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PRODUCTION OF APPROPRIATE FOOD: sufficient, safe, sustainable

## IMPACT OF THE USE OF DOMESTIC WATER FILTERS ON HEALTH IN A RURAL INDIAN POPULATION

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### 1. Introduction

Diarrheal diseases are a major cause of morbidity and mortality, especially among children in developing countries [1] and in India [2]. The fecal contamination of water for human consumption, is one of the biggest risks for public health in India [2]. Although largely preventable and / or treatable, diarrhea is estimated to be the cause of over 840,000 deaths each year [3]. Diarrhea frequently also contribute to chronic malnutrition, because of reduced physical and mental growth, as a result of the inability to absorb the nutrients in food. In India, 47 per cent of households do not use any method of purification for water coming from sources often contaminated [4].

The interventions most used for the improvement of drinking water quality at the household level in low-income countries are, among others, chlorination, filtration, solar disinfection, combined flocculation disinfection and appropriate storage [1].

This study aims to evaluate the impact of candle filters use for home purification of drinking water in a rural population of Darenchigre area, in the state of Meghalaya (North East of India); in particular with reference to gastro-intestinal diseases and in relation to the origin of the water used.

### 2. Materials and methods

Ceramic candle filters (made in India) were distributed to 136 families in the rural area of Darenchigre. After 6 months, two types of questionnaires were administered, one in 100 families with filters (FF) and another to as many families without filters (FSF). The compilation of the questionnaires was done going from house to house. The information required, in addition to common infos related to family members, concerned the origin of water, the use of that filtered and the type of health problems observed within the family in the previous 12 months, keeping apart the last 6 with filters use. For the FSF, we requested the same information (excluding those relating to filtered water) and health problems observed during the last 6 months from the day of the survey. The data were processed using Excel software both to build the database and to process a summary of statistics such as the average, maximum, minimum, and standard deviation of household members and the frequency (%) of the different health problems in controlled families.



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### 3. Results and discussion

Analysis of the questionnaires, revealed that the FF (91 responses) and FSF (94 responses) were grouped in the same geographic area. The average number of family members was  $6 \pm 2$  for both the FF that for the FSF with a minimum of 2 and a maximum of respectively 10 and 12. The source of the water to drink was the open well (for 99% of the FF and the 100% of the FSF), known to be easily subject to faecal contamination [2]. In FF, the filtered water was used by all members and almost exclusively for drinking, one family of all FF said also use it for cooking. Health problems reported without the use of the filters were found to be similar in both groups of families and dominated by diarrhea (51% of FF and 28% of the FSF) and in any case by abdominal pain (47% of FF and 45% of the FSF).

With the use of the filters, the families who have declared to have no health problems has increased significantly. There was also a nearly-disappearance of diarrhea and abdominal pain dropped respectively from 51% and 47% to only 1%. Problems related to the general malaise, jaundice, fever and headaches disappeared completely even if they were declared to be infrequent (1%). It is interesting to observe that FF have declared a higher presence of diarrhea and abdominal pain with reference to the period before the use of the filters. Without excluding that in the two periods the water contamination was different, it is possible that the remembrance of the problems were amplified in who was freed.

These results are consistent with those obtained by other authors, where it is stated that interventions to improve the microbiological quality of drinking water are effective in the prevention of diarrhea, for both adults and children [1]. In addition, a meta-analysis of 976 jobs, has shown that among all entries by home improvement of drinking water quality, filtration provides more consistent results, more effective and more sustainable in the prevention of the above mentioned health problems [1].

Still to understand why 15-27% of households without filters did not report health problems.

### 4. Conclusions and recommendations.

The introduction of filters for drinking water helps to significantly improve the health of families and consequently the general welfare; reducing at the same time, the problems of malnutrition and the costs of health care, especially for children. These results also suggest that the introduction of the use of filters makes it probably more conscious families about the health problems. Despite the availability of these simple to use filters on the local market, they are not yet widespread in rural families where other forms of drinking water supply of adequate quality are missing. Specific interventions targeted to rural populations, both to raise awareness and demonstrative, have to be taken into primary consideration (but not in their own right, since it serves the training for use and maintenance of the filters) and in research projects in the interventions of human development and sustainable economic.

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## 5. References

1. ClasenTF, Roberts IG, Rabie T(2006). Interventions to improve water quality for preventing diarrhoea (Cochrane Review) In: The Cochrane Library, Issue 3. Oxford: Update Software, 1-115.
2. David McKenzie and Isha Ray (2005). Household Water Delivery Options in Urban and Rural India. Stanford Center for International Development. Stanford University. Working Paper No. 224,1-59.
3. UNICEF and WHO. (Update 2014). Joint Monitoring Program for Water Supply and Sanitation, New York and Geneva, 1-78.
4. Jalan, Jyotsna, E. Somanathan and Saraswata Chaudhuri (2003) 'Awareness and the Demand for Environmental Quality: Drinking Water in Urban India', Indian Statistical Institute, Delhi, Planning Unit; Discussion Paper 03-05, 1-31.