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**Original Article****Study of housing conditions among people of a rural community in Morang, Eastern Nepal.****Alok Acharya\*, Ava Pokhrel, Amar Kumar Yadav and Rimu Mishra**

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Received: 15<sup>th</sup> August, 2017; Revised after peer-review: 22<sup>nd</sup> September, 2017; Accepted: 16<sup>th</sup> October, 2017DOI: <http://dx.doi.org/10.3126/jonmc.v6i2.19562>**Abstract****Background**

Poor Housing condition, sanitation and hygiene is associated with adverse health conditions. This study is done to assess the housing conditions, sanitation coverage and hygiene practices among rural community in Bhaudaha VDC, eastern Nepal.

**Material & Methods**

A cross sectional study was conducted from 22<sup>nd</sup> May 2016 to 22<sup>nd</sup> November 2016 in Bhaudaha VDC of eastern Nepal with appropriated sample size of 525 participants. A direct interview was taken with structured questionnaire. Chi square test was used to find out association of the variables.

**Results**

Out of 525 respondents, adequate ventilation was present among 54.9% literates followed by 44.2% illiterates ( $p=0.01$ ) and separate kitchen was also found among 77.2% of literates and 64.6% of illiterates ( $p=0.002$ ). Among Dalit castes 74.4% had separate kitchen in their house followed by 50.7% janajatis ( $p<0.001$ ). Covering of stored water was found in 75.8% Dalit and 61.2% Janajati ( $P=0.003$ ). Improved sanitation was highest among other terai casts (78.1%) followed by Dalits (59.9%) and 58.2% Janajati ( $p=0.132$ ).

**Conclusion**

There is need of appropriate methods of health education to be focused on all the groups in the community for improvement in sanitation and healthy housing conditions and targeted more towards Janajati and illiterate group and further studies need to be done in different region of Nepal to understand the cause of disparities in housing and sanitation conditions among different groups.

**Keyword:***Community, Health, Housing, Sanitation***Introduction**

Providing a safe and healthy environment for the inhabitants is an interpretation of healthy housing. Technical, social, planning and policy factors are related to housing which affects physical, mental health and social wellbeing. In terms of basic human requirements that form housing standards, policies and goals of attainment relevant to

an individual country's needs, these factors are expressed. Around two third of our life is spent in home and its immediate surroundings. Each of us is potentially at risk from an insanitary or unhealthy housing environment. Moreover, vulnerable groups like children, mothers with young children, the elderly, disabled persons, the chronically sick and the unemployed can be

disproportionately affected by poor housing conditions and usually have special health and housing needs. [1].

On the basis of materials used in the construction of building, characteristics of housing has changed over the past 15 years in Nepal. However, the Population using latrine has more than doubled during this period [2]. Reports of WHO and UNICEF (2004) showed that South Asia is not on track to meet the Millennium Development Goal (MDG) for sanitation [3]. Joint Monitoring Program (JMP) of UNICEF and WHO has defined improved sanitation facility as one that hygienically separates human excreta from human contact. The coverage of sanitation in rural area is only 37% and an urban area is 78%. This shows that there is big disparity between urban and rural sanitation. Nepal has target of universal coverage by 2017 [4]. According to estimation of government, 62% has access to basic sanitation facilities. Although Nepal is in progress to the MDG target for sanitation, there are challenges in making sanitation facilities available for unreached people. Major challenges are the lack of adequate financial resource and skilled person willing to work in rural areas, lack of appropriate and affordable technologies, and lack of energy despite of huge potential for hydropower [5].

### **Objective**

The objective of this study is to assess the housing conditions, sanitation and hygienic practices among rural community in Bhaudaha VDC of Morang district, Eastern Nepal.

### **Materials and Methods**

A cross-sectional study was carried out in Bhaudaha VDC of Morang District. The study was conducted in the VDC of study population 1,605 from 9 wards. The study period was from 22<sup>nd</sup> May 2016 to 22<sup>nd</sup>

November 2016 and conducted after the approval of Institutional review committee (IRC).

### **Sample Size**

The sample size was calculated on the basis of 76.1% of kachha and semi pucca houses (including 51.6% mud bonded and 24.5% wooden pillar foundation) in rural Nepal (Annual Household Survey 2014/15) [6]. Considering permissible error of 5% of the proportion, 5% level of significance and using the formula  $n = Z^2PQ/L^2 = 1.96 \times 1.96 \times 76.1 \times 23.9 / 3.81 \times 3.81 = 481.33$ , the final sample size was determined as 529 after adding 10% for non response error. The samples were chosen randomly from 9 different wards but 4 respondents denied to take part in the study. Thus only 525 participants were included in study.

### **Data collection**

For data collection, pretested structured questionnaire was used and face to face interview was conducted with one member of each household who were atleast 18 years or elder and either owner of the house or family of the owner. Interview was conducted only after taking verbal consent from the respondents and each respondent was explained the purpose of the study before interview. Written permission was also taken from the VDC. For grouping communities into caste groups like dalit caste, Janajati or other terai castes, Population Monograph of Nepal was used [7]. Houses were classified according to materials used for construction as Kachha, Semi-pucca and Pucca [8].

### **Data entry and analysis**

Data entry was done using Microsoft excel. Data were analyzed using SPSS version 16. Chi-square test was used to find associations among different variables. A p-value less than 0.05 were considered as statistical significance.

**Result**

In this study, out of 525 household respondents that were interviewed, 37.1% were below 30 years of age and remaining were 31-90 years of age. Among the participants in the study group 63.8% were female and 60.8% could not read or write and 38.3% were employed. Type of family was mostly nuclear 62.7% and land holding of more than 1 kattha was 67.2% among the participants. Dalit castes were 68.4% among the participants followed by 25.5% janajatis and 6.1% other terai castes.

Table.1. Demographic Characteristics of respondent of household (N= 525)

Characteristics	N	%
<b>Age Group</b>		
18-30 yrs	195	37.1
> 30 yrs	330	62.9
<b>Sex</b>		
Male	190	36.2
Female	335	63.8
<b>Literacy Status</b>		
Literate	206	39.2
Unable to read and write	319	60.8
<b>Employment Status</b>		
Employed	201	38.3
Unemployed	324	61.7
<b>Type of Family</b>		
Nuclear	329	62.7
Joint	196	37.3
<b>Land Holding</b>		
< 1 Kattha	172	32.8
> 1 Kattha	353	67.2
<b>Caste/Ethnicity</b>		
JanaJati cast	134	25.5
Dalit cast	359	68.4
Other casts	32	6.1
<b>House type</b>		
Kachha	347	66.1
Semi-pucca	127	24.2
Pucca	51	9.7
<b>Sanitation</b>		
Improved sanitation	318	60.57
Unimproved sanitation	165	31.43
No toilet facility	42	8.0

Housing characteristics observed regarding construction were 66.10% Kachha house, 24.2% semi pucca house and 9.7% pucca

house. Pucca house was observed in 16.0% literates followed by 5.6% illiterates while 71.2% of those who did not know to read or write had kachha house ( $p < 0.01$ ). The study showed 13.0% who had land holding more than 1 kattha had pucca house and semi pucca house was observed in 26.9% followed by only 2.9% pucca house among land holding less than 1 kattha while 78.5% of < 1 kattha group and 60.1% > 1 kattha group had kachha house ( $p < 0.01$ ). Among the participants who were not able to read and write, 55.8% did not have ventilation in their house followed by literates (45.1). Similarly, 52% among nuclear family did not have ventilation followed by 51% among joint family. Similarly, 59.3% among those who had land holding less than 1 kattha did not have ventilation followed by 47.9% among more than 1 kattha ( $p = 0.01$ ). Similarly, separate kitchen and bathroom was not found among 35.4% illiterates followed by 22.8% literates ( $P = 0.002$ ). In the study people dwelling in up to 2 rooms were observed in 27.7% kachha house in the community while 3-4 rooms were observed in 66.7% pucca house followed by 64.6% kachha house and 61.6% semi pucca house ( $p < 0.001$ ). However, 27.0% Dalit castes live in up to 2 rooms in the community followed by 18.8% other terai cast and by 16.4% Janajati ( $p = 0.11$ ).

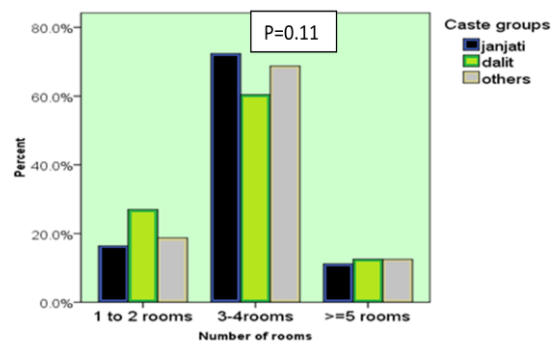


Fig.2. Distribution of rooms among different caste group.

In the community only 8.00% of the study group did not have latrine facility at their home. However, improved sanitation was highest among other terai casts (78.1%) followed by Dalits (59.9%) and 58.2% (p=0.132). Water supply in the latrine was found in 44.3% of dalit caste followed by 36.6% janajatis and only 25.0% other terai castes (p=0.082). Among the caste groups, hand washing before meal was seen more among other terai castes 100% followed by 98.6% dalit and 83.6% Janajati; while soap and water for hand washing was seen more among 81.1% dalit followed by 76.1% Janajati and 71.9% other terai castes. Also 29.8% of illiterates did not cover the water while storing it followed by 24.3% literates. Among Dalit castes 74.4% had separate kitchen in their house followed by 50.7% janajatis; however, 93.8% of other castes had separate kitchen in their house (p<0.001). Storage of water in plastic bucket was seen more among dalit castes

(84.7%) followed by other terai castes (81.2%) and 70.1% of janajatis (P=0.01). However, covering of stored water was seen more among other terai castes (81.2%) followed by 75.8% dalit and only 61.2% Janajati (P=0.003).

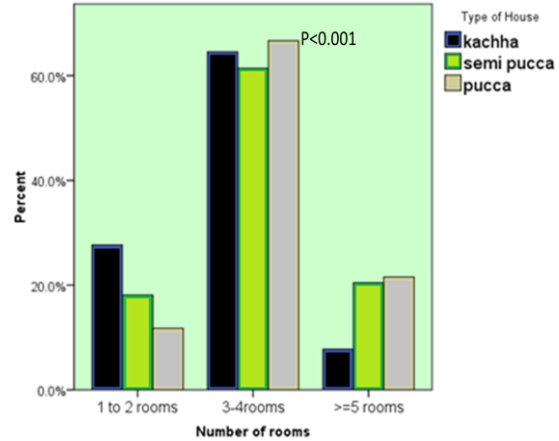


Fig.3. Number of rooms according to type of house.

Table.2. Relation of Hand washing and sanitation practices according to Literacy status (N= 525)

Characteristics	Hand washing After meal			p value	Sanitation			p value
	No washing	Wash with water only	Wash with Soap and water		No Latrine	Improved	Unimproved	
Literate	9 (4.4)	23 (11.2%)	174 (85.5%)	0.053	8 (3.9)	149 (72.3)	49 (23.8)	
Unable to read and write	18 (5.6)	59 (8.9%)	242 (75.9%)		34 (10.7)	169 (53.0)	116 (36.4)	<0.001

Table.3. Housing condition as observed in the community (N= 525).

Variables	Ventilation		P value	Separate kitchen/Bathroom		P value	Type of House			P Value
	Yes	No		Yes	No		Kachha	Semi Pucca	Pucca	
Unable to Read and write	141 (44.2)	178 (55.8)	0.01	206 (64.6)	113 (35.4)	0.002	227 (71.2)	74 (23.2)	18 (5.6)	<0.001

Literate	113 (54.9)	93 (45.1)		159 (77.2)	47 (22.8)		120 (58.3)	53 (25.7)	33 (16.0)	
<b>Type of family</b>										
Nuclear	158 (48.0)	171 (52)	0.8 5	227 (69.0)	102 (31.0)	0.7 3	226 (68.7)	75 (22.8)	28 (8.5)	0.23
Joint	96 (49.0)	100 (51)		138 (70.4)	58 (29.6)		121 (61.7)	52 (26.5)	23 (11.7)	
<b>Land holding</b>										
> 1 kattha	184 (52.1)	169 (47.9)	0.0 1	249 (70.5)	104 (29.5)	0.4 6	212 (60.1)	95 (26.9)	46 (13.0)	<0. 001
< 1 Kattha	70 (40.7)	102 (59.3)		116 (67.4)	56 (32.6)		135 (78.5)	32 (18.6)	5 (2.9)	

Table.4. Housing condition, Sanitation practices and hygiene among caste groups in the community (N= 525)

Variables	Caste groups			P value
	Janajati	Dalit	Other terai caste	
<b>Sanitation</b>				
No Latrine	15 (11.2)	25 (7.0)	2 (6.2)	0.132
Improved Sanitation	78 (58.2)	215 (59.9)	25 (78.1)	
Unimproved Sanitation	41 (30.6)	119 (33.1)	5 (15.6)	
<b>Water supply in Toilet</b>				
No Latrine	15 (11.2)	25 (7.0)	2 (6.2)	0.082
Water supply Present	49 (36.6)	159 (44.3)	8 (25.0)	
Water supply Absent	70 (52.2)	175 (48.7)	22 (68.8)	
<b>Distance of water source</b>				
Far > 500 m	1 (0.7)	34 (9.5)	2 (6.2)	0.001
Near < 500m	133 (99.3)	325 (90.5)	30 (93.8)	
<b>Hand washing Before food</b>				
Yes	112 (83.6)	354 (98.6)	32 (100)	
No	22 (16.4)	5 (1.4)	0	
<b>What do you use to wash hands normally?</b>				
Don't wash after meal	22 (16.4)	5 (1.4)	0	
Water only	10 (7.5)	63 (17.5)	9 (28.1)	
Soap and water	102(76.1)	291(81.1)	23 (71.9)	
<b>Storage of water</b>				
Muddy pot	5 (3.7)	17 (4.7)	2 (6.2)	0.001
Plastic bucket	94 (70.1)	304 (84.7)	26 (81.2)	
Other	35 (26.1)	38 (10.6)	4 (12.5)	

<b>Cover stored water</b>				
Yes	82 (61.2)	272 (75.8)	26 (81.2)	
No	52 (38.8)	87 (24.2)	6 (18.8)	0.003
<b>House type</b>				
Kachha	84 (62.7)	245 (68.2)	18 (56.2)	
Semi pucca	40 (29.9)	78 (21.7)	9 (28.1)	0.19
Pucca	10 (7.5)	36 (10.0)	5 (15.6)	
<b>Separate Kitchen/Bathroom</b>				<0.001
Yes	68 (50.7)	267 (74.4)	30 (93.8)	
No	66 (49.3)	92 (25.6)	2 (6.2)	
<b>Ventilation</b>				
Yes	57 (42.5)	178 (49.6)	19 (59.4)	0.169
No	77 (57.5)	181 (50.4)	13 (40.6)	

### Discussion

More than half of the households in our neighbouring country India live in kachha/semipucca (14% kachha, 40% semipucca) houses while most of the illness in India is due to poor environmental sanitation conditions [9].

In this study 66.10% of the study group in rural setting dwell in Kachha house followed by 24.2% semi pucca house and 9.7% pucca house. The result was similar to 56.95% kachha roofing and 91.22% kachha wall house as revealed in National Population and Housing Census 2011 of Morang [10].

In this study, among those living in Kachha house, maximum was Dalit caste (68.2%), followed by 62.7% janajati and 56.2% other terai castes. In a similar study of Housing Condition in Kerala with special focus on rural areas and Socially Disadvantaged Sections showed different results as 29.36% scheduled caste had kachha materials used to build walls while materials used to build roof were 48.77% tiles and 6.33% used kachha materials in roof. In same study only 3% scheduled tribes had kachha roof and 34.63% had roofs of tiles while 26.73% scheduled tribes used kachha walls; concrete was

used for building only by 24.92% of Scheduled tribes and 24.30% of scheduled caste groups in Kerala [11]. However, in a different study of caste-based discrimination in Bangladesh, 76 per cent for Hindu Dalits and 91 per cent for the Muslim Dalits live in Kachha houses and about 14 per cent of Hindu Dalits and 8 percent of Muslim Dalits live in semi-pucca houses and 99 per cent live in 1-2 room houses [12]. In this study however 27.0% Dalit castes live in up to 2 rooms in the community followed by 18.8% other terai cast and by 16.4% Janajati, though not statistically significant ( $p=0.110$ ).

According to research done by WaterAid (2011), water, sanitation and hygiene (WASH) related mortality observed in Nepal were 14% child deaths due to diarrhoea. Study shows that Sanitation access lowered children suffering from diarrhoea by 7-17%, and reduced mortality for children under five by 5-20%. This shows the impact of WASH on public health [13]. In this study, 92% household had latrine facility at their home where Improved sanitation was highest among other terai casts (78.1%) followed by Dalits (59.9%) and 58.2% Janajati ( $p=0.132$ ) and Improved sanitation coverage within whole

community was 60.57%. Water supply in the latrine was found in 44.3% of dalit caste followed by 36.6% janajatis and only 25.0% other terai castes ( $p=0.082$ ). In a different study done by Acharya P. et.al. in slums of Pokhara, 96.3% had toilet facility in home with 77% improved latrine. [14]. However, demographic survey of government (2016) has revealed that 62.9% of Nepalese rural households have improved sanitation facilities which is the marked improvement made in 5 years time [15]. This shows there have been focused programs among marginalised community for improvement of basic housing requirement like sanitation by the government.

In this study, hand washing with soap and water was observed more among literates (85.5%) however 75.9% of people who were not able to read and write also washed hands with soap and water ( $p=0.053$ ). In a different study done in Odisha, India, among urban slum children and their care takers, 72% women washed hands with soap after toilet [16].

In this study, 74.4% Dalit castes had separate kitchen in their house followed by 50.7% janajatis, although maximum of other terai castes (93.8%) had separate kitchen in their house ( $p<0.001$ ), this shows that all the caste group have better housing practices with regards to separate kitchen. In Kerela, study of Disadvantaged people 93.19% Scheduled caste and 88.43% of scheduled tribe had separate kitchen in their dwelling [11].

In this study, covering of stored water vessels was seen 81.2% among other terai castes followed by 75.8% dalit and only 61.2% Janajati ( $P=0.003$ ). In a report of 2000, 53.0% rural household and 48.5% Eastern terai household covered the vessels of stored water in Nepal [17].

### Conclusion

Study shows that there is need of awareness programs to be focused on

improvement in housing and sanitation conditions among all the groups in the community, which has to be targeted more towards Janajati and illiterate group. The rural regions of Nepal still have poor housing conditions in terms of materials used for construction of houses and use of improved sanitation; hence there is need of more such studies to find out the cause of disparities in housing and sanitation conditions among different groups in rural communities in Eastern Nepal for implementation of proper public health programs.

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