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STATUS OF ENVIRONMENTAL SANITATION AND ITS RELATION WITH HEALTH: A PRELIMINARY STUDY IN DISTRICT HAMIRPUR, HIMACHAL PRADESH

ASHISH THAKUR AND RAJAN GAUR

ABSTRACT

Infectious and communicable diseases account for a majority of the health problems in our country. It has been reported that in our country, communicable disease or infectious diseases contribute to 27.5% of all deaths for which one of the main reason is lack of sanitation (GBD, 2016). According to World Health Organization (WHO/UNICEF JMP, 2015), 2.4 billion people worldwide were exposed to high risks of incidence and spread of infectious disease as they live under unsanitary conditions and have poor hygiene behaviours. Transmission of communicable or infectious disease is mainly caused due to unsanitary conditions. As the development of environmental sanitation services has been given attention in government policies, strategies and plans, the present study would help to scrutinize the accessibility, availability and utilization of the environmental sanitation services and hygiene facilities in Hamirpur District of Himachal Pradesh. Present study was based on a cross-sectional sample of 200 individuals from two blocks and 20 villages of Hamirpur District. The data was collected through a questionnaire that solicited information on socio-demographic and economic aspects, water supply, water disposal, excreta disposal, solid waste disposal and personal hygienic services. It was found that 98% of the population is literate. 100% households had private toilet facility in their premises and about 95% of the households had hygienic latrines. 82% (164) of the household had been disposing liquid waste in open. It was further found that 60% of the households burnt solid waste in their premises while 32% of the households dumped solid waste anywhere in the premises or outside the premises and only 8% out them deposited it in bins or common garbage area. Due to unsafe sanitary practices, there is increase in the burden of the disease in the community. More intervention or IEC (Information, Education and Communication) is required at the grass root level to improve the environmental sanitation of the area and to reduce the disease burden of the community.

Keywords: *Environmental sanitation, health, waste disposal, personal hygiene services*

Ashish Thakur, Center for Public Health, Panjab University, Chandigarh-160014, Email-drashishthakur@rediffmail.com; **Rajan Gaur,** Professor (Retired), Department of Anthropology, Panjab University, Chandigarh-160014, Email: rajan_gaur7@yahoo.com.

INTRODUCTION

Sanitation is the hygienic means of promoting health through prevention of human contact with the hazards of wastes as well as the treatment and proper disposal of sewage or wastewater. Hazards can be physical, microbiological, biological or chemical agents of disease. Wastes that can cause health problems include human and animal excreta, solid wastes, domestic wastewater (sewage, sullage, and grey water), industrial wastes and agricultural wastes. Sanitation generally refers to the access to and use of services and facilities for the safe disposal of human urine and faeces (Dobe *et al.,* 2011; WHO, 2018).

By definition, environmental sanitation is "the control of all those factors in man's physical environment which exercise or may exercise a deleterious effect on his physical development, health and survival" (Menzies, 1951). It is a set of actions directed towards improving the quality of the environment and reducing the amount of disease. Its chief concern is to improve the living conditions and hence, minimize health problems. To an extent, management of solid waste, industrial waste, as well as the topic of pollution and noise control, could be considered to fall under the purview of environmental sanitation.

The environmental sanitation indicator (ESI) is composed of indicators that are selected from the fields of environmental sanitation, socio-economics, public health and hydro sources. The variables generally include: water supply indicator, sewage sanitation indicator, solid refuse indicator, vector control indicator hydro resources risk indicator and the socio-economic indicator. According to the Basic Manual of the ESI, other information with regard to the municipalities and/or regions can be added to these indicators, when it involves unusual or relevant aspects related to environmental sanitation.

Sanitation Status around the World

According to WHO/UNICEF JMP (2015), about 2.4 billion people globally live under highly unsanitary conditions and have such poor hygiene behaviours that their exposure to risks of incidence and spread of infectious diseases are enormous. Worldwide one third of the people of of total world population do not have

Figure-1: Proportion of World population using improved sanitation facilities (%)

Source: WHO (2015), Map Production, Information Evidence and Reaearch (IER)

access to basic sanitation (Figure-1). They lack safe means of disposal of excreta and waste water. Despite continued efforts to promote sanitation, 40% of the world's population is still without basic sanitation. This number does not tell the whole story, sanitation coverage is often much lower in rural areas than in urban areas. For example, in Africa 84% of urban but only 45% of rural residents have access to basic sanitation. The numbers are similar in Asia where 78% of urban and 31% of rural residents have access to basic sanitation (WHO, 2000). In many cases, improving sanitation can be as simple as installing a well-designed ventilated improved pit latrine (VIP) or composting latrine. However, in other cases, improving sanitation will be more challenging, particularly in rapidly growing urban slums. Building improved sanitation facilities is a crucial health intervention, the full health benefits of which will not be realized without proper use and maintenance of the facilities and good personal and domestic hygiene (Carr and Strauss, 2001).

Safe drinking water, sanitation and good hygiene are fundamental to health, survival and development (WHO and UNICEF, 2006). Yet, 1.1 billion people in the world lack access to improved water supplies and 2.6 billion people lack adequate sanitation (Moe and Rheingans, 2006). Unsafe water, inadequate sanitation, and insufficient hygiene practices account for an estimated 9.1 percent of the global burden of disease and 6.3 percent of all deaths, according to WHO (Prüss-Üstün, *et al.,* 2008).

Sanitation Status in India

In the last two decades, efforts have been made to research environmental sanitation situation in India. Dwivedi and Sharma (2007) investigated the environmental sanitation, sanitary habits and personal hygiene among the Baigas of Samnapur Block of Dindori District, Madhya Pradesh. A total of 100 households comprising of 494 persons were studied for this purpose on a random sampling basis, by using pre-tested, structured schedules, through semi-participant method. The result of study indicated that, from the hygiene point of view, the environmental sanitation was though average but not very satisfactory.

Banda *et al*. (2007) did a study to understand the socio-cultural factors impacting water safety, namely attitudes and practices of water handling and usage, sanitation, and defecation habits, in upper caste and Harijans of rural Tamil Nadu, India, They found that all households stored drinking water in wide-mouthed containers and 30.9% of the households had toilets but only 83.3% used these. 74.2% of respondents defecated in fields. Hand washing with soap after defecation and before meals was common only in children under 15 years 86.4%.

Sharholy *et al*. (2008) found that municipal solid waste management (MSWM) was one of the major environmental problems of Indian cities. In the context of improvement in environmental sanitation, efforts have been made

by authorities but problems remain. Table-1 compares environmental sanitation situation in India in 1990 and 2015.

In the present study, an attempt has been made to investigate the characteristics related to the environmental sanitation practices in the Hamirpur District of Himachal Pradesh. Such investigations are needed in view of the prevalence of several diseases caused by lack of sanitation, which may be waterborne due to contaminated water (e.g., Traveller's Diarrhoea, Giardiasis and cryptosporidiosis, Dysentery, Salmonellosis, *Escherichia coli* infection, Typhoid Fever, Cholera, Hepatitis A, Hepatitis E, campylobacteriosis, etc.), or diseases transmitted by the faecal-oral route (e.g. Cholera, *Clostridium difficile*, Shigellosis /bacillary dysentery, Typhoid fever, Vibrio parahaemolyticus, etc). Moreover poor sanitary conditions may also give rise to diseases caused by viruses (Hepatitis A, Hepatitis E, acute gastroenteritis, Polio, Rotaviral infections, etc.), protozooans (e.g. Entamoeba histolytica, Giardiasis, Cryptosporidiosis, Toxoplasma gondii, Amoebiasis, etc.), and even by helminthes (e.g., tape worms, ascariasis and other soil transmitted helminthiasis) (Rottier and Ince, 2003). Such diseases eventually may result in stunted growth and malnutrition in children.

Table-1: Sanitation status in India

India	Sanitation coverage estimates					
	Urban (%)		Rural (%)		Total (%)	
	1990	2015	1990	2015	1990	2015
Improved facilities(toilet)	49	63	6	28	17	40
Shared facilities	16	21	1	5	5	10
Other unimproved	6	6	2	6	3	6
Open defecation	29	10	91	61	75	44

Source: WHO/UNICEF JMP, 2015

MATERIALS AND METHODS

The Sample: The present research work is basically a community-based survey. The study is dependent on a cross-sectional sample of 200 respondents from the Hamirpur District of Himachal Pradesh. Out of these, 164 were male and 36 females for the present investigation.

Data Collection: The present research investigation was conducted in the Hamirpur District of Himachal Pradesh State of North India. The data were collected by first author from year 2016 to 2018 from the people inhabiting the area and other stakeholders like Government officials and Gram Panchayat members. Out of the six development blocks in the Hamirpur District (namely Bhoranj, Barsar, Hamirpur, Nadaun, and Bijhari) 2 blocks, namely Bhoranj block and Barsar block, were randomly chosen for data collection. For this, chit picking system was used and two chits were taken out. To check the status of the environmental sanitation in these blocks, 10 villages were chosen, randomly. District and block headquarter towns were also included for data collection.

Both the qualitative and quantitative data were employed to facilitate the present research. Besides primary data, some data from reliable secondary sources has also been utilized for this study. The primary data was collected through a questionnaire that solicited information on socio-demographic and economic aspects, water supply, water disposal, excreta disposal, solid waste disposal and personal hygienic services.The secondary data was obtained from reputed news papers, random surveys, census, reports and records from the concerned government departments. The data pertaining to disease prevalence in the district was collected by the first author from the office of the Chief Medical Officer, IDSP Division, Hamirpur, Himachal Pradesh.

Before data collection, written informed consent of each respondent was obtained in the language he or she understood. Questions from each household were asked from head of the household. For data collection multiple stage sampling method was used. The sample of 200 respondents was divided into 9:1, ratio, i.e. 180 respondents from rural area and 20 from urban area (5 from each block headquarter and 10 from district headquarter). From rural area, 10 villages were selected randomly and from each village nine respondents were selected.

Study Area: Hamirpur District is located in the south-western part of Himachal Pradesh State of India. Himachal Pradesh is mainly mountainous with altitude ranging from 365 to 6975 meters above mean sea level. The district has five tehsils namely, Barsar, Bhoranj, Hamirpur, Nadaun and Tira Sujanpur. For development purposes the district has been further divided into six Development Blocks viz., Bamson, Bijhri, Bhoranj, Hamirpur, Nadaun and Tira Sujanpur (Census of India, 2011). The district has four towns, namely Bhota, Hamirpur, Nadaun and Tira Sujanpur. The district has a total number of 1,725 villages. In Hamirpur District, the ratio of rural to urban population is about 9:1. The economy of Hamirpur District is chiefly dependent on agriculture. All the inhabited villages of the district have the facilities of potable drinking water and electricity. As per Census of India (Census, 2011), Hamirpur had a population of 454,768 individuals, of which 217,070 were male and 237,698, were females. Statistical details of district Hamirpur are presented in Table-2.

Table-2: Statistical details of Hamirpur District (H.P.)

Actual Population	454,768	Child Sex Ratio (0-6 yrs)	887
Male	217,070	Average Literacy	88.15
Female	237,698	Male Literacy	94.36
Population Growth	10.19%	Female Literacy	82.62
Area Sq. Km	1,118	Literates	358,091
Density/km^2	407	Male Literates	180,555
Sex Ratio (Per 1000)	1095	Female Literates	177,53

Source: Census of India (2011)

RESULTS

The present results are based on an analysis of the structured questionnaires

administered to a total of 200 respondents in rural and urban area of district Hamirpur. Out of these, 92 respondents were graduates, 64 had education up to higher secondary level and 44 respondents had primary education. Among these respondents, 103 were employed in private sector, 21 in government service, 11 were farmer, and 26 respondents were retirees from government services. A large majority (98%) of the households of the respondents had piped water services in their houses. However more than 90% of the respondents did not use any extra precautionary or preventive measures before drinking water. In other words, they used to drink water as it came from the pipes. The analysis of the responses of the subjects revealed that most of the households in the present study maintained appropriate personal hygiene with proper hand washing.It was found that 100% households had private toilet facility in their premises and about 95% of the households were having hygienic latrines. In the present sample, around 30% household had children below 3 years of age. Out of these 55% households disposed excreta of their children below 3 years in solid general waste leading to environmental contamination. The remaining 45% households disposed child excreta in their private toilet facility. 45% (90) of the households believed that private toilets prevented environment contamination and 35% (70) were of the opinion that private toilet facilities were also helpful in improving personal hygiene.82% (164) of the households were found to be disposing their liquid waste in the open. Only 18% (46) disposed their liquid waste in soak pits or in sewerage line. With respect to the practice of open liquid waste disposal, 35% of the people said that it causes bad smell in the locality, 30% felt that it made the place dirty, 14% believed that it polluted the surface water, while 5% were of the opinion that it spread the germs and disease. As far as solid waste management practices used by the respondents is concerned, it was found that 60% of the households burnt their solid waste in their premises while the 32% of the households dumped it anywhere in the premises or outside the premises and only 8 % deposited it in garbage bins or common garbage area. It was also noticed that a majority (65%) of the households did not have any container for storage of solid waste and only 35% of the household had separate containers to store solid waste. Among these 35% of the households, only 40% were found to cover the solid waste container with lid while 60% did not cover their solid waste.During survey of the area, it was observed that the surroundings of 60% of households were not clean and only 40% of the household had moderately clean surroundings. 68% respondents of the households said that due to these unclean surroundings water sources got contaminated, and 32% were of the opinion that these unclean surroundings also cause disease. When asked about the source of information about various aspects of sanitation and waste management, 75% of these persons responded that they received information mainly on the solid waste disposal, 15% got information on communicable disease and only 10% received information about environmental sanitation from different media. It was discovered that, in the present sample, the main media sources for obtaining information about sanitation and waste

disposal were television and radio from where 70% of the households received information while only 10% of the respondents acquired the information from health workers of the area and 20% got the same information from newspaper/ magazines.

Table-3: Disease burden due to unsafe sanitation practices in the Hamirpur District

Year	Dengue	Hepatitis-A	Hepatitis-E	Scrub Typhus	Malaria	Dysentery / Diarrhea
Year 2016	62	33	22	36	35	10624
Year 2017	68	145	13	238	40	12364
Year 2018	75	44	20	323	55	12817
TOTAL	**205**	**222**	**55**	**597**	**130**	**35805**

Data Source- CMO Office Hamirpur, Himachal Pradesh

Unsafe sanitation practices and the associated disease burden: The results of this study indicate that 90% of the households used unsafe drinking water practices, 65% used unsafe solid waste management practices and 82% employed unsafe liquid waste disposal practices. Table-3 shows the number of people of the area suffering from various diseases which could be attributed to unsafe sanitation practices. It is clear that diarrhea/dysentery were the predominant diseases afflicting the inhabitants of Hamirpur District. In the year 2016, 10624 patients were reported with the diarrhea/dysentery in different health institutions in district Hamirpur. This number rose to 12364 in 2017 and 12817cases in 2018, among different health institution in district Hamirpur. Besides diarrhea/dysentery, scrub typhus, Hepatitis-A, Dengue, Malaria, and Hepatitis-E were the other diseases. Several of these diseases can be linked to unsafe sanitation practices adopted by the people of the area under investigation. Nearly 90% of the households were found to have unsafe drinking water practices, which could be linked to the high incidence of diarrhea and prevalence of Hepatitis-A and Hepatitis-E. Similarly, 65 % of the households were detected with unsafe solid waste disposal practices that could be related to prevalence of diarrhea, Hepatitis-A, Hepatitis-E, and Scrub Typhus. In the same way, the usage of unsafe liquid waste disposal practices by 82% of the households could be associated with the incidence of diarrhea, Hepatitis-A, Hepatitis-E, Scrub Typhus, Dengue and Malaria.

CONCLUSIONS

The results of this investigation reveal that most of the households of the Hamirpur District under study were practicing unsafe methods of solid and liquid waste management. It was observed that this was leading to water source contamination as well as environmental contamination. In solid waste management, it was found that most of the solid waste is burnt in the open leading to pollution and left over solid waste was being dumped anywhere in the surrounding causing increase in the burden of certain diseases. Similarly, in liquid waste management it was found that most of liquid is disposed in open

which leads to contamination of nearby water sources, which in turn was giving rise to various infectious diseases in the vicinity. From the health source data, it was found that there is continuous rise in the burden of disease such as diarrhea, hepatitis and scrub typhus in the area under investigation.

Though most households were maintaining appropriate personal hygiene practices, but safe water drinking practices were not practiced by majority of households, which was leading to water borne diseases.

The prevailing pattern of disease burden in the Hamirpur area can be decreased by maintaining good sanitation and hygiene practices. To this end, more IEC/Awareness drives regarding *Swacchta* need to be carried out along with the involvement of political and local bodies of the area.

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