Extent and Causes of Hospitalizations in India

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ABSTRACT

For emergency, hospitalization is the only option. There may be other reasons for hospitalization of people in a country. To understand the major causes for hospitalizations in India, we have used National Sample Survey 71st round data on health which was collected from different geographical regions of the country during January 2014 to June 2014.Data were collected on different issues of hospitalization such as: whether hospitalised during last 365 days: if yes, number of times hospitalized, other information was also taken on sex, age, religion, social group (SC/ST/OBC/Gen) of the individuals/households, type of latrine, drainage system, drinking water source, cooking source etc.

The present paper tries to examine whether difference exists between age, sex, various social groups, religions with number of hospitalized cases. And how do the various latrine facilities, drainage system, drinking water sources, sources of cooking are affecting the number of hospitalizations?

Almost equal numbers of male and female persons were taken in the sample (male 168697, Female 164407). But the number of females hospitalized during the last one year is double than that of males. The chi-square test shows that there is a significant relationship between hospitalization and gender difference. Thus, it appears that women are more vulnerable than men to many of the diseases. There is also some possibility of gender discrimination against females.

Sex, age, education, religion have direct effect on hospitalization. Another important reason is that those people who are using good quality latrine, drainage and cooking sources are more prone to be hospitalized than others. People who are using bottled water, tap water, tube well or hand pump as a source of drinking water are less hospitalized than the rest. So, it reflects the awareness among them.

More researches should be done on household characteristics and its effect on health. Despite the limitations of hospital-based data, this paper gives a reasonable insight of the important causes for hospitalizations in uprising health complexes that may guide the policy-makers in strengthening and prioritizing the health condition in India.

Keywords: Hospitalization, National Sample Survey, Age-sex structure, Latrine facility, Drainage facility, Cooking facility, Logistic regression, India.

INTRODUCTION

In case of emergency, hospitalization is the only option. There may also be other reasons for a person to be hospitalized. According to 71st round of National Sample Survey report, 15% of total sample individuals got hospitalized once or more than once during the last one year. Differentials exist on number of hospitalizations when we consider various socio-economic groups taking age, sex, caste, religion etc. Variations in the percentage of hospitalizations also exist with different kinds of drainage systems, drinking water sources, cooking sources, latrine facilities of the households. All these are considered in our study. In this study, we seek answer to the following questions:

1. Whether various age groups do follow any pattern when hospitalization is considered.
2. How much difference exists between different sex, various social groups and religion groups with number of hospitalizations?
3. How do the various latrine facilities, drainage system, drinking water source, cooking source affect number of hospitalizations?

Number of hospitalizations has been taken because it can reveal the real situation of individual′s healthor wellbeing of any group at the extreme level.

Government of India has a comprehensive public health infrastructure in India. There are large number of Public Health Centres (PHCs) and Community Health Centres (CHCs). Besides, Auxiliary Nurse Midwives and Male Health workers are available almost in every village. But the question is: whether the health care system is enough and whether it runs efficiently. It is difficult to answer the second question. But about the first we would like to point out that majority of Indian population avail private sector health care. In fact, private sector takes care of about 80 percent outpatients (NHP 2015). The National Rural Health Mission (NRHM) (2005-12) was launched in April 2005 by GOI with special focus to18 States, which need health care more than other States. All the villages in these 18 states will be covered by NRHM through "Accredited Social Health Activists" (ASHA)(NRHM, 2005).Then, there was a government-subsidized National Health Insurance Program for unorganized workers. It provided coverage of nearly $500 per family per year for hospital care for vulnerable groups. But people's out-of-pocket spending remained almost same (Reddy, 2015).

In 2014 a universal health care System was introduced, which is known as National Health Assurance Mission. This is aimed to provide all citizens with free drugs, diagnostic treatments, and insurance for serious ailments (Kalra, 2014). In 2015, implementation of a universal health care system was delayed due to budgetary concerns (Kalra, 2015).Most of the studies deal with costs incurred due to hospitalization. Prior to this, one should think of how to prevent hospitalization. Common sense suggests that the provision of balanced food,

pure water, sanitation, and education are the most important factors towards sound health (Bajpai, 2014).

It will be incomplete if we do not say anything about the Jan Swasthya Abhiyan (JSA). The JSA is the Indian circle of the Global People's Health Movement, which was formed in 2001, just after the First Global Peoples Health Assembly, in Dhaka, in December 2000. The JSA believes that there are disturbing evidences of rising disparities in health status among people in India and worldwide, despite of having large number of medical colleges and producing large numbers of doctors in India. Majority of citizens has very limited access to quality healthcare in India.

Variation in socio-economic factors results in discrepancies in the use of health care services. People having education at high school level and above use primary health care less than those who don't complete high school education.

There exist strong genders differences when healthcare is the concerning issue. Various social, economic, demographic factors are important for the ill health in India. Gender differences were significantly observed in morbidity prevalence with females at greater risk of ill health than male (Ghosh & Arokiasamy, 2009).

The leading causes of hospitalization in Sri Lanka, were traumatic injuries, respiratory diseases, viral illnesses and gastrointestinal tract (GIT) diseases, while the leading causes of death were ischemic heart disease, gastrointestinal diseases tract (GIT) disease and cerebrovascular accident (Annual Health Bulletin, 2002; Jawaid et al., 2004).

In Canada, cardiovascular disease, cancer and respiratory disease were the most common causes of hospitalization (Respiratory Disease in Canada, 2001).

Religious belief was found to be associated with a reduced likelihood of engaging in risk behaviour such as alcohol and drug abuse and cigarette smoking (Klocker et al., 2011). We thus thought of taking religion as one of the factors in our analysis. Also, there are evidences that poor sanitation falls disproportionally on the poorest household and particularly on children.

DATA

In our study we have used National Sample Survey 71st round data. It is an all India household level data which was collected during January 2014 to June 2014.

The National Sample Survey (NSS) was set up by the Government of India in 1950 to collect socioeconomic data every year employing scientific sampling methods. From time to time NSS Organisation also collects data on various issues of national importance like health, education etc. The latest data on health was collected in 2014.

Schedule 25.0 of 71st round was used to take data on health. Following question had been asked to know about hospitalization: "whether hospitalised during last 365 days: if yes, number of times hospitalized." Along with this, other information was also taken through this schedule. However, the usual information on sex, age, religion, social group (SC/ST/OBC/Gen) of the individuals/households has been used by us. Other information, used by us, includes household income, type of latrine, drainage system, drinking water source, cooking source etc.

METHODS

The methodology used here is based on simple statistical tables and logistic regression. In case of two-way contingency tables, Chi-square tests have been used to see whether the two categorical variables have any association. About hospitalization we had only two possible responses: "yes" or "no". This is obviously a binary variable which has been taken as a dependent variable. We wanted to see whether the explanatory variables influence the decision of hospitalization. Since the dependent variable is binary, the usual linear regression has many problems. Thus, we have taken Logistic regression to know whether the independent variables significantly affect hospitalization.

The independent variables are either categorical variables or have been categorized into different groups according to the very purpose.

Variables	Category
Sex	Male and Female
Age group	0-4,5-9,10-14,15-29,30-44,45-59, 60 and Above
Education	Below primary, Primary and above
Religion	Hindu and Non-Hindu
Social group	(SC/ST/OBC and General
Latrine type	Latrine Service, Pit, Septic tank and Others
Drainage type	*Pucca* drainage system and Others
Drinking water source	Bottled, Tap, Tube well and Others
Cooking sources	LPG, *Gobar gas* and Others

RESULTS

There is almost equal number of male and female persons in the sample (Male: 168697, Female: 164407). But the number of females hospitalized during the last one year (31911) is about double that of males (17912) (Table 1). The chi-square test shows that there is a significant relationship between hospitalization and sex of the person. Thus, it appears that women are more vulnerable than men to many of the diseases. There is also some possibility of gender discrimination against females.

Table 1.Number of People Hospitalized by Sex

Sex	Numbers Hospitalized (Last 365 days)		Total	% hospitalized
	Yes	No		
Female	31911	132496	164407	19.41
Male	17912	150785	168697	10.62
Total	49823	283281	333104	14.96

There is a positive relation between the percentage of people hospitalized and age. Because, as age increases, health complicacy increases, and people are more likely to get admitted in hospital. From Table 2, we see that percentage of hospitalized cases in the age group 5-9 is minimum and more or less same in each age group (About 6%). It suddenly increases to as high as 19 percent in the age group 15-29 years. And then it more or less remains stagnant up to age 59 year. It then increases to about 26 percent in the age group 60 year or more (fig.1).

Table 2. Number of People Hospitalized by Age Group

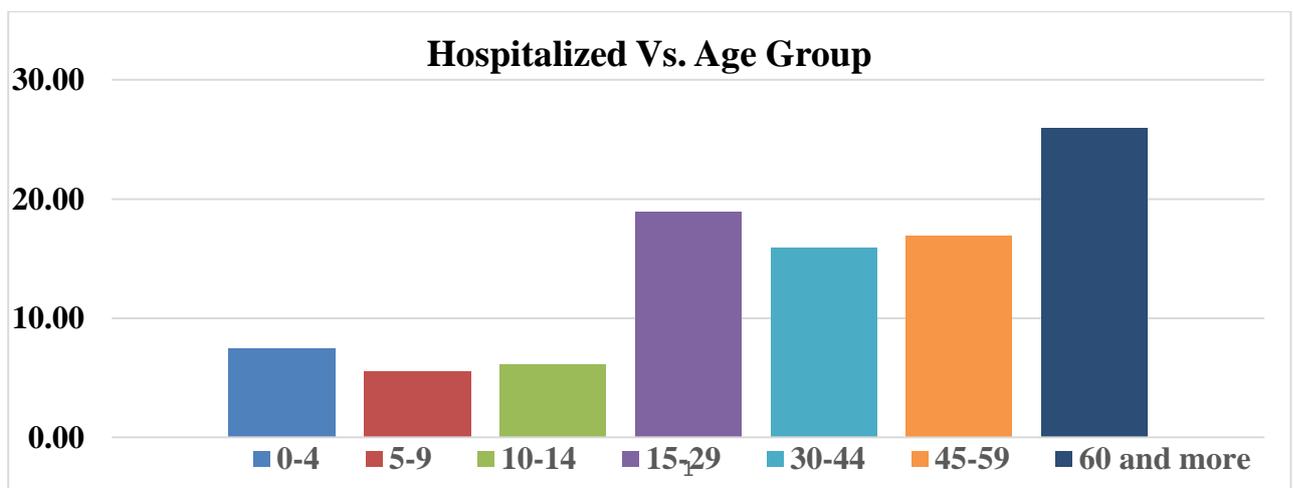|		No. hospitalized (Last 365days)		Total	%hospitalized
		Yes	No		
Age group	0-4	3106	38534	41640	7.46
	5-9	1594	27135	28729	5.55
	10-14	1716	26471	28187	6.09
	15-29	17790	76057	93847	18.96
	30-44	10585	55936	66521	15.91
	45-59	7962	38973	46935	16.96
	60 or more	7070	20175	27245	25.95
Total		49823	283281	333104	14.96

Figure 1. Percentage of people hospitalized by Age Group

We expect the educated people to be more aware to the pros and cons of food habit and hygienic practices and hence are likely to get hospitalized. But the data show a different picture (Table 3). Where average level of overall hospitalization is 14.96 percent, only 13.57 percent people are hospitalized among those who are educated up to primary level. The percentage increases as education level increases. In the 'above primary to higher secondary' level the percentage of hospitalized case is 16.60 percent, whereas in the 'above higher secondary' group the percentage increases to 18.25. This is also statistically significant at 1% level. It looks strange. We do not have any explanation to it.

Table 3. Number and Percentage of People Hospitalized by Level of Education

Level of Education	No. hospitalized (Last 365 days)		Total	% hospitalized
	Yes	No		
Up to primary	26721	170120	196841	13.57
Above Primary to Higher Secondary	17738	89119	106857	16.60
Above Higher Secondary	5364	24035	29399	18.25
Total	49823	283274	333097	14.96

We have done our religion-based analysis by using two categories – Hindu vs. non-Hindu and Islam vs. non-Islam. Hindus have been seen to be the most affected so far as hospitalization is concerned, as there are more Hindus hospitalized (15.27%) than that of non-Hindus (13.98) when seen as percentages. Is it because Hindus have less access to the hospitals? We have no evidence. Hindus are spread over all regions, whereas the non-Hindus have pockets where they are concentrated. This phenomenon is known as segregation. But it is difficult to put forward this phenomenon as one of the reasons.

As Hindus and Muslim constitute more than 90 percent population, the percentages can be easily imagined when Muslim, Non-Muslim groups are taken. For Muslim, the percentage is only 13.6. It is possible that the Muslims are more reluctant to go to hospitals. There may be religious taboos on women to go outside home. The results are also statistically significant for both the types of groups.

Table 4. Number and Percentage of People Hospitalized: Hindu vs. Non-Hindu

	No. Hospitalized (365 days)		Total	% Hospitalized
	Yes	No		
Non-Hindu	11345	69835	81180	13.98
Hindu	38478	213446	251924	15.27
Total	49823	283281	333104	14.96

Table 5. Number and Percentage of People Hospitalized: Muslim Vs. Non-Muslim

	No. Hospitalized (365 days)		Total	% Hospitalized
	Yes	No		
Non- Muslim	42995	239897	282892	15.20
Muslim	6828	43384	50212	13.60
Total	49823	283281	333104	14.96

General category people are more likely to get admitted in hospital than people in the reserved people. 15.60 percent of general people whereas only 14.68 percent of reserved people were admitted in hospital (Table 6). Here, it should be mentioned that hospitals include private nursing homes also. Only affluent people can afford to avail private nursing home facilities. It is known that Scheduled Castes (SC), Scheduled Tribes (SC) and Other Backward Class (OBC) people are poor compared to General Hindus.

Table 6. Number and Percentage of People Hospitalized by Social Groups

Social Group	Number Hospitalized (Last 365 days)		Total	% Hospitalized
	Yes	No		
General	15745	85198	100943	15.60
SC/ST/OBC	34078	198083	232161	14.68
Total	49823	283281	333104	14.96

There are more surprises when we investigate the effect of latrine facility, drainage facility, drinking water source and cooking sources on hospitalization. The results defy any explanation.

When we consider latrine type, the results show that 15.46 percent of people were hospitalized who used pit, septic tank or flush toilet, whereas this figure for non-users is 13.92 percent (Table 7). Septic tank or flush systems are considered as best and healthy way of toilet system. Again, chi square value gives significant result.

Table 7. Number and Percentage of People Hospitalized by Latrine Types

Latrine Type	No. Hospitalized (Last 365 days)		Total	% Hospitalized
	Yes	No		
Latrine service, pit, septic tank or flush	34585	189084	223669	15.46
Others (including no latrine)	15238	94197	109435	13.92
	49823	**283281**	**333104**	**14.96**

Among the people who use *pucca* and underground drainage system, only 15.37 percent were hospitalized but the figure for other system users including no latrine is 14.50 percent, which is not much less than 15.37 percent (Table 8). Though, *pucca* drainage and underground drainage system are considered as healthy system, but figures do not support the fact.

Table 8. Number and Percentage of People Hospitalized by Drainage Facilities

Drainage Facilities	No. Hospitalized (Last 365 days)		Total	% Hospitalized
	Yes	No		
Open pucca, covered pucca, underground	**26935**	**148285**	**175220**	**15.37**
Others	**22888**	**134996**	**157884**	**14.50**
Total	**49823**	**283281**	**333104**	**14.96**

When we come to the effect of use of drinking water source, we get results as expected. People using bottled water, tap water, tube well, hand pump are less likely to get hospitalized by any kind of diseases, and it is 14.87 percent, whereas that is for 'others' sources 15.64 percent (Table 9) However, the difference between these two numbers is not much.

Table 9. Number and Percentage of People Hospitalized by Drinking Water Sources

	No. Hospitalized (365days)		Total	% Hospitalized
Bottled water, tap, tube well or hand pump	44181	252856	297037	14.87
Others	5642	30425	36067	15.64
Total	**49823**	**283281**	**333104**	**14.96**

Again, the results for cooking sources vs. hospitalization are not as expected. Table 10 shows that only 14.09 percent are hospitalized among the persons who do not use the modern facilities, i.e., LPG and Gobar Gas. The LPG and Gobar Gas users are more hospitalized (16.14%).

Table 10. Number and Percentage of People Hospitalized by Cooking Sources

Cooking sources	No. Hospitalized (Last 365 days)		Total	%of hospitalization
	Yes	No		
Others	27090	165156	192246	14.09
LPG or Gobar gas	22733	118125	140858	16.14
Total	49823	283281	333104	14.96

So far, we have found the effect of a single explanatory variable on the hospitalization. If we take the simultaneous effect, then the picture may change. The variables which had strong significant relations may lose its significance due to the presence of other variables. To see the simultaneous effect of the explanatory variables we run a Logistic regression. Logistic regression is different from the usual linear regression. In Logistic regression the dependent variable takes only two values, 0 and 1. This type of variables is known as binary variable or dummy variable. Many of the assumptions of linear regression model fail in this case. That is why we resort to Logistic regression. In this case we take transformation of the dependent variable which is known as log-odd ratio. This is assumed to be linearly related with the explanatory variables.

If we fit logistic regression model taking 1 for hospitalized and 0 for not hospitalized during last 365 days as dependent variable, we get a more satisfactory result. This is shown in the following table.

Table 11. Results of Logistic Regression of the Status of Hospitalization on Age, Education, Religion, Social Group, Latrine Type, Drainage Type, Drinking Water Source and Cooking Source

	Coefficient (B)	Sig.	Exp(B)
Sex	-.698	0.000	.497
Age		0.000	
Age (1)	1.479	0.000	4.390
Age (2)	1.790	0.000	5.991
Age (3)	1.672	0.000	5.324
Age (4)	.379	0.000	1.461
Age (5)	.590	0.000	1.805
Age (6)	.548	0.000	1.729

Education		0.000	
Education (1)	-.001	0.961	.999
Education (2)	.081	0.000	1.085
Relg_Hindu	.075	0.000	1.078
Relg_Islam	-.013	0.539	.987
Social group	-.012	0.282	.988
Latrine_type	.041	0.002	1.041
Drainage_type	-.035	0.003	.965
Drinking_water	-.082	0.000	.922
Cooking sources	.114	0.000	1.121
Constant	1.367	0.000	3.922

Table 12 gives us more significant values. All values fall under significant region except the age group 15-59 and latrine type.

Table 12. Result of Logistic Regression of the Status of Hospitalization on Age (0-14, 15-59, 60 and above), Education (Higher secondary, HS and above), Religion (only Hindu), Social Group, Latrine type, Drainage type, Drinking water sources, Cooking sources

	Coefficient (B)	Sig.	Exp(B)
Sex	.478	.000	1.612
Age (0-14)		.000	
Age (15-59)	-.371	.740	.690
Age (60 or more)	-.774	.000	.461
Education (>HS ➜ 1)	-.189	.000	.828
Rel_Hindu (H=1)	.127	.000	1.136
Social group (SC/ST/OBC=1)	-.087	.000	.917
Latrine_type (Good=1)	.028	.305	1.028
Drainage_type (Good=1)	.050	.043	1.051
Drinking_water (Good=1)	-.048	.148	.953
Cooking sources (Good=1)	.140	.000	1.150
Constant	-1.088	.000	.337

Here an important observation is when we are taking only latrine type and hospitalization as analysing variables, we found that latrine type gives significant value bur while logistic regression is taken, it gives insignificant value. When we see the effect of one variable on another variable, other variables, which are not considered, may intervene into the result; but, effects of other variables are automatically removed when multiple logistic regression is used.

CONCLUSION

Child health is more vulnerable when first three age groups are considered. State of child health appears to be due to a cumulative effect of its continuous neglect by not according to its rightful place in key areas of medical education and training, research and health delivery system (Bhargava, 1994).

So, we can conclude that, health is affected by various socio-economic conditions as well as household characteristics. Previously many researchers have been done on health, but researches on hospitalization are few. In this paper hospitalization is the prime variable. We have seen that rate of hospitalization as a proxy of health status in the society. Sex, age, education and religion of an individual have effect on one's health condition, which is reflected by hospitalization in last one-year data.

Though it has been seen from literature that men are more likely to be hospitalized than women (Afsaw et.al. 2010), but this paper reveals just the opposite. Not men but women are more prone to get hospitalized. The result shows that women are vulnerable to various diseases and there may be growing concern about the health of women. Age is one of the important demographic factors that show significant influence on the rate of hospitalization. It has been found that mean age of hospitalization is more among women than among men (Hohn 2018). Hospitalization and mortality can be used as proxy variables to each other and from the above result of age structure of hospitalization, it shows the same curve as the age pattern of mortality. However, the age group of 15 to 29 shows abnormal increase in hospitalization. The reason might be the sufferings from various young age diseases, injuries due to various accidents etc. Hospitalizations among elder people are more common due to various circulatory diseases, increasing distress and disabilities (May et.al 1988, Joshi et.al. 2003).

Though we have found reasonable result for education, still religion and social groups are more important when it comes to the determinant of hospitalization. Hindu people are more likely to get hospitalized but the people who belong to reserved category are less likely to be hospitalized.

Another important as well as surprising outcome is that the people, who use healthy latrine facility, drainage facility and cooking sources, are more likely to get hospitalized. Millennium Development Goals contain goals related to access to safe drinking water and basic sanitation (WHO 2008). Although, it has been seen that private sanitation facility and advancement in water management facility reduces the burden of many diseases among children and adult population (Baker et.al. 2016 and Beer et.al. 2015), but from logistic regression it seems that drinking water facility, latrine type and drainage type have no significant effect on hospitalization whereas cooking source has significant effect. Unhealthy cooking source may cause respiratory disease among children (Melia et.al. 1977) due to the pollution of indoor atmosphere by the products of cooking gas combustion.

More researches should be done on household characteristics and its effect on health. Every year 39 million people of India are going below poverty line due to various medical care

costs and costs at hospitals which are very severe (Garg et.al. 2008). A country like India, where diversity among people is a common phenomenon, research should be on those diversified characteristics and how they are affecting health should be an important objective.

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