ORIGINAL ARTICLE

Outbreak of Water-Borne diseases due to improper water management – A cross sectional study

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ABSTRACT

Floods are the most common natural disaster. Water-borne diseases are caused mostly by the natural calamities such as flood, cyclone, Tsunami and hence this article aimed to determine the outbreak of water-borne diseases due to improper water management. The study was done in Andhimanam village in Kanchipuram district. Over 370 household were covered and questionnaires were administered. 81% of the villagers consumed water through damaged pipelines and 19% used can water. Chi-square analysis proves that there is a significant association between the consumption of water through pipelines and number of hospital visits.

Key Words: Flood, water, management, pathogens

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INTRODUCTION

Poor water quality continues to pose a major threat to human health. Diarrheal disease alone amounts to an estimated 4.1% of the total Disability Adjusted Life Year (DALY) global burden of disease and is responsible for the deaths of 2 million people every year[(1)]. It was estimated that 88% of that burden is attributable to unsafe water supply, sanitation, and hygiene and is mostly concentrated on children in developing countries[(2)].Climatic changes are associated with heat waves, droughts, and floods which have significant impacts on human health. Floods enhance the effects of water-borne pathogens increasing the concentration of biological agents in surface water[(3)]. On the basis of national statistics collected by the Italian Ministry of Health, this work illustrates preliminary observations concerning outbreaks of water-borne diseases after flood events in Italy and presents options for an administrative response[(4)].. The water-borne infectious diseases taken into account are Legionellosis, Salmonellosis, Hepatitis A, cutaneous and visceral Leishmaniasis, Leptospirosis, and Infectious Diarrhea[(5)]..

Floods are the most common natural disaster also in India. Floods are due to significant rise of water level in a stream, lake, reservoir, or costal region[(7)]. Floods can kill people and cause direct or indirect diseases. They can damage the environment, infrastructure, property and cultural heritages[(8)].. However, the relationships between human health and problems of water quality and quantity are complex, and predicting the potential impacts of climate change on water-related diseases is still difficult[(9)].. Weather extremes contribute to the persistence of a number of water-borne diseases in the developed world. Consumption of contaminated water represents the main human exposure pathway linking extreme events to human health risk[(9)]. Despite improvements in public health and economic wealth, the incidence of intestinal infection still remains high and this situation could significantly worsen under the impact of climatic changes[(10)].Hence floods contributed to the impairment in the human health and hence it needs a detailed. Therefore this study focused on the need to analyse the waterborne disease associated with the flood that caused the detruction in many parts of Kanchipuram district.

MATERIALS AND METHODS:

The Study setting was Andhimanam village in Kanchipuram district.Duration of the study was 3 months (December 2016-March 2016).Total population of the Andhimanam village was 1143 (2011 census) and Door to door survey was done in the village.The study was conducted based on two methods which were the Observation method and Questionnaire survey. Based on observation method, Pipelines were used mostly by the villagers to use water for drinking and household purposes. A self administered questionnaire was given to the residents of Mappadu village in Thiruvallur district and were asked them to fill. The questionnaire covered the demographic details, Number of members in the house, education status, Occupation.The participants were asked regarding their hospital visit in a month.

Type of House, Toilet facilities, Drainage linked to home , Waste collection system, Annual income, source of water, Power and electricity information were obtained.The participants were recruited after getting their consent and the information disclosed by them was maintained privy from other participants of the study. Inclusion criteria were the Residents of Andhimanam village, Migrants to the village were included in the study. Exclusion criteria were the Differently abled people, villagers who were not interested were excluded from the study.

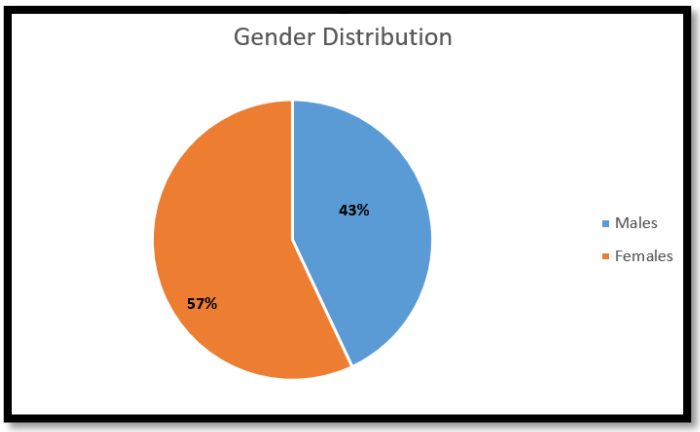
Statistical analysis was done using SPSS version 21.Data were entered in the Excel spreadsheet and

was transferred to the SPSS Software. Descriptive statistics was done and Chi-square association was done to determine the level of significance between the variables.p-value of 0.05 was considered to be significant.

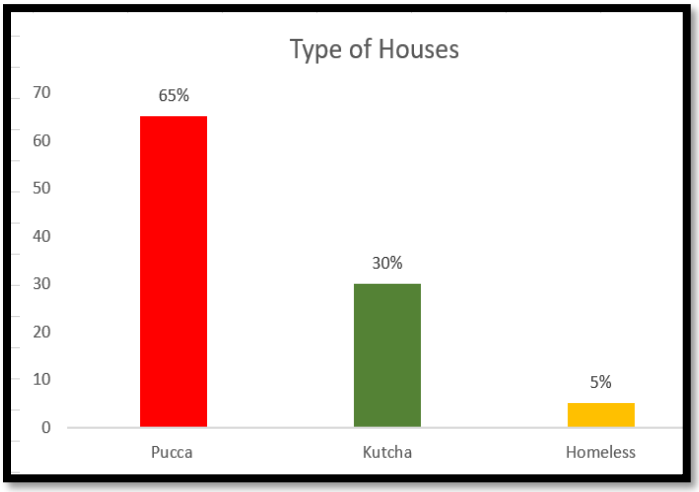
RESULTS

Totally 370 households and 1090 participants were involved in this study. Males were 467 and females 623 were present in this study(Fig 1).

Figure 1: Pie chart representing the gender distribution



Based on the question "Type of house"- 65% were residing in Pucca and 30% Kutcha houses 5% were homeless.(Figure 2)



71% of the household had covered drainage linked to the house and 29% had open drainage linked to the house(Table 1). 81% of the villagers stated that they drank water through the pipelines supplied to the community and 19% of the villagers stated they used through can water (Table 1). 78% of the villagers stated that they dispose waste at the common point and 22% stated that they burn the waste. No waste collection system was present in the village.

Test for significance

Chi-square association test was performed to determine the level of significance between water supply and hospital visit.There was a significant difference between water supply to the villagers and number of hospital visit per month among the participants.81% of the participants consumed water through the pipelines which was damaged and there was a frequent visit to hospital (3 times per month).

DISCUSSION

This study highlighted the point that the water borne diseases like typhoid, diarrhea were more common among the villagers after the flood due to consumption of water through the damaged pipelines. This study coincides with the study done in Thiruvallur district which was also due to the outbreak of the Acute diarrheal disease due to consumption of water from damaged pipelines[(11)].

When highlighting the solid waste management, 78% of the villagers disposed waste through common point and 22% the waste was burnt. The current study results coincides with the previous study done by Amy et al 2020, that urban biological vector-borne diseases, especially Aedes-borne diseases, are associated with solid waste accumulation but vector preferences vary over season and region[(12)]. Solid waste management needs to be considered and managed effectively to prevent the vector borne diseases permanently. Another study done in Kerala (Retheesh Babu Gopalan et al, 2021) also suggests a community awareness need to be created to protect the mankind from vector-borne diseases.

Table 1: Frequency distribution of study subjects

	Frequency(n)	Percentage(%)
Drainage linked to house		
Covered	773	71%
Open	317	29%
Waste collection system		
Pipeline water supply	882	81%
Can water	207	19%

CONCLUSION

We confirmed that the outbreak of water borne disease in Andhimanam village, Kanchipdistrict, Tamil Nadu was due to the consumption of faecal contaminated water supplied through damaged subterranean pipelines post-flood. We recommended replacing the damaged subterranean pipelines and distributing chlorinated water.

The limitation of the study was this study would have used a case-control design rather than using a cross-sectional design as the case-control study would have given a reliable result

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