonal workers and the permanent ones regarding their dental health. The seasonal ones said that they were laid-off for some time during summer and hence they went to their families in the countryside where they consumed clean spring water and hence were less likely to develop the teeth and skeletal problems.

Economically, bowing and stiffness of the back and joints resulted in early retirement for some individuals. Weak and fragile teeth interfered with chewing, particularly hard food that is essential part of the diet in the plantation villages.

Preventive measures: Concerning possible solutions some groups suggested that the water from the river is relatively safe and that water should be pumped, treated and distributed for consumption. Some families are bringing drinking water from remote places like Addis Ababa, however, it was agreed, this could not solve the problem of the community. All the discussants expressed willingness to participate in any public health activity intended to provide the community with a safe water supply in a continuous basis.

DISCUSSION

This study is exploratory in nature and a statistically representative sample was not intended. Hence, the findings should be interpreted with this limitation in mind. However, since the various focus groups are selected in such a way that they represent the different age groups, genders, and socio-economic segment of the community studied, we believe that the study gives a realistic impression of the issues addressed.

To our knowledge so far, there are no studies reported describing knowledge perception, attitude and health seeking behaviour of inhabitants residing in fluorotic areas. It was also very difficult to obtain international literature dealing with similar issue. Hence, it was not possible to compare and contrast the finding of this study with others.

In our study dental fluorosis was not considered as a major and priority health problem by most of the groups. This may be due to its developmental nature and the fact that often it is painless and non-life threatening. Also this may be due to the fact that it affects the majority of people at such a large scale that discoloration of the teeth being considered as a community norm. Nevertheless, it was viewed by some as an embarrassing public health problem particularly for girls, and it became a concern for everybody when it causes pain and interferes with feeding.

The groups from the higher socioeconomic segment of the community were fairly knowledgeable about fluoride and its health consequences. On the other hand, the lack of knowledge concerning fluoride and its health consequences in women from the lower socio-economic segment of the community deserves due attention and action. Since most of these women are in the childbearing age, education would have

a great impact. This should be incorporated to the routine health education given in the villages. Another concern coming out of this study is that health workers seem to have avoided teaching about fluorosis and what do about it. Many respondents said that they were told nothing about fluorosis from professionals. This may have happened out of the frustration of the health workers themselves, because most of the defluoridation attempts have been either not fully successful or not sustainable.

The reported economic consequences to persons affected by skeletal fluorosis should also be of concern. From the discussions of the study one can learn that those who have lived for long time in the locality do develop severe skeletal fluorosis and as a consequence are either put on low payment jobs or laid-off. It is therefore, not difficult to understand the consequences in the family and the community at large. Most of the discussants, particularly plantation workers, expressed frustration and helplessness saying that they are going to end in such situations.

All groups expressed willingness to participate in activities directed at improving the provision of safe water to the community. This, supplemented by health education, will be an important asset for future defluoridation programmes.

In conclusion, this study indicates that the health consequences of consuming untreated water are fairly understood. However, still there is a knowledge gap and wrong perception concerning fluoride and its health consequences, particularly among women from the lower socioeconomic segment of the community. Hence health education should be given to the community with emphasis to this group. This study has also showed a positive attitude of the community towards taking an active part in future efforts in providing the community with safe water. To address these issues further future large-scale studies using a combination of qualitative and quantitative methods are recommended.

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