

Housing-related factors associated with the communicable diseases among urban slum residents of Rupandehi district of Nepal

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= Abstract =

목적 : 이 연구는 नेपाल 루판디 지역의 도시 빈민 거주자를 대상으로 가정에서의 감염병 유병률과 그 관련 위험요소를 파악하기 위해 수행하였다.

자료 및 방법 : 이 연구는 단면연구로서 2018년 11월 25일부터 12월 7일까지 नेपाल 루판디 빈민가에 있는 259개의 가구를 선정하여 조사하였다. 가구 내 감염병 유병률을 조사하였고, 이에 관련된 위험요소는 다변량로지스틱 회귀분석을 통해 분석하였다.

결과 : 연구결과 259명의 참여자 중 2/3이상(71.8%)이 지난 1년 이내에 감염병을 적어도 하나 이상 앓았다고 응답하였고, 그중 가장 많이 앓은 감염병은 감기, 기침 및 설사로서 91.9%이었다. 다변량분석 결과 집에 적절한 조명이 없는 경우 감염병의 유병률이 더 높았다(OR 2.75, 95% CI 1.36-5.59).

결과 : 앞으로 नेपाल에서 건강증진 사업 또는 도시계획을 할 때 감염병의 유병률과 이에 대한 위험요인을 동시에 고려해야 할 것이다.

핵심단어 : 전염병, 주거관련요인, 도심빈민가, नेपाल

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Introduction

Housing refers to physical structure providing shelter, immediate surroundings, and the related community services and facilities. Poor housing condition can lead to the wide range of health conditions including communicable and non-communicable diseases such as, respiratory infections, diarrheal diseases, asthma, lead poisoning, injuries, and mental health among many others [1]. Urban poor in low-income countries are major sufferers of communicable diseases mainly diarrheal diseases and respiratory infections in addition to increasing vector-borne infections [2]. The rapid rise of urban slums in low-income and middle-income countries (LMICs) has further worsened the health conditions of people living in those areas complicating the situation with burden of health care cost and diversion of health care resources to the management of end-stage complications of diseases; majority of which are preventable [3, 4].

Overcrowding puts urban slums residents to a greater risk of transmitting communicable diseases. In addition, urban slum residents are frequently exposed to stagnant water, unhygienic garbage, and other poor hygiene and sanitation conditions [5]. Therefore, Cold and cough, worm infestation and other bacterial infections are also frequently reported in many studies conducted in slum areas [5, 6]. Identification and management of health problems that are arisen because of poor housing standards has long been an important public health issue elsewhere [7]. However, addressing issue of health problems of urban slums needs data from such settings.

Data on prevalence of communicable diseases and risk associated with it in people living in slum of Nepal is limited. It has been reported that in urban slum communities of Kathmandu, 98% of households were living in semi-permanent or temporary

accommodation, 15% practiced open defecation and 48% used latrines that discharge directly into a river [8]. Further, another report reported that 7% of household members of Kathmandu slums suffered from gastro-intestinal disease, respiratory disease, accidents and injuries within a year [9]. Therefore, understanding the situation of communicable diseases and associated risk is crucial to design evidence-based prevention strategies and programmes. As such the current study was carried out to identify the prevalence of communicable diseases at household level and associated risk factors among urban slum residents of Rupandehi district of Nepal.

Materials and methods

1. Research design, population and setting

This study was a descriptive cross-sectional study designed to identify association between housing-related factors and prevalence of communicable diseases. The population of this study was the household heads (male or female) of slum areas of Butwal sub-metropolitan city, Rupandehi district, Nepal. Butwal sub-metropolitan city (also known as Butwal Upamahanagarपालिका), is situated in Rupandehi, province number 5 of Nepal. It is located at 83°22' 52.70"- 83°30' 22.61" E and 27°39' 56.65"- 27°44' 55"N.

2. Sampling

We used the non-probability purposive sampling technique to select the sample until the required sample size was met. The sample size for this study was estimated based on 21.5% reported prevalence of cough, cold and fever among urban slum dwells in Dhaka, Bangladesh [5] using formula, $n = z\alpha^2 pq/d^2$

where, n = sample size requirement, $Z\alpha$ = level of statistical significant at 0.5 standard normal deviate set at 1.96 corresponds to 95% confidence interval,

$p=0.215$, $q=1-p=0.785$, and $d=$ absolute precision (level of error $+5\% = 0.05$). We obtained a total of 259 individuals as final sample size for the study.

3. Data collection

Data were collected between 25 November and 7 December, 2018 using self-developed structured questionnaires with face to face interview with the study participants. We enrolled only one study participants per household. The questionnaire consisted of three parts: i) questionnaire related to socio-demographic information of the respondent, ii) questionnaire about housing standard and condition, and iii) questionnaires on prevalent diseases. The outcome variable of this study was the one year prevalence of communicable diseases at household level. The outcome variable was assessed either of self-reported symptoms and verified diagnosis of the communicable diseases. Independent variables were socio-demographic and housing-related factors; all of which were collected by using survey questionnaires. The housing standards and conditions were adapted from criteria for healthful housing as recommended by Environmental and Health Committee of India [10].

4. Ethics

This study obtained the approval from research ethical committee of Sanjeevani College of Medical Sciences, Butwal, Purbanchal University of Nepal (approval number: 130-2018). The written informed consent was obtained from all the study participants. Participants' privacy, confidentiality and anonymity were fully maintained including removal of personal identification during data analysis.

5. Statistical Analysis

Data were entered into Microsoft Excel for windows, and then transferred to Statistical Package

for the Social Sciences SPSS for Windows Ver. 20.0 (SPSS Inc. Chicago, IL, USA). All variables with p -values 0.05 in univariate test were entered in final multivariable logistic regression model to assess the association between housing-related factors and prevalent communicable diseases. Results are expressed as odds ratios (ORs) with 95% confidence intervals. All significantly associated independent variables with outcome variables were presented in the final multivariable logistic regression model. All tests were two tailed and p -values of <0.05 were considered significant.

Results

Table 1. shows the prevalence of communicable diseases within past one year among residents of urban slums of Rupandehi district of Nepal. Out of 259 study participants, more than two third (71.8%) reported to have at least any one of the communicable diseases within past one year; most (91.9 %) reported to have cold and cough and diarrheal diseases.

Table 1. Prevalence of communicable diseases within past one year among residents of urban slums of Rupandehi, Nepal, 2018

Status of communicable diseases	Number, N=259 (%)
No	73 (28.2)
Yes*	186 (71.8)
Cold and cough	86 (46.2)
Diarrheal diseases	85 (45.7)
Respiratory Problems (pneumonia, tonsillitis, Pharyngitis)	14 (7.5)
Pyrexia unknown origin	1 (0.5)

*Types of communicable diseases calculated with $n=186$

Study participants' personal profile and its association with the prevalence of communicable diseases have been demonstrated in Table 2. Most study participants (93.8%) were of between 19 to 49 years of age group, majority (71.8%) female, 80.7 % believed in Hindu religion, 78% from Aadibasi/

janajati and dalit ethnicity, 76.4 % were married, 50.2% were educated with secondary and above level of education, 51.4 % were of housewives, 51% households had more than 5 family members. Participants occupation was significantly associated

with prevalence of communicable disease in univariate analysis ($p=0.023$).

Table 3. presents the association of housing-related factors with the prevalence of communicable diseases. Housing-related factors such as appropriate lightening,

Table 2. Personal Profile of the residents from urban slums of Rupandehi, Nepal associated with prevalence of the communicable diseases, 2018

Characteristics	Total, N=259 (%)	Communicable disease		p-value
		Present, n=186 (%)	Absent, n= 73 (%)	
Age(in years)				0.974
19-29	99 (38.2)	70 (37.6)	29 (39.7)	
30-39	77 (29.7)	56 (30.1)	21 (28.8)	
40-49	67(25.9)	49 (26.3)	18 (24.7)	
50-59	11(4.2)	8 (4.3)	3 (4.1)	
60-69	5 (1.9)	3 (1.6)	2 (2.7)	
Sex				0.896
Male	73 (28.2)	52 (28.0)	21 (28.8)	
Female	186 (71.8)	134 (72.0)	52 (71.2)	
Religion				0.360
Hindu	209 (80.7)	151 (81.2)	58 (79.5)	
Buddhist	18 (6.9)	10 (5.4)	8 (11.0)	
Muslim	3 (1.2)	2 (1.1)	1 (1.4)	
Christian	29 (11.2)	23 (12.4)	6 (8.2)	
Ethnicity				0.508
Upper caste group(Brahmin and chhetri)	57 (22.0)	42 (22.6)	15 (20.5)	
Aadibasi/Janajati	131 (50.6)	90 (48.4)	41 (56.2)	
Dalit	71 (27.4)	54 (29.0)	17 (23.3)	
Marital status				0.653
Unmarried	59 (22.8)	43 (23.1)	16 (21.9)	
Married	198 (76.4)	141 (75.8)	57 (78.1)	
Divorced/widowed	2 (0.8)	2 (1.1)	0 (0.0)	
Education				0.564
No education	26 (10.0)	21 (11.3)	5 (6.8)	
Primary	103 (39.8)	73 (39.2)	30 (41.1)	
Secondary and above	130 (50.2)	92 (49.5)	38 (52.1)	
Occupation				0.023
Sales and services	19 (7.3)	9 (4.8)	10 (13.7)	
Skilled manpower	22 (8.5)	20 (10.8)	2 (2.7)	
Unskilled manpower	64 (24.7)	50 (26.9)	14 (19.2)	
Unemployed	21 (8.1)	14 (7.5)	7 (9.6)	
Housewife	133 (51.4)	93 (50.0)	40 (54.8)	
Number of family members				0.676
2-3	26 (10.0)	18 (9.7)	8 (11.0)	
4-5	101 (39.0)	70 (37.6)	31 (42.5)	
> 5	132 (51.0)	98 (52.7)	34 (46.6)	

proper drainage system, and water connection available at household were significantly associated with prevalence of communicable diseases.

The result of final multivariable logistic regression analysis model predicting the housing-related factors with the prevalence of communicable diseases among

Table 3. Housing-related factors of the residents from urban slums of Rupandehi, Nepal associated with prevalence of the communicable diseases, 2018

Characteristics	Total, N=259 (%)	Communicable disease		p-value
		Present, n=186 (%)	Absent, n= 73 (%)	
Number of rooms available				0.371
1-2 rooms	221 (85.3)	161 (86.6)	60 (82.2)	
3 to 4 rooms	38(14.7)	25 (13.4)	13 (17.8)	
Adequate Ventilation				0.605
Yes	107 (41.3)	75 (40.3)	32 (43.8)	
No	152 (58.7)	111 (59.7)	41 (56.2)	
Appropriate lightening				<0.001
Yes	68 (26.3)	34 (18.3)	34 (46.6)	
No	191 (73.7)	152 (81.7)	39 (53.4)	
Proper drainage system				<0.001
Yes	41 (15.8)	18 (9.7)	23 (31.5)	
No	218 (84.2)	168 (90.3)	50 (68.5)	
Water connection available at home				<0.001
Yes	11 (4.2)	0 (0.0)	11 (15.1)	
No	248 (95.8)	186 (100)	62 (84.9)	

residents from urban slums of Rupandehi district of Nepal has been presented in Table 4. Significant variables in univariate analysis such as occupation, appropriate lightening in house, proper drainage system available at home, only one factor- appropriate lightening in house was significantly associated with prevalence of communicable diseases. Study participants who did not have appropriate lightening at household were more likely (aOR 2.75; 95% CI (1.356-5.586)) to have communicable diseases.

Discussion

Our study found that more than two third of the study participants reported to have suffered from

at least any one of the communicable diseases in their households and most common prevalent health problem reported was cold and cough and diarrheal diseases. In addition, inappropriate lightening in houses had higher odds of having communicable diseases among residents of urban slums.

Association between sub-standard housing and occurrence of communicable diseases in different study settings has been consistently reported [4, 6, 7, 11, 12]. Similar to our study, a study performed in urban slums of Bangladesh reported 21.5% of the study participants were suffered from cough, and cold, this proportion is less than half of our study finding [5]. Although study settings and participants seems similar, our study reported the self-reported prevalence within

Table 4. Multivariable logistic regression analysis predicting housing-related factors associated with prevalence of communicable diseases among the residents from urban slums Rupandehi, Nepal, 2018

Characteristics	aOR (95% CI)	p-value
Occupation		
Sales and services	1 (ref.)	
Skilled manpower	0.48 (0.170-1.373)	0.172
Unskilled manpower	3.67 (0.793-16.976)	0.096
Unemployed	1.62 (0.780-3.383)	0.195
Housewife	0.88 (0.316-2.441)	0.803
Appropriate lightening		
Yes	1 (ref.)	
No	2.75 (1.356-5.586)	0.005
Proper drainage system		
Yes	1 (ref.)	
No	2.03 (0.878-4.716)	0.097
Water connection available at home		
Yes	1 (ref.)	0.082
No	1.01 (0.66-4.99)	

※ aOR, adjusted odds ratio; CI, confidence interval; ref., reference; variables entered for final model of multivariable logistic regression were- occupation, appropriate lightening, proper drainage system and water connection at household level.

one year, while in former study; it was of only three months prior to the survey time might have been such a huge differences between two. Moreover, our study also has revealed that 45.7% were the self-reported diarrheal diseases and also highlighted that more than two third of the study households' members were suffered from any one of the communicable diseases within past one year. This overall self-reported prevalence of communicable diseases is in line with other study from urban slums [13].

Our study attempted to assess several housing-related factors that could predict existing higher prevalence of communicable diseases. Among those studied variables, only inappropriate lightening posed the higher risk of having communicable diseases with higher odds ratio. Sub-standard housing has already predicted a number of communicable diseases and

health conditions such as respiratory symptoms, diarrhoea and headaches and fever [5, 6, 14-18], whether it be in urban slums or other areas. On the other hand, slums are frequently well-known risk areas for various communicable diseases such as diarrheal diseases and respiratory infections [6, 19]. Several responsible factors such as overcrowding, inadequate ventilation, poor environmental and housing sanitation of urban slum residents have been explored for the occurrence of communicable diseases [5-7, 12, 19]. In fact, inadequate water supply, sanitation, drainage, and rubbish collection in a crowded environment of slums predisposes to recurrent communicable diseases [3]. However, we could not witness the overall individual behavioral patterns and many other ecological factors that may have bigger impacts on higher prevalence of communicable

diseases since it was beyond our study method. The reports from other Nepalese urban slums highlighted the practice of open defecation, less than half of the study subjects used sanitary latrines [8] that suggests for an immediate need of interventions to reduce the problems of communicable diseases in Nepalese urban slums.

This study has several limitations for which due care should be taken while interpretation of the study outcome. First, sampling method is not robust as we used the purposive sampling to select study participants, and also small sample size inhibits us to generalize the study outcomes. Second, our study may have been suffered from potential recall bias since self-reported information for one year prevalence has been used. Finally, our study is unaware about personal hygiene, or behaviour, along with the many environmental factors, and nutritional factors that are responsible for the occurrence of communicable diseases. This study, however, provides a true picture of existing situation of communicable diseases among residents of some urban slums of Nepal may help design effective evidence-specific health strategies.

Summary

This study aimed to identify the prevalence of communicable diseases at household level and associated risk factors among urban slum residents of Rupandehi district of Nepal. A cross-sectional study was carried out among a total of 259 purposively selected households in the urban slum of Butwal sub-metropolitan city, Rupandehi, Nepal between 25 November and 7 December, 2018. Prevalence of communicable diseases in the households within past one year were reported followed by assessment of risk factors associated with prevalence of communicable diseases using multivariable logistic regression analysis. The study result revealed that

out of 259 study participants, more than two third (71.8%) reported to have at least any one of the communicable diseases in the household within past one year, and most common (91.9 %) reported to have cold and cough and diarrheal diseases. Final multivariable logistic regression analysis showed that study participants who did not have appropriate lightening in their houses were more likely (aOR 2.75; 95% CI (1.356-5.586)) to have communicable diseases. This study recommends understanding of the existing prevalence of communicable diseases and risk associated with it while designing health promotion activities and appropriate urban planning in Nepal.

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