



## URBAN-RURAL COMPARISON OF SOCIO-DEMOGRAPHIC PREDICTORS OF COMMUNITY DISASTER PREPAREDNESS IN FIELD PRACTICE AREAS OF A MEDICAL COLLEGE IN WEST BENGAL, INDIA.

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### ABSTRACT

**Background:** South Bengal is a multi-hazard prone area. Disaster preparedness at the community level serves to mitigate the far-reaching consequences of disasters. The present study attempts to estimate the state of disaster preparedness in urban and rural communities served by a Medical college of West Bengal and to determine the socio-demographic parameters that could predict adequate disaster preparedness.

**Methods:** 202 eligible individuals each from the rural and urban setting, selected by quota sampling, were interviewed for socio-demographic details and information relating to disaster preparedness.

**Result:** 46.1% had faced a prior disaster. 26.1% thought that their locality was prone to disaster. More than three-quarters relied on newspapers for information. 37.2% had training in first aid and 51.5% had contact information of "rescue functionaries". Significant predictors of disaster preparedness were Business as occupation, rural residence and Post-primary level of education.

**Conclusions:** Disaster preparedness was low. There was hardly any formulated disaster plan.

### KEYWORDS : community, disaster preparedness, urban, rural

#### INTRODUCTION:

Disaster is "a serious disruption of functioning of a community or a society causing widespread human, material, economic or environmental losses that exceed the ability of the affected community or society to cope using its own resources" (World Health Organization, 2016).

Disasters are not confined to a particular part of the world; they can occur anywhere and at any time. Major emergencies and disasters have occurred throughout history and as resources become more limited, communities including those in our own state are increasingly becoming vulnerable to the hazards that can cause disaster (Biswas et al., 1997, 2017).

Disaster preparedness aims to reduce the damage caused by natural hazards like earthquakes, floods, droughts and cyclones, through an ethic of prevention (United Nations International Strategy for Disaster Reduction (UNISDR), 2009). It is the concept and practice of reducing disaster risks through systemic efforts to analyze and reduce the causal factors of disasters. Reducing exposure to hazards lessening vulnerability of people and property (United Nations International Strategy for Disaster Reduction (UNISDR), 2009). Highly populated cities in Asia are at greater risk of emergency resulting from natural disasters; the Southern part of West Bengal is certainly no exception (Chan et al., 2016). According to the World Disaster Report 2016, the total number of reported disasters was highest in Asia: 240 in 2015, highest of all regions (International Federation of Red Cross and Red Crescent Societies, 2016). South Bengal has weathered many disasters, like the 'Amphan' Cyclone in 2020, tremors related to the Nepal Earthquake in 2015, Cyclone 'Aila' in 2009 and floods in 2017 and 1978.

There is a relative dearth of comparative studies of disaster preparedness in rural & urban areas in this part of the country (Sharma R et al., 2015). Hence, this study was conceived to address the lack of recent data upon this important public health issue. It attempts to estimate the state of disaster preparedness in urban and rural communities served by a medical college in the Southern part of West Bengal and determines the socio-demographic parameters that could predict adequate disaster preparedness.

#### METHODOLOGY:

The present descriptive study with cross-sectional design was conducted over a period of 3 months (November 2019 to January 2020) in the urban and rural field practice areas of a medical college in Paschim Medinipur district in West Bengal. The urban field comprises of families served by the Urban Health Training Centre of the College, located at Sarat pally in Midnapore town. The rural field consists of villages that are served by The Deypara (Chandra) Block Primary Health Centre, of Paschim Medinipur District, about 20 kilometers from the college.

Consenting adults, not severely ill, residing in the urban & rural field practice areas of the medical college for at least one year were included for the study. However, those who did not complete the interview or withdrew their consent after initially agreeing to be interviewed were excluded.

Using the formula  $n = z^2 pq / l^2$ , a sample size (n) of 404 was calculated, taking standard prevalence (p) of disaster preparedness to be 50.0%, 'q' being (1-p), an absolute error (l) of 5.0% at 95% level of confidence with an expected attrition of 5%. 202 participants each from all eligible residents in the urban and rural areas were selected using Quota sampling by house-to-house survey and interviewed after obtaining informed consent. A pre-designed and pre-tested structured data collection schedule inquiring about socio-demographic details and assessing the knowledge and state of disaster preparedness was used for data collection.

Required ethical permission was taken from the Institutional Ethics Committee of the concerned medical college.

Statistical Packages for Social Science (SPSS)® (SPSS Inc, Chicago, IL, USA) version 16.0 was used for data entry and analysis. Results were analyzed using simple frequencies and descriptive statistics. Associations between socio-demographic variables and disaster preparedness were assessed using Pearson's Chi-squared test for Independence. Predictor variables emerging significant on univariate analysis were then entered in a step-wise fashion into a logistic regression model with disaster preparedness as the dependent variable and tested.

For the purpose of the study, disaster preparedness was a composite index of whether the respondent had ready stock of food, essential medicines and water for 72 hours, and had contact numbers of persons in authority at hand and training in first aid. Respondents satisfying all the five criteria were considered to have adequate disaster preparedness.

#### RESULTS:

Although the planned sample size was 404, 7 participants (4 from the urban arm and 3 from rural), had to be excluded at the data analysis stage due to incomplete responses.

More than 95% of the study participants were of the economically productive age group. Similar proportions of people residing in urban and rural areas. 90.0% of respondents were practising Hinduism, 84.2% were currently married. 19.3% were illiterate, and about 18% were educated till Higher Secondary or higher. Approximately 28% were engaged in either business or service. (Table 1)

**Table 1: Socio-demographic and background characteristics of**

**the study participants (n=397):**

Characteristic	Number (Percentage)
<b>Age</b>	
18-64 years	366(96.6)
65 years and above	13(3.4)
<b>Residence</b>	
Rural	183(48.3)
Urban	196(51.7)
<b>Gender</b>	
Male	154(40.6)
Female	225(59.4)
<b>Religion</b>	
Hinduism	341(90.0)
Islam	37(9.8)
Others	1(0.2)
<b>Marital Status</b>	
Currently married	319(84.2)
Currently unmarried	60(15.8)
<b>Financial Status</b>	
APL	190(50.1)
BPL	189(49.9)
<b>Education: Highest level attained</b>	
Graduate	38(10.0)
Passed Higher Secondary	32(8.4)
Illiterate	73(19.3)
Up to Primary level	116(30.6)
Post-Graduate	4(1.1)
Up to Secondary level	116(30.6)
<b>Occupation</b>	
Business	73(19.3)
Others	254(67.0)
Service	36(9.5)
Student	16(4.2)

46.1% had faced a prior disaster. Among them, 22.7% had faced earthquake, followed by 13.9% fire and 14.5% storm. 26.1% thought that their locality was prone to disaster. Among those who thought that their area was vulnerable, most identified vulnerability towards earthquake and floods (43.4% each). Regarding the source of information on disasters, more than three-quarters relied on newspapers (75.7%), 18.2% sourced their information from the Internet. (Table 2)

**Table 2: Knowledge and experience of study participants about disasters**

Variable	Number (Percentage)
<b>Faced a prior disaster (n=397):</b>	
Yes	177 (44.6)
No	220 (55.4)
<b>Type of disaster faced (n=177):*</b>	
Earthquake	86(48.6)
Fire	53(29.9)
Storm	55(31.1)
<b>Whether locality is prone to disaster (n=397):</b>	
Yes	99 (24.9)
No	298 (75.1)
<b>Perceived disaster vulnerability of locality (n=397):*</b>	
Collapse	11 (2.8)
Earthquake	172 (43.4)
Flood	172 (43.4)
Fire	20 (5.0)
Storm	91 (22.9)
<b>Sources of information on disasters (n=397):*</b>	
Newspaper	92(75.7)
TV	326(86.0)
Radio	35(9.2)
Internet	69(18.2)

\*Multiple response

Analysis of collected data showed that 65.2% of people had kept 72-hour stock of food; 73.4% people had kept 72-hour stock of water,

44.6% had stocked a 72-hr supply of medicines. Only 37.2% had training in first aid and 51.5% had contact information of "rescue functionaries" available at hand. As per the criteria set up for this study, 16.1% were having adequate disaster preparedness. 4.6% had a formulated disaster plan, more commonly found among urban residents than rural residents (at a ratio of 8:1). (Table 3)

**Table 3: Distribution Of Study Subjects According To The Parameters Used For Measuring Disaster Preparedness (n=397)**

Item	Number (Percentage)
72-hr stock of food	247(65.2)
72-hr stock of water	278(73.4)
72-hr stock of Medicines	169(44.6)
Training in First Aid	141(37.2)
Contact information of "rescue functionaries" available at hand	195(51.5)

On univariate analysis exploring the association between socio-demographic factors and disaster preparedness: Residence ( $p=0.002$ ), financial Status ( $p=0.005$ ), occupation ( $p=0.040$ ), were significantly associated. On performing a multinomial logistic regression with dependent variable as presence of Disaster preparedness, the predictors that emerged with statistical significance were: Business (AOR=4.089), Rural Residence (AOR=0.304) and Post-primary level of education (AOR=1.531). (Table 4)

**Table 4: Results Of Multinomial Logistic Regression Of Socio-demographic Predictors For Disaster Preparedness (n=397)**

	Adjusted Odds Ratio (AOR)	95% C.I. for AOR		p value
		Lower	Upper	
<i>Occupation:</i>				
Student (reference)				
<b>Business</b>	<b>4.089</b>	<b>1.021</b>	<b>16.369</b>	<b>.047</b>
Others	2.185	.652	7.325	.205
Service	1.595	.409	6.226	.502
<i>Residence:</i>				
Urban (reference)				
<b>Rural</b>	<b>.304</b>	<b>.162</b>	<b>.568</b>	<b>&lt;0.0001</b>
<i>Financial Status:</i>				
BPL (reference)				
APL	.695	.370	1.306	.258
<i>Education:</i>				
Illiterate (reference)				
Upto Primary	.579	.193	1.733	.328
<b>Post-primary</b>	<b>1.531</b>	<b>1.065</b>	<b>2.202</b>	<b>0.024</b>

**DISCUSSION**

This study attempted to examine the socio-demographic determinants of disaster preparedness in the community residing in rural and urban field areas of a medical college in Paschim Medinipur district of West Bengal.

The findings so obtained paint an interesting picture of the disaster preparedness situation in the field practice areas of the medical college. In the present study, 24.9% participants thought that the area was disaster-prone. In a Hong Kong based study, 82.3% respondents did not see their area as disaster prone; infectious disease outbreak was the most common threat perceived (72.4%), followed by Typhoon (12.6%) and Fire (7.1%) (Chan et al., 2016). In the current study, the most common threat perceived was due to Earthquake or Flood (43.4% each), followed by Storm (22.9%).

**Information sources:**

75.7% of participants of this study quoted newspapers and 86.0% said TV was their primary source of disaster-related information. In an Australian study by Cretikos et al. (2008) on the sources of disaster information during and after a storm, radio (78%), family, friend, colleagues and neighbours (50%) and TV (45%) were the main sources cited; storm preparations were made by 42% households.

In the current study, 37.2% reported that they possessed training of any sort in first aid, whereas 26.1% participants reported the same in a study by Chan et al., (2016). 15.1% respondents had first aid training, as was pointed out by a survey conducted among female homemakers in Delhi (Sharma R et al., 2015). In a large survey in urban China, the

level of preparedness was even worse: less than 5% (Xu et al., 2015). In a Delhi based study by Sharma R et al., (2015) only 2.7% were adequately prepared.

### Results of logistic regression:

In a Chinese study, middle age group (40-64 years) (OR=1.52, 95% CI=1.07, 2.16  $p < 0.05$ ) was associated with a higher likelihood of better household preparations compared to younger age group (15-39 years) (Chan et al., 2016).

In the present study, business (AOR=4.089), Rural Residence (AOR=0.304) and Post-primary level of education (AOR=1.531) were significant predictors of disaster preparedness. In a study by Xu et al., (2015), conducted in urban China, educational attainment was not a significant predictor, and was not entered into the regression model. Instead, women (OR=1.691), higher household income (OR 1.666-2.117), previous experience with emergency (OR=1.552), higher knowledge about emergency (OR=2.192), risk awareness (OR=1.531) were associated with adequate disaster preparedness. In a study conducted in a rural minority population of China, disaster preparedness was not significantly associated with prior experience of disaster (Chan et al., 2014). In a major study among residents of Teheran, Iran, disaster preparedness was mainly governed by monthly income level, prior disaster experience, residential area and occupation (Najafi et al., 2015).

### CONCLUSION:

This cross-sectional study attempted to examine socio-demographic factors that may help to predict the adequacy of disaster preparedness among urban and rural communities living in West Bengal. Important findings that emerged from the study were that the level of disaster preparedness was low (16.1%) and only 4.6% respondents had formulated a disaster plan. The predictors of adequacy of disaster preparedness that emerged with statistical significance after regression modelling were business (as an occupation), rural residence and post-primary level of education. Preparedness is of paramount importance as outlined by a statistical study of disasters in India (Mishra P et al., 2016). In a study done in India by Kar (2010), the findings underlined the importance of pre-disaster planning, proper training of disaster management personnel, harnessing the capabilities of community-level volunteers, and fortifying coping strategies as possible interventions for increasing resilience. A qualitative study in rural Kenya, four broad areas that may raise the level of disaster preparedness were revealed: "1) better awareness, (2) improved availability, (3) developed routines, and (4) personal responsibility" (Karvinen et al., 2016).

Limitations encountered during the study were social desirability bias of the respondents and the fact that field areas of only one teaching medical institution was considered.

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