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Surviving with Seasonal Extremeness: A Case Study of Slum Dwellers of Rajshahi City

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Abstract

All major urban centers in Bangladesh have slums and squatter settlements, the largest concentrations being in Dhaka, followed by Chittagong, Khulna and Rajshahi. In Winter and in Rainy season, the weather becomes extreme at Rajshahi making people more difficult, even more for slum dwellers. We aimed to evaluate the extremeness of the seasonal variation to various seasonal diseases. Our data was from a pilot study of 250 respondents of a survey on "Health Status of Slum Dwellers in Rajshahi City". Original sampling method is two-stage PPS. First stage units are 35 wards of Rajshahi city and second units are the slum dwellers (per household basis) of the wards. Study area for the pilot survey was ward number 28 and 30. Study population was adult slum dwellers. Data collection period was Nov 2010 to Jan 2011.Descriptive statistics (mean with standard deviation, median with IQR or percentage where appropriate) had been primarily observed. Cross table technique along with chi-square test (Pearson or LR whichever applicable) was had been to find association of various covariates to diseases. Logistic model was fitted to main outcome variable (diseases) for advanced analysis. It has found that mean age of the respondent was 30.88 yrs with standard deviation 10.68. Of the respondent female was 56%; maximum of the respondents were illiterate (56.08%) following with primary level 34.46% and with secondary level 9.46%; maximum of them were Muslim (97.30%). Some of their citable professions were daily labor (21.62%), pulling rickshaw (10.81%) small business (7.43%) etc. Mean family income was tk 90493 per year with standard deviation (sd) 67068; on an average family savings per year was tk 1182 with sd 1705. Among the respondents, 93% manage their worm cloths by themselves; 95% store their worm cloths after winter; among the common communicable diseases, 88% suffer from Cold, 56% suffer from Flue, 14% suffer from Asthma in Winter, whereas 38% suffer from cold, 37% suffer flue, 12% suffer asthma in Rainy season. Results suggested that none of the covariates had significant effect on Cold in Winter, but in Rainy season, Profession had significant association with it (p-value=0.019). It was also found that respondent of profession daily labor (OR=0.25,

95%CI=0.06, 1.03) and pulling rickshaw (OR=0.57, 95%CI=0.13, 2.58) were less likely to suffer from it and of profession small business (OR=3.70, 95% CI=0.72, 18.94) was more likely than other professions. For the slum dwellers, profession and family status had significant effect on suffering from Flue in Winter season which also revealed that daily laborer (OR=17.41, 95%CI=3.04,99.71), small businessmen (OR=2.63, 95%CI=0.36,19.17) and rickshaw puller (OR=6.55, 95%CI=1.05, 41.02) are more likely than other professions and respondents with unique family (OR=0.17, 95%CI=0.05,0.56) are less likely to suffer from it than combined family. But in Rainy season, it was found that only family status had significant effect on it and respondents with unique family (OR=0.25, 95% CI=0.08, 0.76) are less likely to suffer from it than combined family. However, none of the covariates were found to have significant effect to Asthma in both Winter and Rainy season. By means of feasible action plans focused on a broad urban development vision that will lead to lasting and meaningful improvements in the health and lives of slum dwellers.

Keywords: Descriptive statistics, Chi-square test, Logistic Regression.

AMS Classification: 97K40.

1. Introduction

Bangladesh, with a population of 142.3 million [1], is one of the poorest countries in the world. It has an urban population of about 35 million which is about 23.1 percent of its total population and 50 percent of them are poor [2,3]. The poor migrants routinely turn to slums and squatter settlements for shelter. All major urban centers in Bangladesh have slums and squatter settlements, the largest concentrations being in Dhaka, followed by Chittagong, Khulna and Rajshahi. Rajshahi is one the 4 cities of Bangladesh in the North-East of the country, close to the Indian border and built along the banks of the River Padma. Season is one of the divisions of a year according to weather. Its number and features vary from country to country. There are six seasons in Bangladesh such as summer, the rainy season, early autumn, late autumn, winter and spring. In Winter and in Rainy season, the weather becomes extreme at Rajshahi making people more difficult to live. Slum dwellers of Bangladesh are living miserable life in the lowest socio-economic condition. Therefore, extremeness of these two seasons makes their life even more difficult, especially at Rajshahi.

In rainy season almost all time slums are flooded and damaged badly because of heavy rainfall. Many diseases often break out in an epidemic form into slums. The people of slums can’t go out of doors for work almost all the day in rainy season and for this reason they spend their livelihood very miserably. In winter season all

the day cover with mist and cold. Nature looks dull and gloomy. It is painful time for the slum dwellers. Because, they can't buy warm cloths and they shiver in cold. They burn dry leaves and make fire to warm themselves.

Now days, health status and the livelihood style of the slum dwellers are most concernable discussions. The most important health problems of slum are common infectious diseases particularly cold, flue, diarrhea, and respiratory infections which are responsible for the large bulk of morbidity and mortality. Lower environmental and personal hygiene are responsible for a high attack rate from infectious diseases which in turn bring about under-nutrition and malnutrition. And in winter season and rainy season, they manage their livelihood very miserably. It was therefore, decided to carry out a survey of extremeness of the seasonal variation and surviving with it for slum dwellers in Rajshahi City. Attempts are being made to analyze the effect of seasonal extremeness to this community. Therefore, the main target of this paper is to analyze the health status in the extreme seasons of the slum dwellers in Rajshahi City.

2. Materials and Methodology

Our data was from a pilot study of 250 respondents of a survey on "Health Status of Slum Dwellers in Rajshahi City". Original sampling method is two-stage PPS. First stage units are 35 wards of Rajshahi city and second units are the slum dwellers (per household basis) of the wards. Sample frame was done by the team of a project on "Disease-specific out-of-pocket expenditure on health care and coping strategies for health care costs in Rajshahi district, Bangladesh" jointly done by Tokyo University, Japan and Rajshahi University, Bangladesh. Study area for the pilot survey was ward number 28 and 30. Study population was adult slum dwellers. Data collection period was Nov 2010 to Jan 2011.

All recorded data were first coded in code sheets according to a comprehensive code plan. Data entry was performed using a spreadsheet application (Microsoft Excel-2007) and data analysis was performed by using SPSS (Statistical Package for Social Science) version 15.0. Data set was screened regarding our study and valid sample size was found to be 148. Descriptive statistics (mean with standard deviation, median with IQR or frequency with percentage where appropriate) were primarily observed. Using cross table technique chi-square test (Pearson or LR whichever applicable) was used to find association of various covariates to diseases. Logistic model was fitted to main outcome variable (diseases) for advanced analysis.

3. Result and Discussions

First decriptives of the study subjects were analyzed and summarized in Table#1. We found that mean age of the respondent was 30.88 yrs with standard deviation 10.68. Of the respondent female was 56%; maximum of the respondents were illiterate (56.08%) following with primary level 34.46% and with secondary level 9.46%; maximum of them were Muslim (97.30%). Some of their citable professions were daily labor (21.62%), pulling rickshaw (10.81%) small business (7.43%) etc. Mean family income was tk 90493 per year with standard deviation (sd) 67068; on an average family savings per year was tk 1182 with sd 1705. Among the respondents, 93% managed their worm cloths by themselves; 95% stored their worm cloths after winter; among the common communicable diseases, 88% suffered from Cold, 56% suffered from Flue, 14% suffered from Asthma in Winter, whereas 38% suffered from cold, 37% suffered flue, 12% suffered asthma in Rainy season.

We also found that suffering from cold in winter (Table#2) was significantly associated with number of family members (p-value=0.028) and family status (p-value = 0.045) and in Rainy season (Table#3) it was significantly associated with number of family members (p-value=0.017), number of earning members (p-value=0.024), profession (p-value=0.029) and family status (p-value=0.001). An epidemic spread of Flue in winter was significantly associated with number of earning members (p-value=0.012), profession (p-value=0.002) and family status (p-value<0.001); whereas in Rainy season it was found to be significantly associated with profession (p-value=0.025) and family status (p-value<0.001). For Asthma, family income per year (in taka) was found to have significant association in both Winter (p-value=0.008) and Rainy season (p-value=0.001).

Finally, advance analysis was carried out to identify the influencing factors to diseases by Logistic regression and the results were summarized in Table#4&5. Results suggested that none of the covariates had significant effect on Cold in Winter, but in Rainy season, profession had significant effect on Cold (p-value=0.019). It was also found that respondent of profession daily labor (OR=0.25, 95%CI=0.06, 1.03) and pulling rickshaw (OR=0.57, 95%CI=0.13, 2.58) were less likely to suffer from Cold and of profession small business (OR=3.70, 95% CI=0.72, 18.94) was more likely than other professions. For the slum dwellers, profession and family status had significant effect on suffering from Flue in Winter season which also revealed that daily laborer (OR=17.41, 95%CI=3.04, 99.71), small businessmen (OR=2.63, 95%CI=0.36,19.17) and rickshaw puller (OR=6.55, 95%CI=1.05, 41.02) are more likely than other professions and respondents with unique family (OR=0.17, 95%CI=0.05,0.56)

are less likely to suffer from Flue than combined family. But in Rainy season, it was found that only family status had significant effect on it and respondents with unique family (OR=0.25, 95%CI=0.08,0.76) are less likely to suffer from it than combined family. However, none of the covariates were found to have significant effect to Asthma in both Winter and Rainy season.

4. Conclusion

Slum is the single most common place where low-income families live, accordingly standards of health also tends to be worse than for the non-poor [4]. Therefore an attempt was made to observe prevalence of very common diseases and their influential covariates among the slum dwellers of Rajshahi City Corporation during extreme Winter and Rainy season. This paper summarizes the output of the pilot survey. It was found that Cold, Flue and Asthma were most common diseases that adult slums were suffering in those extreme periods with some other diseases, but not suffering from Pneumonia. Analytical results suggested that in extreme Rainy season, daily laborer and rickshaw puller were less likely to suffer from Cold comparative to other professions, whereas small businessmen were more likely to suffer from it. It might be due to the fact that daily laborer and rickshaw pullers have their option not to go out on those extreme days. Slum dwellers with more family members suffered more from Cold than small family members in Rainy season might be due to not having enough dry space in their house. Slums who were daily laborer, rickshaw puller and small businessmen were more likely to suffer from Flue in winter season and also combined family than unique family. The reason might be to come in contact with other people more which helped to spread the disease. Same picture of family status was found for Rainy season. Slums of Rajshahi City Corporation were suffering from Asthma in both extreme weathers irrespective of all covariates which were really alarming. As the study is a pilot study, main study may provide more interpretable information.

There is no doubt that slum dwellers of Rajshahi City Corporation suffers from various diseases because of extremeness of the seasonal variation as they are not able to maintain them very well which might be because of their lack of ability or their ignorance than other slum areas of Bangladesh. Since slums are also part of our society, government and various NGOs should be caring to the slums, too. According to the analytical results and interpretations some recommendations are given bellow:

- Awareness about some common diseases, especially for asthma should be increased among all slum dwellers.

- Health related NGOs should increase their activities to increase knowledge about common diseases, their spread and respective care seeking practices among slum dwellers.
- Who cannot manage warm clothes in winter themselves; they should provide warm cloths by other ways to minimize the cold related diseases in extreme winter.

Lastly by means of feasible action plans focused on a broad urban development vision that will lead to lasting and meaningful improvements in the health and lives of slum dwellers.

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Table 1: Characteristics of study subjects

Characteristics	(N = 148)
Female (%)	83(56.08)
Age, mean, SD	30.88(10.68)
Education (%)	
Illiterate	83(56.08)
Primary	51(34.46)
Secondary	14(9.46)
Profession (%)	
Labor	32(21.62)
Business	11(7.43)
Pulling Rickshaw	16(10.81)
Hawker	1(0.68)
Other	88(59.46)
Religion (%)	
Islam	144(97.30)
Hindu	4(2.70)

Others	0
Family members, median (IQR)	
Adult	3 (4-2)
Non-adult	2 (3-1)
Earning members, median (IQR)	
Adult	2 (2-1)
Non-adult	0(0-0)
Family income per year, mean (S.D.)	90492.57(67068.48)
Saving per year, mean (S.D.)	1182.05(1705.07)
Manage winter extremeness:	
Manage worm cloths (%)	
Own	138(93.24)
Govt. help	0
Non-govt. help	1(0.68)
Own,Non-govt. help	8(5.41)
Own,Govt.,Non-govt help	1(0.68)
Store after winter (%)	141(95.27)
Suffer from any disease in winter (%)	
Cold	130 (87.83)
Flue	81(54.73)
Pneumonia	0
Asthma	20(13.51)
Others	37(25)
Manage rainy extremeness:	
Manage heavy raining (%)	
Own saving	148(100)
Govt. help	0
Non-govt. help	0
Suffer from any disease in rainy (%)	
Cold	56(37.83)
Flue	54(36.49)
Pneumonia	0
Asthma	17(11.49)
Others	80(54.05)

Table 2: Association of various covariates with diseases (in Winter).

		Suffering from Cold		**Suffering from Flue**		**Suffering from Asthma**	
		No(%)	Yes(%)	No(%)	Yes(%)	No(%)	Yes(%)
No. of family	<3	2(11.11)	37(28.46)	24(28.62)	15(22.39)	34(26.56)	5(25.0)
	4	9(50.00)	23(17.69)	15(18.52)	17(25.37)	27(21.09)	5(25.0)
	5	7(38.89)	70(53.85)	42(51.85)	35(52.24)	67(52.34)	10(50.0)
P-value (Chi-square)		**0.028**		0.315		0.593	
No. of earning	1	12(66.67)	58(44.62)	40(49.4)	30(44.8)	62(48.44)	8(40.0)
	2	3(16.67)	37(28.46)	28(34.6)	12(17.9)	33(25.78)	7(35.0)
	3	2(11.11)	24(18.46)	10(12.3)	16(23.9)	23(17.97)	3(15.0)
	4	1(5.56)	11(8.46)	3(3.7)	9(13.4)	10(7.81)	2(10.0)

P-value (Chi-square)		0.373		**0.012**		0.810	
Family income per year (tk)	≤60000	9(50.0)	42(32.31)	28(34.57)	23(34.33)	48(37.50)	3(15.0)
	61000-120000	6(33.3)	66(50.77)	42(51.85)	30(44.78)	56(43.75)	16(80.0)
	120000+	3(16.67)	22(16.92)	11(13.58)	14(20.90)	24(18.75)	1(5.0)
P-value (Chi-square)		0.304		0.463		**0.008**	
Profession	Daily Labor	2(11.11)	30(23.07)	8(9.88)	24(35.82)	25(19.53)	7(35.00)
	Small business	1(5.56)	10(7.69)	7(8.64)	4(5.97)	10(7.81)	1(5.00)
	Pulling rickshaw	1(5.56)	15(11.54)	9(11.11)	7(10.45)	15(11.72)	1(5.00)
	Other	14(77.78)	75(57.69)	57(70.37)	32(47.76)	78(60.94)	11(55.00)
P-value (Chi-square)		0.398		**0.002**		0.416	
Family status	Unique	16(88.89)	85(65.38)	67(82.72)	34(50.75)	87(67.98)	14(70.00)
	Combined	2(11.11)	45(34.62)	14(17.28)	33(49.25)	41(32.03)	6(30.00)
P-value (Chi-square)		**0.045**		**<0.001**		0.856	

Table 3: Association of various covariates with diseases (in Rainy season)

		Suffering from Cold		**Suffering from Flue**		**Suffering from Asthma**	
		No(%)	Yes(%)	No(%)	Yes(%)	No(%)	Yes(%)
No. of family membe	<3	17(18.48)	22(39.28)	29(30.85)	10(18.52)	35(26.72)	4(23.53)
	4	23(25.0)	9(16.07)	18(19.15)	14(25.93)	28(37.37)	4(23.53)
	5	52(56.52)	25(44.64)	47(50.00)	30(55.56)	68(51.91)	9(52.94)
P-value (Chi-square)		**0.017**		0.238		0.910	
No. of earning member	1	38(41.30)	32(57.14)	47(50.00)	23(42.59)	61(46.56)	9(52.94)
	2	23(25.0)	17(30.36)	29(30.85)	11(20.37)	35(26.72)	5(29.41)
	3	22(23.91)	4(7.14)	13(13.83)	13(24.07)	25(19.08)	1(5.88)
	4	9(9.78)	3(5.36)	5(5.32)	7(12.96)	10(7.63)	2(11.76)
P-value (Chi-square)		**0.024**		0.097		0.494	
Family income per year (tk)	≤60000	34(36.96)	17(30.36)	33(35.11)	18(33.33)	49(37.40)	2(11.76)
	61000-120000	39(42.39)	33(58.93)	45(47.87)	27(50.00)	57(43.51)	15(88.24)
	120000+	19(20.65)	6(10.71)	16(17.02)	9(16.67)	25(19.08)	0(0.00)

P-value (Chi-square)		0.109		0.968		**0.001**	
Profession	Daily Labor	26(28.26)	6(10.71)	13(13.83)	19(35.18)	25(19.08)	7(41.18)
	Small business	4(4.35)	7(12.50)	7(7.45)	14(7.41)	10(7.63)	1(5.88)
	Pulling Rickshaw	10(10.87)	6(10.71)	12(12.77)	4(7.41)	15(11.45)	1(5.88)
	Other	52(56.52)	37(66.07)	62(65.96)	27(50.00)	81(61.83)	8(47.06)
P-value (Chi-square)		**0.029**		**0.025**		0.269	
Family status	Unique	54(58.70)	47(83.93)	74(78.72)	27(50.00)	90(68.70)	11(64.71)
	Combined	38(41.30)	9(16.07)	20(21.28)	27(50.00)	41(31..30)	6(35.29)
P-value (Chi-square)		**0.001**		**<0.001**		0.739	

Table 4: Analyzing covariates to diseases (in Winter) by Logistic Regression

	Suffering from Cold		**Suffering from Flue**		**Suffering from Asthma**	
	B (p-value)	OR(95% CI)	B (p-value)	OR(95% CI)	B (p-value)	OR(95% CI)
Age	-0.02(0.468)	0.98(0.92,1.04)	-0.01(0.672)	0.99(0.95,1.03)	0.02(0.471)	1.02(0.97,1.07)
Gender(male)	-0.11(0.893)	0.89(0.18,4.49)	-1.47(0.074)	0.23(0.05,1.15)	0.15(0.845)	1.16(0.27,5.03)
Profession	-- (0.633)		-- (0.010)		–(0.406)	
Daily Labor	0.96(0.359)	2.62(0.33,20.53)	2.86(0.001)	17.41(3.04,99.71)	0.60(0.455)	1.81(0.38,8.62)
Small business	1.05(0.433)	2.86(0.21,39.47)	0.97(0.340)	2.63(0.36,19.17)	-0.45(0.717)	0.64(0.06,7.33)
Pulling Rickshaw	1.53(0.239)	4.61(0.36,58.76)	1.88(0.045)	6.55(1.05,41.02)	-1.22(0.327)	0.30(0.03,3.37)
Family Status (Unique)	-1.17(0.213)	0.31(0.05,1.96)	-1.75(0.003)	0.17(0.05,0.56)	0.38(0.622)	1.47(0.32,6.77)
No. of family member	-0.47(0.204)	0.62(0.30,1.29)	-0.16(0.560)	0.86(0.51,1.44)	-0.07(0.847)	0.93(0.46,1.89)
No. of earning member	0.21(0.592)	1.24(0.57,2.70)	0.06(0.844)	1.06(0.61,1.83)	0.31(0.349)	1.37(0.71,2.62)
Family income	0.00(0.454)	1.00(1.00,1.00)	0.00(0.272)	1.00(1.00,1.00)	0.00(0.605)	1.00(1.00,1.00)
Constant	4.37(0.023)		1.94(0.152)		-2.78(0.126)	
Hosmer-Lemeshow Test	Chi-square=9.21,df=8, p-value=0.325		Chi-square=5.19,df=8, p-value=0.737		Chi-square=7.07,df=8, p-value=0.529	

Table 5: Analyzing covariates to diseases (in Rainy season) by Logistic Regression

	Suffering from Cold		**Suffering from Flue**		**Suffering from Asthma**	
	B (p-value)	OR(95% CI)	B (p-value)	OR(95% CI)	B (p-value)	OR(95% CI)
Age	-0.00(0.962)	1.00(0.96,1.04)	-0.00(0.933)	1.00(0.96,1.04)	0.04(0.147)	1.04(0.99,1.09)
Gender(male)	0.34(0.576)	1.40(0.43,4.51)	-0.52(0.429)	0.59(0.16,2.16)	0.46(0.583)	1.58(0.31,8.18)
Profession	–(0.019)		–(0.106)		–(0.438)	
Daily Labor	-1.40(0.055)	0.25(0.06,1.03)	1.56(0.029)	4.75(1.18,19.16)	0.57(0.506)	1.76(0.33,9.34)
Small business	1.31(0.117)	3.70(0.72,18.94)	0.52(0.548)	1.68(0.31,9.04)	-0.68(0.604)	0.51(0.04,6.54)
Pulling Rickshaw	-0.56(0.469)	0.57(0.13,2.58)	0.26(0.762)	1.30(0.24,7.01)	-1.09(0.400)	0.34(0.03,4.26)
Family Status (Unique)	1.14(0.064)	3.11(0.94,10.36)	-1.39(0.015)	0.25(0.08,0.76)	-0.56(0.478)	0.57(0.12,2.68)
No. of family member	-0.50(0.050)	0.61(0.37,1.00)	0.07(0.812)	1.07(0.62,1.82)	0.15(0.709)	1.16(0.53,2.58)
No. of earning member	-0.25(0.375)	0.78(0.45,1.35)	0.11(0.672)	1.12(0.67,1.88)	-0.26(0.497)	0.77(0.36,1.64)
Family income	0.00(0.093))	1.00(1.00,1.00)	0.00(0.139)	1.00(1.00,1.00)	0.00(0.483)	1.00(1.00,1.00)
Constant	0.63(0.625)		0.46(0.735)		-2.81(0.150)	
Hosmer-Lemeshow Test	Chi-square=6.49,df=8,p-value=0.592		Chi-square=10.29,df=8,p-value=0.245		Chi-square=11.61,df=8,p-value=0.169	