

## Situation of Environmental Health of Rural Communities in Palpa District of Nepal

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### ABSTRACT

**Background:** Sanitation refers to create and maintain hygienic conditions, through services such as garbage collection and its proper disposal, wastewater disposal, consumption of safe drinking water, housing condition and its surrounding, an act or process of making sanitary, the promotion of hygiene and prevention of disease. Human being is a social animal and being a part of society, factors affecting the society also affect human and his surroundings. The study is concerned to demographic variables and environmental practices in rural communities. **Objectives:** To find out environmental situation and observe an impact of demographic variables on environmental factors. **Materials and methods:** A cross-sectional study was followed to conduct the study in palpa district of Nepal at 2012. Three hundred thirty nine households were selected through simple random procedure. Semi-structure interview schedule was used to collect information. Data were analyzed using software SPSS for windows version 16.0. **Results:** Most of the families were faithful to ethnic group. Practices of refuse and excreta disposable had unsatisfactory where percentages of throwing refuse and open field defecation was 39.2 and 9.1 respectively. 77.6% households were consumed tap water. Most of the households (53.4%) did not have proper drainage system around their houses. **Conclusion:** Family type and caste of households were strongly associated with practice related to excreta disposal, drainage system and refuse disposable. Improper sanitation could be main threat to public health promotion and disease prevention in study areas.

**Keywords:** Demographic variables, drainage system, open field defecation, Palpa, waste disposal

### INTRODUCTION

Sanitation is the hygienic means of promoting health through prevention of human contact with the hazards of wastes. It has been observed that the kinds of environment in which we live also depict our life-style and standards of living, like in which kind of place a particular family is residing, the surrounding is clean, type of housing, type of flooring, type of roofing, proper ventilation, overcrowding present or not, practices regarding management of safe drinking water and water used for household purposes, proper disposing of garbage and effective management of household waste, probation for safe and effective excreta disposing techniques and avoiding of breeding grounds for vectors leading to vector-borne and water-borne diseases. Environmental health is the branch of Public health that is concerned with all aspects of the natural and built environment that may affect human's health. It addresses all the physical, chemical, and biological factors external to a person, and all the related factors impacting behaviors. World Health Organization stated that "Environmental health comprises those aspects of human health, including quality of life that is determined by physical, biological, social, and psychosocial factors

in the environment. It also refers to the theory and practice of assessing, correcting, controlling, and preventing those factors in the environment that can potentially affect adversely the health of present and future generations."<sup>1</sup> Clean air, Safe and sufficient water, Safe and adequate food, Safe and peaceful settlements and stable global environment are essential factors for safe environmental health. Low socioeconomic status, women, children, elderly, ethnic minorities, disabled, indigenous peoples.<sup>2</sup>

Quality water should be free from chemical and biological contamination and must be acceptable in terms of colour, taste and odour in accordance with the World Health Organization guidelines on the quality of drinking water.<sup>3</sup> Wells, bore holes, ponds and streams need a great deal of protection from pollution and contamination by potential parasites, micro-organisms and harmful chemical substances. Unfortunately, these water sources have become sites for breeding and harbouring of many diseases - causing agents.<sup>4</sup>

Waste is an inevitable by-product of our use of natural resources. The amount and make-up of waste in any given area depends on factors such as the local

population density, economic prosperity, time of year, type of housing and whether there are local waste minimization initiatives such as home composting.<sup>5</sup> From longstanding to emerging hazards, environmental factors are a root cause of a significant burden of death, disease and disability - globally and particularly in developing countries. They range from poor water quality and access, vector-borne disease and air pollution to toxic chemical exposures, climate change and degraded urban environments. The resulting impacts are estimated to cause over 25% of death and disease globally.<sup>6</sup> Much of this burden rests upon the shoulders of the poor and vulnerable. Many of these deaths are avoidable and much of this disease is preventable. However, effective action requires renewed moral commitment to sustainable development and determined political action through international and national partnerships.<sup>7</sup>

Water-borne diseases are usually acquired by the consumption of polluted water containing human and animal faecal matter from patients or healthy carriers.<sup>8</sup> Human excreta are important sources of pathogenic organisms, especially intestinal parasites which are causes of a high morbidity in the general population primarily due to inadequate disposal of excreta and lack of personal hygiene. Most urban and rural communities in the developing countries do not have adequate disposal system for human waste, and many inhabitants defecate indiscriminately in places not far from their dwelling places, including directly on the soil and rocks, by the sides of the streams, home ponds, wells, and in some cases into the streams.<sup>9</sup> Furthermore, excreta from children and free roaming animals are particularly hazardous and a potential source of health problems in both urban and rural communities.<sup>10</sup>

Environmental health aims to prevent contamination of the environment by excreta and, therefore, to prevent transmission of pathogens that originate in faeces of an infected person. A wide range of technologies and methods exists to achieve this, which include sophisticated and high-cost methods like waterborne sewage systems and simple low-cost methods like the cat method, which involves the digging of a hole and covering faeces with soil after defecation.<sup>11</sup>

## **MATERIAL AND METHODS**

A cross sectional study was carried out in four villages (DAMKADA, DUMRE, GORKHEKOT and TELGHA) of Palpa district of Nepal. Four villages were randomly selected from the list of the total villages of the district. Sample size of 339 was calculated assuming margin of error 5%, nonresponse 10% with 95% confidence interval (CI). Three hundred and thirty nine households were

selected randomly from study area. Information was obtained on socio-demographic, housing, ventilation in house, water resources, and disposal practices of waste water, garbage and excreta. Anonymity of the respondent had preserved. The above information was collected by questioning the head of the family through a structured questionnaire during the time period of December 2012 to June 2013. Data were analyzed using software SPSS for windows version 16.0.

## **RESULTS:**

Table-1 explain that more than one third (40.7%) were devoted to Magar only. Sixty nine percent households fall under the nuclear type of family and unemployment rate was 9.4%. Near about fifty five percent houses were paccha. Around sixty six percent were covered house with smoke outlet kitchen. Practice of refuse and excreta disposable had unsatisfactory where percentages of throwing refuse and open field defecation was 39.2 and 9.1 respectively. Most of surveyed households (77.6%) used tap water for drinking proposes but they were unaware about the safeness of consumed water. Most of the households (53.4%) did not have proper drainage system around their houses.

**Table-1: Demographic and environmental situation (N=339)**

		Frequency	Percent
Family type	Nuclear	235	69.3
	Joint	104	30.7
Caste	Brahmin	63	18.6
	Chhetri	67	19.8
	Magar only	138	40.7
	Schdueled cast	46	13.6
	Janajati	25	7.4
Occupation	Unemployed	32	9.4
	Teacher	31	9.1
	Farmer	80	23.6
	Business	115	33.9
	Others	81	23.9
House type	Kaccha	153	45.1
	Pucca	186	54.9
Smoke outlet	Present	223	65.8
	Absent	116	34.2
Refuse disposal	Throwing	133	39.2
	Dumping	87	25.7
	Manure pit	104	30.7
	Burning	15	4.4
Excreta disposal	Open field	31	9.1
	Sanitary latrine	282	83.2
	Insanitary	12	3.5
	Community Latrine	14	4.1
Overcrowding	Absent	266	78.5
	Present	73	21.5
Source of water	Tap water	263	77.6
	Tube well	61	18.0
	River	15	4.4
Drainage system	Yes	158	46.6
	No	181	53.4

The study revealed that type of family could strongly associate ( $p= 0.000$ ) with practice related to excreta disposal, drainage system and refuse disposable

(0.004). It was also predictive factors to determine overcrowding, smoke outlet, and consumption of water where p values of them were 0.016, 0.060, and 0.002 respectively (Table-2).

**Table-2: Association between family type and environmental factors (N =339)**

		Family type		
		nuclear	joint	
Overcrowding	Absent	176	90	Pearson Chi-Square value=5.785, df = 1 p = 0.016
	Present	59	14	
Smoke outlet	Present	147	76	Pearson Chi-Square value=3.54 df = 1 p = 0.060
	Absent	88	28	
Refuse disposal	Throwing	87	46	Pearson Chi-Square value=13.065df = 3 p = 0.004
	Dumping	68	19	
	Manure pit	65	39	
	Burning	15	0	
Drainage	Yes	154	4	Pearson Chi-Square value=1.102,df = 1 p = 0.000
	No	81	100	
Excreta disposal	Open field	31	0	Pearson Chi-Square value=73.678,df = 3 p = 0.000
	Sanitary latrine	204	78	
	Insanitary	0	12	
	Community Latrine	0	14	
Source of water	Tap water	171	92	Pearson Chi-Square value=12.402,df = 2 p = 0.002
	Tube well	49	12	
	River	15	0	

Table-3 shows that cast of households could significantly impact (p = 0.000) on environmental practices as: refuse disposable, drainage system, excreta disposable and source of drinking water.

**Table-3: Association between caste and environmental practices (N =339)**

		Caste				
		Brahmn	Chhetri	Magar	scheduled	Janajati
Smoke outlet	Present	33	40	97	29	24
	Absent	30	27	41	17	1
Pearson Chi-Square value = 17.668 df = 4, P = 0.001						
Refuse disposable	Throwing	18	0	54	45	16
	Dumping	18	3	57	1	8
	Manure pit	27	64	12	0	1
	Burning	0	0	15	0	0
Pearson Chi-Square value = 2.660 df = 12, P = 0.000						
Drainage	Yes	34	37	82	0	5
	No	29	30	56	46	20
Pearson Chi-Square value = 59.741 df = 4, P = 0.000						
Excreta disposal	Open field	0	0	15	16	0
	Sanitary Latrine	63	55	109	30	25
	Insanitary	0	12	0	0	0
	Community latrine	0	0	14	0	0
Pearson Chi-Square value = 1.129, df = 12, P = 0.000						
Source of water	Tap water	51	42	99	46	25
	Tube well	12	25	24	0	0
	River	0	0	15	0	0
Pearson Chi-Square value = 55.803, df = 8, P = 0.000						

Analysis shows that lighting system, kitchen with smoke outlet, excreta disposable, drainage system and presence of rodent inside the house are determined by types of house (p = 0.000) but there is no association(p = 0.958) between house type and cross –ventilation (Table-4).

**Table-4: Impact of house type on environmental factors (N=339)**

		House type		Total
		kachha	pacca	
Cross ventilation	Adequate	72	87	159
	Inadequate	81	99	180
Pearson Chi-Square value = 0 .003, df = 1, p =0 .958				
lighting	Adequate	109	169	278
	Inadequate	44	17	61
Pearson Chi-Square value = 21.896, df = 1, p = 0.000				
Smoke outlet	Present	88	135	223
	Absent	65	51	116
Pearson Chi-Square value = 8.463, df = 1, p = 0.004				
Refuse disposal	Throwing	60	73	133
	Dumping	57	30	87
	Manure pit	36	68	104
	Burning	0	15	15
Pearson Chi-Square value = 31.583, df = 3p = 0 .000				
Excreta disposal	Open field	16	15	31
	Sanitary latrine	111	171	282
	Insanitary	12	0	12
	Community latrine	14	0	14
Pearson Chi-Square value = 35.926, df = 3, p = 0 .000				
drainage	Yes	57	101	158
	No	96	85	181
Pearson Chi-Square value = 9.802, df = 1, p = 0.002				
rodent	Present	95	165	260
	Absent	58	21	79
Pearson Chi-Square Value = 33.278, df = 1, P = 0.000				

**DISCUSSION**

Sanitation remains one of the biggest development challenges in all developing countries. Improving sanitation is the key to achieving the health-related Millennium Development Goals (MDGs) of reducing child mortality and combating disease. However, these outcomes will remain pressing and persistent concerns for many nations even as they approach the goal of halving the number of the world's poor by 2015.<sup>12</sup> The study analysed an environmental situation of rural villages of palpa district and tried to find out association between demographic and environmental variables. Results from the study shows that most of the families (40.7%) in study area were devoted to Magar but these communities had caste diversities as: brahamin, Chhetri, other ethnic groups (except Magar) and scheduled cast were living together cooperatively. Sixty nine percent of respondent fall under the nuclear

type of family and unemployment rate was 9.4%. 54.5% had their own puccha house. 65.8% were covered house with smoke outlet kitchen.

A typical solid waste management system in a developing country displays an array of problems, including low collection coverage and irregular collection services, crude open dumping and burning without air and water pollution control, the breeding of flies and vermin, and the handling and control of informal waste picking or scavenging activities. These public health, environmental, and management problems are caused by various factors which constrain the development of effective solid waste management systems.<sup>13</sup> Poor solid waste management in the developing countries consists of a major threat to public health and environmental quality, and reduces the quality of life, particularly for the poorer residents in both urban and rural areas.<sup>14</sup> An estimated 2.6 billion people or 39% of the world's population lack access to improved facilities for the disposal of human excreta, such as a basic pit latrine, a toilet connected to a septic tank or piped sewer system, or a composting toilet according to the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF). In low-income regions, where people are most vulnerable to infection and disease, only one in two people is covered by improved sanitation. More than one billion people still practice open defecation.<sup>15</sup> Diarrhoea and water-borne diseases are leading causes of mortality and morbidity in developing countries.<sup>16</sup> Approximately 88% of diarrhoeal diseases are attributed to unsafe water supply, inadequate sanitation and hygiene.<sup>17</sup> The proportion of population in rural areas with access to safe drinking water and sanitary latrines has a direct impact on the health of the masses. Water sources and sanitation facilities have an important influence on the health of household members, especially children.<sup>18</sup> WHO/UNICEF joint monitoring report 2012 stated that 15 per cent of the global population practiced open defecation, Countries that account for almost three-quarters of the people who practice open defecation as: India (626 million), Indonesia (63 million), Pakistan (40 million), Ethiopia (38 million), Nigeria (34 million), Sudan (19 million), Nepal (15 million), China (14 million), Niger (12 million), Burkina Faso (9.7 million), Mozambique (9.5 million) and Cambodia (8.6 million).<sup>19</sup> Results from our study explain that practice of refuse and excreta disposable was unsatisfactory where throwing refuses and open field defecation were 39.2% and 9.1 % respectively compared to the study conducted by Rajiv Ranjan Karn and their friends in in Katahari VDC of Morang district at 2011 showed that 64% of the houses didn't had toilet facilities and they

were exposed to open defecation.<sup>20</sup> The study also revealed that drainage system in these communities had inadequate where 53.4% households did not have proper drainage system around their houses. Most of the households (77.6%) consumed tap water but the quality of water could be doubt to ensure safe drinking. All these conditions may be responsible to develop epidemic of infectious diseases which is due to faecal contaminated water. Similar situation was observed in other developing countries as more than half of the population did not have access to safe drinking water and about two-thirds lacked good sanitary means of excreta disposal in African countries. Nigeria faced with the dilemma of inadequate disposal of excreta-related human waste discharged into the environment. Rural farming communities of southeast Nigeria, promiscuous defecation on open fields and farm lands had a common practice.<sup>21</sup> Many researches stated that Inadequate sanitation, lack of access to clean potable water and poor domestic hygiene are the cause of 80% of all infectious diseases (e.g. cholera, typhoid, hepatitis, polio, cryptosporidiosis, ascariasis, and schistosomiasis) in the world and responsible for 10-25 million deaths each year, most them in the under 5 years age group. These diseases are mainly transmitted via the faecal-oral route through faecally contaminated water, food or soil .<sup>22</sup>

The study analyzed demographic and environmental variables to find association between them so it revealed that the type of family and caste of households were strongly associated ( $p= 0.000$ ) with practice related to excreta disposal, drainage system and refuse disposable (for association between family type and refuse disposable,  $p = 0.004$ ). In the study family type could play role of predictive factors to determine overcrowding, kitchen with smoke outlet and consumption of water where  $p$  values of them were 0.016, 0.060, and 0.002 respectively. It also found to be significant association ( $p = 0.000$ ) between type of house and other environmental factors as: lighting system, kitchen with smoke outlet, excreta disposable, drainage system and presence of rodent inside the house but there is no association ( $p = 0.958$ ) between house type and cross-ventilation.

## **CONCLUSION**

Unsatisfactory environmental condition of the communities observed during study period and it may create ideal condition for spread of water borne diseases. Some demographic factors as family type and caste were highly associated with inappropriate drainage system, open field defecation and open field waste disposal.

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