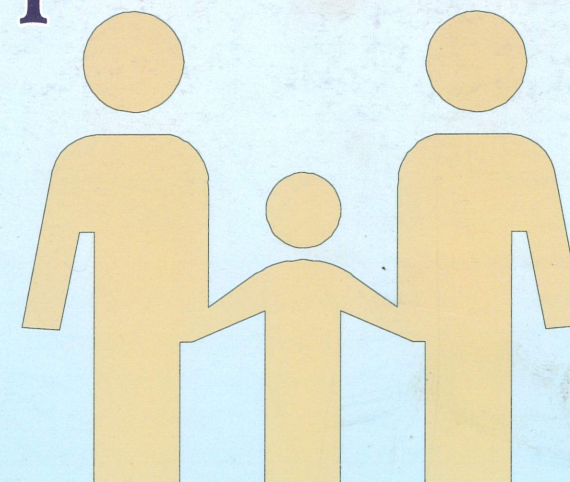


HEALTH *and* Population Perspectives & Issues



आरोग्यं सुखसम्यदा

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DISASTER MANAGEMENT: ARE WE REALLY PREPARED?

Pankaj Arora* and Sanjay Arya**

ABSTRACT

In this article, the authors describe the importance of disaster management plans. According to them, the disaster management plans are very generic in nature and are based on a lot of presumptions. Further, they say that disasters or MCI have a strong knack of severely testing all these presumptions. Therefore, the way forward is to make a MCI management plan to the minutes detail based on realistic estimates and facts, they add. The plan must be tested and simulated in real life conditions to bring forth the avenues for improvement. Otherwise, an accident may not be a MCI but will surely become a disaster, the authors caution.

Keywords: Disaster, Mass Casualty Incident, Preparedness.

Disasters have accompanied mankind since time immemorial and are an unwanted reality of today. Man has been able to conquer some of the causes of natural disasters and the modern technology has helped to predict few disastrous events but the damage is still enormous. Hurricane Katrina in United States is a pertinent example of this. What has added to the complexity of the issue is the increasing propensity of man made disasters. Bhopal Gas Tragedy, Chernobyl nuclear accident, terrorist attacks like the ones in New York (9/11), London (7/7) and Mumbai (26/11) are fresh in memories and are a constant reminder that constant vigil is required to prevent these incidents. Some of the natural disasters like Tsunami in 2004 and the latest one in Japan in 2011 have caused extensive damage due to various factors including urbanization, density of population etc.

Center for Research on the Epidemiology of Disasters¹ (CRED), Brussels, Belgium, defines disaster as a situation or event which overwhelms local capacity necessitating a request to a national or international level for external assistance while Pan American Health Organization (PAHO) has labeled it as an overwhelming ecological disruption occurring on a scale sufficient to require outside assistance. World Health Organization (WHO) has tried to include all dimensions into the scenario when it defines disaster as a serious disruption of the functioning of

*Assistant Professor, Department of Hospital Administration, PGIMER, Chandigarh,

**Additional Professor, Department of Hospital Administration, AIIMS, New Delhi.

a community or a society causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources.

Besides 'disaster' two other terms; Mass Casualty Incident (MCI) and Surge Capacity also need to be understood to fully comprehend the issue of Disaster prevention. Mass casualty incident² is defined as an incident which generates more patients at one time than locally available resources can manage using routine procedures. It requires exceptional emergency arrangements and additional or extraordinary assistance while a surge³ is a sudden or unexpected increase in patient volume that has the potential to severely challenge or exceed the capacity of the health care system. The American College of Emergency Physicians (ACEP)⁴ believe that surge capacity is a measurable representation of health care system's ability to manage a sudden influx of patients within the available resources at a given point in time.

The definitions given above and many more such definitions have tried to define disaster and its implications in the community. India with a vast area within its boundaries faces certain unique problems. In the past the country has suffered from the cycles of floods and droughts in succession and sometimes simultaneously. It had been hit by cyclones, landslides, earthquakes, cloudbursts, massive fires and even tsunamis. The geopolitical situations within the boundaries and outside the boundaries have also caused adverse events and continue to do so. In short, almost all types of adverse events have had hit India, sometimes with disastrous consequences. There is wide disparity in the health care infrastructure between the states and between urban and rural sector. Similarly there is huge gap between the resources and demand. The disaster management or mass casualty incident management can be a resource intensive project which can put strain on already stretched health infrastructure and resources. But despite these constraints, there is no escape from the preparedness for management of such adverse events. Guidelines (NDMA)⁵ have been issued and it is expected that the country will be prepared at all levels be it national, regional, zonal and peripheral to handle any mass casualty incident.

ROLE OF HOSPITALS

The hospitals are expected to play an important role in mitigating the effects of such an adverse event. Every health care facility must prepare for any eventuality depending upon its capabilities. In the month of October, 2010 Common Wealth Games (CWG) were held in New Delhi. Extensive preparations were made to meet any eventuality during the event which included setting up of command center and entrusting different hospitals across the city for different venues and categories of personnel. But the preparation was event specific.

In light of what was done and what exists today, a question needs to be asked - Are we prepared? Both at the hospital as well as at the state levels.

KEY ISSUES

Certain key issues need to be addressed before any plan for MCI management can even be thought of. These are:

- a. Are the hospitals/health care facilities of a city mapped?
- b. How many beds are there in these hospitals?
- c. What is the surge capacity of these hospitals?
- d. Do we have detailed inventory of the men and material for these institutions?
- e. Is there a command center ready in place to take over a situation?
- f. Are all hospitals expected to be ready for all disasters?
- g. If no, how to plan for designating hospitals for various MCI?
- h. What is the effect of outsourcing on managing such an event?
- i. Has a plan for a hospital ever been tested?
- j. What training methods have been devised to train the providers?

PREPAREDNESS

Even before the role of a particular hospital can be delineated it must be known which hospitals' services shall be utilized to treat patients. It is very important as the scarce resources must be utilized optimally and for the maximum good. The hospitals must also be aware of whether they are expected to tackle all types of MCI or their role is limited to manage certain types of adverse events. This depends to a large scale on the overall health infrastructure of the area. In case of Delhi, perhaps it would be better that some hospitals be designated to manage a certain kind of MCI. For example, it would indeed be very expensive to create treatment modalities for chemical disasters in every hospital. It would be very difficult to train the staff in all the hospitals in managing a chemical disaster. Herein lays the role of mapping. A chemical disaster may be expected to take place in the vicinity of chemical factories, so the hospitals designated for handling such an event should be located away from such a neighborhood so that they are not caught in the event itself.

The number of beds in the hospital is no indication for the capacity of the organization to treat the patients in an MCI. There are number of limiting factors and the availability of beds is one of them. At any point during the course of routine day, the emergency department is overflowing with patients in most of the

hospitals. So the 'slack capacity' is never there. Hence to determine the number of beds that can be made available for such an MCI have to be determined. One way to do this is to take any random day census of the hospitals and estimate which patients can be discharged within a short time without compromising on the care for the patients who are already admitted. It must be remembered that they cannot just be thrown out and there are ethical, social, economical and medical aspects attached. Another way is to have a separate ward only for disaster patients to be staffed and occupied in case of MCI. This is an expensive option and arrangement of additional manpower to manage such a ward may itself be a problem.

RESPONSE OF STAFF

Disasters usually have the tendency to strike at the most inopportune time; hence we need to prepare for the same at the worst of times. Generally, whenever the emergency plans are devised, it is presumed that the manpower will respond. But is it really so? A study by Cone and Cummings⁶ reveals that while eighty seven per cent of hospital employees were willing to work after a natural disaster but less than sixty per cent of the employees were ready to respond to work in case of manmade disaster. Another study by Jan et al⁷ reveals that staff mobilization is difficult in the evening and night time with unwillingness of staff to report for duty being one of the reasons for the same. Other factors may be the distance from the hospital, communication, personal trauma etc. An approach could be to make a separate roster for the disaster comprising the personnel living in the campus or in close vicinity which can be activated at the time of MCI. This roster must also have redundancy built within it so that maximum personnel mobilization can be achieved. This will have another benefit. The training resources can be focused on limited number of people initially which can be increased once a capacity threshold has been reached. This may be a faster approach to preparedness.

COMMUNICATION

The importance of communication cannot escape emphasis and it is one aspect which is liable to fail more often than not. According to Staudenmayer and Schechter⁸ reliance on mobile phone technology is dangerous because the system is shut down internally immediately after a terrorist attack or is overloaded due to congestion. The effect of congestion can be realized by recalling what happens on New Year eve with jammed networks⁹. Alternative mechanisms¹⁰ have to be worked out. This may include a local/internal exchange, hand held radios or even call bell system. The call bell system is effective to convey a pre-designed message as has been the experience of the authors.

MEDICAL RECORDS

The demographic information available may be severely limited due to unconscious patients or serious patients or even physical trauma e.g. transient/permanent deafness subsequent to bomb blast. Hence patient records and patient tracking can become really difficult. Truncated information may be taken if possible and use of modern technology resorted to fill the gaps. This includes use of digital cameras/webcams to have photographs of victims pasted on patient records, use of RFID devices, and even finger prints, photo identity card e.g. Driving License in possession of victim.¹⁰ This will also help in keeping the public and media informed about the status of patients and aid in decongesting the premises.

TRAINING

All the good plans on paper will fail in the absence of adequate training and regular drills. Few of the MCI require specific training e.g. chemical event, biological event etc. Depending upon the mandate of the hospital, such training must be provided. The adequacy of training must be tested with regular drills. Training may be expensive e.g. training for decontamination procedures. Now-a-days the training adequacy must also be studied in the light of phenomenon of 'outsourcing'. Whether to spend precious resources on training outsourced workers whose loyalty and accountability may be somewhat less has to be consciously deliberated upon. Also more often than not, they may not reside within the premises so their availability *per se* at the time of MCI is doubtful. More so, as turnover is high among them as has been the experience of the authors. During the training, the roles of different personnel should be made clear and they should also be told about expectation from them. Personal protection must also be a part of any training programme because the health of care givers will determine to a large extent the success of any MCI plan. An incident command centre should be established in the hospital which will be responsible for coordinating all the important aspects of implementation of MCI plan.

SLACKNESS OF RESOURCES

Another limiting factor besides the availability of beds is the availability of OTs, ICUs and ventilators. The current scenario in any public sector hospital at the best of times is scarce availability of beds, OTs and ICUs. Patients are being referred or refused admission due to non-availability of ventilators or ICUs. Their requirement increases manifold in MCI especially in some of them e.g. biological event. The correct estimates should be made in this regard also. Hence any plan for Disaster mitigation should include hospitals in private sector to augment the capacity in terms of men and material.

Many other factors need revisiting as far as MCI management plan is concerned. These include security of the premises, availability of pharmaceuticals especially antidotes and life saving drugs, level of decision making etc.

CONCLUSION

The disaster management plans are very generic in nature and are based on a lot of presumptions. Disasters or MCI have a strong knack of severely testing all these presumptions. The way forward is to make a MCI management plan to the minutes detail based on realistic estimates and facts. The plan must be tested and simulated in real life conditions to bring forth the avenues for improvement. Otherwise an accident may not be a MCI but will surely become a disaster.

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IDENTIFYING FACTORS FOR HIGH FERTILITY IN SLUM AREAS OF SHILLONG CITY IN MEGHALAYA, INDIA

Sanku Dey*

ABSTRACT

This article identifies the factors associated with the number of children ever born to women in slum areas of Shillong city, Meghalaya, India. The findings reveal that (i) the mean age at marriage of the women is 18 years and the respondent couples had, on an average, more than three children, (ii) the number of children ever born, on an average, in slum areas of Shillong City amongst the Hindu, Muslim, Christian and other community women are 2.98, 3.45, 3.23 and 3.28 respectively, (iii) the number of children ever born to the illiterate mother was, on an average, 3.58 while for an educated mother was, on an average 2.03, (iv) women living in a slum who desire to have a son (61%) show significantly negative attitudes towards family planning, and (v) sixty two per cent of couples had never used any family planning methods.

Keywords: Slum Dwellers, Children Ever Born, Multiple Logistic Regression Analysis, Fertility.

The concept of slums and its definition vary from country to country depending upon the socio-economic conditions of each society. Slums are consequences of increasing urban poverty and intra-city inequality. Slums have become world-wide phenomena in urban areas. According to a recent report on the results of the first global assessment of slums, nearly 31.6 per cent of the world urban population lives in slums¹. In India, 22 per cent of urban population has no option but to get their shelter in slums ranging from 15 to 50 per cent in different cities² (RGI, 2001). These slums are characterized by over crowded housing, poor waste disposal system and paucity of safe drinking water, poor schooling and health facilities, poor hygienic conditions, malnutrition and other health related practices. Such unhealthy factors lead to higher incidence of communicable diseases, malnutrition and mortality and fertility. Due to poor educational status, the slum dwellers do not have proper knowledge of maternal and child care services, family planning practices, pre-natal care, delivery, immunization etc.

*Department of Statistics, St. Anthony's College, Shillong-793001, Meghalaya, India.

Meghalaya attained its full statehood status on the 21st of January, 1972 with Shillong as its capital. It is a small State which is situated to the south-east of Assam. Shillong, occupies the northern slopes and foothills of Shillong peak at an average altitude of 1496 meters above sea level. The city is situated in the East Khasi Hills district and is also the district headquarters. Out of State's total urban population of 452612 persons as per 2001 Census, the Shillong Urban Agglomeration has a population of 267662 which represents nearly 59 per cent of the State's urban population. There are in all 19 notified slum areas. According to 2001 Census data, there are 86,304 slum population and 17,605 households located in different localities (Wards). This is not a small number for such a small city like Shillong. All the unhealthy situations mentioned above prevail in all the slums of Shillong city. Unlike other States in India, the Department of Urban Planning and Development, Meghalaya or Department of Family and Welfare, Meghalaya, do not have any socio-economic and demographic data/analysis detailing about slum population in Shillong city.

The demographic literature covers a series of article related to fertility either in relation to recent levels and trends or in relation to understanding of associated factors with its various indices, for example, number of children ever born, total fertility rate, crude birth rate and so on. The importance of these types of studies is well known and documented ^{3,4,5}. The need for region specific study from time to time regarding issues having regional variation is well understood. The purpose of this article is to study the factors associated with the number of children ever born to women in slum areas of Shillong city.

METHODOLOGY

The present study was conducted in a slum of Shillong city. From a total of 17605 slum dwellers distributed in different proportions in nineteen localities/ areas in Shillong city, a representative sample of 1300 slum households was selected from fourteen localities. In order to reach the respondents, i.e. currently married women of reproductive age (MWRA), a two-stage random sampling procedure was followed. In the first step, stratification is done according to municipal wards. In the second step, a random sample of proportionate size has been drawn from each of the wards.

Information of 1417 married women was analyzed to interpret the fertility pattern in relation to respondent's religion, education, occupation, family income, age at marriage etc. SPSS/PC software was used to analyze the data.

In this study, a predictive model on fertility was developed by using multinomial logistic regression technique. To assess the degree of association between the risk factors and fertility, odds ratio were computed. The data on predictors are based

on: respondent religion (X1), respondent educational level (X2), respondent husband education (X3), respondent occupation (X4), respondent husband occupation (X5), and monthly family income (X6), use of family planning method (X7), respondent age at marriage (X8) and sex preference of the child (X9). The response variable is designed as polytomous number of ever born children Y (1 = 1 or 2 children, 2 = 3 or 4 children, 3 = 5 or more children).

Wald test statistic has been used to test the significance of the logistic regression coefficients. The reference group was taken as the last category of each predictor. The multinomial logistic regression model is an extension of binary logistic regression model where the dependent variable is polytomous, i.e., its values are more than two categories. In such a case, if we assume that the possible number of categories are q , then we need $q-1$ logits. The logit multinomial model can be written as:

$$\log \left\{ \frac{\text{Pr ob}(\text{Category}_j)}{\text{Pr ob}(\text{Category}_q)} \right\} = b_o^j + \sum_{i=1}^k b_i^j x_i; j = 1, 2, \dots, (q-1) \quad (1)$$

In the above expression one of the categories is used as reference and is called baseline category. In our study, we consider 5 or more number of children born as the reference category. After estimating the coefficients of the model (1) by the method of maximum likelihood, we can readily calculate the logits and therefore the probabilities of each one of the categories.

The equations for the multiple logistic regressions are:

$$\log \left\{ \frac{p_1}{p_3} \right\} = b_o^1 + \sum_{i=1}^9 b_i^1 x_i \quad (2)$$

$$\log \left\{ \frac{p_2}{p_3} \right\} = b_o^2 + \sum_{i=1}^9 b_i^2 x_i \quad (3)$$

where p_1 = Probability of having 1 or 2 children,

p_2 = Probability of having 3 or 4 children,

p_3 = Probability of having 5 or more children

$\{x_i\}$'s ($i = 1, 2, \dots, 9$) are the aforesaid predictors; b_0^1 and b_0^2 are the regression coefficients of equations (2) - (3), respectively. Table 1 represents an overview of the predictors used in the model.

FINDINGS

The data of the survey revealed that, the mean age at marriage of the women is 18.3 years and the respondent couples had, on an average, more than three children with standard error 1.90 (3.11 ± 1.90) (Table 2.1). Forty five per cent of the couples had one or two children, 36.0 per cent had three or four children and 19.0 per cent had five or more children (Table 2.3). It is also observed that the maximum number of children among couple was 16. The study also revealed that the number of children ever born, on an average, in slum areas of Shillong City amongst the Hindu, Muslim, Christian and other community women are 2.98, 3.45, 3.23 and 3.28 respectively (Table 2.1). Table 2.3 shows that 17.3 per cent of the women were illiterate and very few of them (6.84%) had more than higher secondary education where as 1.5 per cent of the husbands were illiterate and 12.9 per cent of them had more than higher secondary education. Women who had better educated husbands tended to have lesser number of children than those whose husbands were less educated. The survey data also indicate that as the education of spouses (both male and female) increases, the fertility decreases. The number of children ever born to the illiterate mother was, on an average, 3.58 while a sharp decline in fertility was found in the highly educated mother, which was on an average 2.03 (Table not presented here). Similar downward tendency in fertility was noticed when education of father increases. In the present study, we found that majority women (49.7%) were in their peak child bearing age 18-25 years (Table 2.3). Table 2.3 shows that the slum dwellers had low incomes-only 7.4 percent of the respondents had a family income of more than Rs. 8000 per month. Seventy per cent of the respondents had a family income between Rs. 2000-4000 per month. It is notable that 62 per cent had never used any family planning methods (Table 2.2). One interesting feature of family planning choice behaviour is related to the role a respondent's religious affiliation. Table 2.2 shows that the family planning methods were adopted by 41.8 per cent of Hindus, 33 per cent of Muslims and 28 per cent of Christian. Another important determinant of family planning practice is son preference. Women living in a slum who desire to have a son, sixty two percent show significantly negative attitudes towards family planning.

Tables 3.1 and 3.2 present multiple logistic regression results for the measures of fertility (children ever born) and various explanatory variables used. Table 3.1 has the outcome of 1-2 children as compared to 5 or more children. The study found that a women's religion was an important factor in her fertility. The data indicate that Hindu women are more likely to have 1-2 children as compared to women of other religious category (O.R. = 1.510, p-value = 0.224). In regard to education, women of middle schooling, high schooling, higher secondary and graduation or above have significantly more risk of having 1-2 children (O.R. = 3.217, 7.404, 34.862, 4.900 with all p-values less than 0.05). Our analysis

showed that the women belong to high family income (i.e., more than Rs. 8000/-) was likely to have fewer children than those who have less income.

Table 3.2 has the outcome of 3-4 children as compared to 5 or more children. Women of middle schooling, high schooling and completed higher secondary are at more risk of having 3-4 children i.e. at less risk of having 5 or more children. Women adopting family planning method are at significantly less risk of having 5 or more children (in both Tables 3.1 and 3.2). Women's age at marriage has a significant effect on fertility.

Table 4 reveals that the predictors- respondent educational level (X2), use of family planning method (X7), respondent age at marriage (X8) and sex preference of the child (X9) are significantly associated with the children ever born

TABLE 1
DESCRIPTION OF PREDICTORS IN THE MULTINOMIAL REGRESSION MODEL

Predictors	Variable name and value level	Type of variable
X1	Respondent Religion 1=Hindu, 2=Muslim 3=Christian, 4=Others	Nominal Categorical
X2	Respondent Education 1=Primary School, 2=Middle School, 3 = High school, 4= Higher Secondary 5 = Degree & above, 6= No education	Ordinal Categorical
X3	Respondent Husband Education 1=Primary School, 2=Middle School, 3= High school, 4= Higher Secondary 5= Degree & above, 6= No education	Ordinal Categorical
X4	Respondent Occupation 1=House wife, 2= Service 3= Wage earners, 4 = Business 5 = Others	Ordinals Categorical
X5	Respondent Husband Occupation 1= Service 2 = Wage earners, 3 = Business 4 = Others	Nominal Categorical
X6	Monthly Family Income 1= Below 1000 2 = 2000-4000 3 = 4000-8000 4 = 8000 & above	Ordinal Categorical

X7	Use Family planning method 1= Yes, 2= No	Dichotomous
X8	Respondent Age at Marriage 1=below 18 years, 2=18-25 years 3= 25 years and above	Nominal Categorical
X9	Sex Preference of the Child 1= Male Child, 2= Female Child 3= No sex preference	Nominal Categorical

TABLE 2.1
MINIMUM, MAXIMUM AND AVERAGE NUMBER OF CHILDREN EVER BORN TO A WOMEN

Variable	Minimum	Maximum	Average	Std. Deviation
No. of Ever Born Children	1	16	3.11	1.8966
Respondent Religion				
Hindu	1	16	2.98	-
Muslim	1	10	3.45	-
Christian	1	11	3.23	-
Others	1	11	3.28	-
Respondent age at marriage	3	38	18.3013	3.8861

TABLE 2.2
USE OF FAMILY PLANNING METHOD VS. RESPONDENT RELIGION

Respondent Religion	Use of Family Planning Method		
	Yes	No	Total
Hindu	385 (41.76%)	537 (58.24%)	922 (100.0%)
Muslim	44 (33.08%)	89 (66.92%)	133 (100.0%)
Christian	69 (28.05%)	177 (71.95%)	246 (100.0%)
Others	41 (35.34%)	75 (64.66%)	116 (100.0%)
Total	539 (38.04%)	878 (61.96%)	1417 (100.0%)

TABLE 2.3
DEMOGRAPHIC CHARACTERISTICS VS. TOTAL CHILDREN EVER BORN

Variable	Total Children Ever Born (Grouped)			Total
	1-2 Children	3-4 Children	5 & above Children	
Respondent Religion				
Hindu	438(47.5%)	319(34.6%)	165(17.9%)	922
Muslim	53(39.8%)	45(33.8%)	35(26.4%)	133
Christian	108(44.0%)	91(37.0%)	47(19.0%)	246
Others	41 (35.4%)	52 (44.8%)	23 (19.8%)	116
Total	640(45.16%)	507(35.78%)	270(19.05%)	1417(100.0%)
Respondent Education				
Primary School	229(38.4%)	227(38.0%)	141(23.6%)	597
Middle School	166(51.9%)	112(34.3%)	48(14.7%)	326
High school	91(59.9%)	52(34.2%)	09(5.9%)	152
Higher Secondary	49(76.6%)	14(21.9%)	01(1.5%)	64
Degree & above	21(63.4%)	07(21.2%)	05(15.2%)	33
No education	84(34.3%)	95(38.8%)	66(26.9%)	245
Total	640(45.16%)	507(35.78%)	270(19.05%)	1417(100.0%)
Respondent Husband Education				
Primary School	253(39.3%)	246(38.2%)	145(22.5%)	644
Middle School	163(46.7%)	123(35.2%)	63(18.1%)	349
High school	112(50.1%)	76(34.5%)	32(14.5%)	220
Higher Secondary	60(61.8%)	29(29.9%)	08(8.3%)	97
Degree & above	45(52.3%)	26(30.2%)	15(17.4%)	86
No education	07(33.3%)	07(33.3%)	07(33.3%)	21
Total	640(45.16%)	507(35.78%)	270(19.05%)	1417(100.0%)
Respondent Occupation				
House wife	434(46.8%)	333(35.9%)	160(17.3%)	927
Service	17(42.5%)	15(37.5%)	08(20.0%)	40
Wage earners	78(39.2%)	73(36.7%)	48(24.1%)	199
Business	18(34.6%)	23(44.2%)	11(21.2%)	52
Others	93(46.7%)	63(31.7%)	43(21.6%)	199
Total	640(45.16%)	507(35.78%)	270(19.05%)	1417(100.0%)
Respondent Husband Occupation				
Service	82(42.9%)	74(38.7%)	35(18.3%)	191
Wage earners	137(43.6%)	118(37.6%)	59(18.8%)	314
Business	81(44.7%)	63(34.8%)	37(20.5%)	181
Others	340(46.5%)	252(34.5%)	139(19.0%)	731
Total	640(45.16%)	507(35.78%)	270(19.05%)	1417(100.0%)
Monthly Family Income (Rs.)				
Below 1000	80(42.8%)	67(35.8%)	40(21.4%)	187
2000-4000	457(46.0%)	340(34.2%)	196(19.8%)	993
4000-8000	63(47.7%)	53(40.2%)	16(12.1%)	132
8000 & above	40(38.1%)	47(44.8%)	18(17.1%)	105
Total	640(45.16%)	507(35.78%)	270(19.05%)	1417(100.0%)

Use Family Planning Method				
Yes	255(47.3%)	227(42.1%)	57(10.6%)	539
No	385(43.8%)	280(31.9%)	213(24.3%)	878
Total	640(45.16%)	507(35.78%)	270(19.05%)	1417(100.0%)
Respondent Age at Marriage				
Below 18 years	190(31.5%)	239(39.7%)	173(28.7%)	602
18 – 25 years	373(53.0%)	243(34.5%)	88(12.5%)	704
25 and above	77(69.4%)	25(22.5%)	09(8.1%)	111
Total	640(45.16%)	507(35.78%)	270(19.05%)	1417(100.0%)
Sex Preference of the Child				
Male Child	389(39.3%)	382(38.6%)	218(22.1%)	989
Female Child	95(41.5%)	93(40.6%)	41(17.9%)	229
No sex preference	156(78.4%)	32(16.1%)	11(5.5%)	199
Total	640(45.16%)	507(35.78%)	270(19.05%)	1417(100.0%)

TABLE 3.1
MULTIPLE LOGISTIC REGRESSION MODEL PARAMETERS
(GROUP: 1-2 CHILDREN)

Predictors	$\hat{\beta}$	S.E. ($\hat{\beta}$)	Wald test	d.f.	P-value	Odds Ratio			95% C.I. for O.R.	
							Lower	Upper		
Intercept	1.668	.939	3.157	1	.07	--	--	--		
[X1=1]	0.412	0.339	1.477	1	0.224	1.510	0.777	2.934		
[X1=2]	-.255	0.415	0.378	1	0.539	0.775	0.344	1.747		
[X1=3]	-.105	0.528	.040	1	0.842	0.900	0.320	2.533		
[X1=4]	0	-	-	0	-	-	-	-		
[X2=1]	0.398	0.225	3.115	1	0.078	1.488	0.957	2.314		
[X2=2]	1.169	0.265	19.426	1	0.000	3.217	1.913	5.409		
[X2=3]	2.002	0.427	21.963	1	0.000	7.404	3.205	17.104		
[X2=4]	3.551	1.051	11.419	1	0.001	34.862	4.444	273.476		
[X2=5]	1.589	0.646	6.047	1	0.014	4.900	1.381	17.392		
[X2=6]	0	-	-	0	-	-	-	-		
[X3=1]	0.436	0.613	0.506	1	0.477	1.547	0.465	5.144		
[X3=2]	0.511	0.628	0.663	1	0.416	1.667	0.487	5.707		
[X3=3]	0.901	0.648	1.931	1	0.165	2.461	0.691	8.767		
[X3=4]	1.060	0.743	2.036	1	0.154	2.886	0.673	12.37		
[X3=5]	0.131	0.728	0.032	1	0.857	1.140	0.274	4.750		
[X3=6]	0	-	-	-	0	-	-	-		
[X4=1]	0.369	0.239	2.383	1	0.123	1.447	0.905	2.312		
[X4=2]	-6.750E-03	0.564	0.000	1	0.990	0.993	0.329	3.000		
[X4=3]	-6.523E-02	0.299	0.047	1	0.828	0.937	0.521	1.685		
[X4=4]	-1.336E-02	0.496	0.001	1	0.979	0.987	0.373	2.609		
[X4=5]	0	-	-	0	-	-	-	-		

[X5=1]	-0.414	0.292	2.010	1	0.156	0.661	0.373	1.171
[X5=2]	-0.362	0.217	2.777	1	0.096	1.437	0.938	2.199
[X5=3]	-0.261	0.266	0.961	1	0.327	0.770	0.457	1.299
[X5=4]	0	-	-	0	-	-	-	-
[X6=1]	0.561	0.414	1.832	1	0.176	1.752	0.778	3.945
[X6=2]	0.444	0.359	1.531	1	0.216	1.559	0.772	3.152
[X6=3]	0.876	0.449	3.795	1	0.051	2.400	0.995	5.793
[X6=4]	0	-	-	0	-	-	-	-
[X7=1]	0.926	0.186	24.742	1	0.000	2.525	1.753	3.636
[X7=2]	0	-	-	0	-	-	-	-
[X8=1]	-2.132	0.391	29.692	1	0.000	0.119	5.509E-02	0.255
[X8=2]	-0.734	0.391	3.520	1	0.061	0.480	0.223	1.033
[X8=3]	0	-	-	0	-	-	-	-
[X9=1]	-2.193	0.344	40.713	1	0.000	0.112	5.690E-02	0.219
[X9=2]	-1.956	0.531	13.576	1	0.000	0.141	4.994E-02	0.400
[X9=3]	0	-	-	0	-	-	-	-

TABLE 3.2
MULTIPLE LOGISTIC REGRESSION MODEL PARAMETERS
(GROUP: 3-4 CHILDREN)

Predictors	$\hat{\beta}$	$S.E.(\hat{\beta})$	Wald test	d.f.	P-value	Odds Ratio	95% C.I. for O.R.		
							Lower	Upper	
Intercept	0.924	0.924	0.710	1	0.400				
[X1=1]	-.271	0.313	0.750	1	0.387	0.763	0.413	1.408	
[X1=2]	-.676	0.389	3.012	1	0.083	0.509	0.237	1.091	
[X1=3]	-.892	0.513	3.016	1	0.082	0.410	0.150	1.122	
[X1=4]	0	-	-	0	0	-	-	-	
[X2=1]	0.161	0.212	0.580	1	0.446	1.175	0.776	1.779	
[X2=2]	0.575	0.256	5.032	1	0.025	1.777	1.075	2.938	
[X2=3]	1.337	.426	9.853	1	0.002	3.809	1.653	8.779	
[X2=4]	2.351	1.068	4.848	1	0.028	10.492	1.295	85.024	
[X2=5]	0.356	0.697	0.261	1	0.609	1.428	0.364	.596	
[X2=6]	0	-	-	0	0	-	-	-	
[X3=1]	0.387	0.574	0.453	1	0.501	1.472	0.478	4.538	
[X3=2]	0.324	0.591	0.300	1	0.584	1.382	0.434	4.399	
[X3=3]	0.495	.612	.654	1	0.419	1.640	0.494	5.442	
[X3=4]	0.683	0.715	0.912	1	0.340	1.980	0.487	.047	
[X3=5]	-4.774E-02	0.697	0.005	1	0.945	0.953	0.243	.740	
[X3=6]	0	-	-	-	0	-	-	-	
[X4=1]	7.807E-02	0.360	0.238	2.274	1	0.132	1.433	0.898	2.286
[X4=2]		0.534	0.021	1	0.884	1.081	0.379	3.081	
[X4=3]		4.202E-02	0.293	0.021	1	0.886	1.043	0.587	1.854
[X4=4]		0.498	0.469	1.130	1	0.288	1.646	0.657	4.125
[X4=5]		0	-	-	0	0	-	-	-

[X5=1]		-.216	0.279	0.601	1	0.438	0.806	0.466	1.392
[X5=2]	0.298	0.212	1.970		1	0.160	1.347	0.889	2.041
[X5=3]		-.241	0.262	0.847	1	0.357	0.786	0.470	1.313
[X5=4]	0	-	-		0	-	-	-	-
[X6=1]	-.134	0.392	0.116		1	0.733	0.875	0.406	1.887
[X6=2]		-.185	0.336	0.302	1	0.583	0.831	0.430	1.607
[X6=3]		0.439	0.424	1.070	1	0.301	1.551	0.675	3.563
[X6=4]	0	-	-		0	-	-	-	-
[X7=1]		1.126	0.180	39.070	1	0.000	3.083	2.166	4.388
[X7=2]		0	-	-	0	-	-	-	-
[X8=1]	-.829	0.416	3.968		1	0.046	0.437	0.193	0.987
[X8=2]		-.117	0.419	0.077	1	0.781	0.890	0.391	2.024
[X8=3]	0	-	-		0	-	-	-	-
[X9=1]		-.560	0.371	2.282	1	0.131	0.571	0.276	1.181
[X9=2]	4.367E-02	0.548	0.006		1	0.936	1.045	0.357	3.059
[X9=3]		0	-	-	0	-	-	-	-

TABLE 4
LIKELIHOOD RATIO TEST

Effect	-2Log Likelihood of Reduced Model	Chi-Square	df	Sig.
Intercept	2200.728	0.000	0	..
X1	2212.463	11.735	6	0.068
X2	2259.643	58.915	10	0.000
X3	2209.229	8.500	10	0.580
X4	2208.797	8.068	8	0.427
X5	2207.501	6.773	6	0.342
X6	2210.439	9.711	6	0.137
X7	2243.203	42.474	2	0.000
X8	2301.289	100.561	6	0.000
X9	2303.903	103.175	4	0.000

DISCUSSION

Like majority of the urban slums of the country, people who live in the urban slums of Shillong city also belong to lower socio-economic classes and have migrated to the city with the prospect of enhancing their living standard. They possess little or no education and have scanty income and thereby compelled to live in close and congested areas under the most unhygienic conditions. They are carrying out their existence with the barest necessities of life.

In slums of Shillong City, the number of children ever born is high. Many factors contribute to this phenomenon. Among these factors, age at marriage, perceived ideal number of children, literacy status, use of family planning methods and

sex preference of the child are most important and strong predictors that affect fertility. Early marriage and child bearing are common in spite of legal restrictions against marrying at an young age. Therefore, policies and programmes should aim at creating awareness among the people about the marriage law and address the advantages of small family size and family planning.

In compliance with the findings of the our study, the association of religious faith with total number of children ever born was documented by various studies^{6,7}. The level of acceptance of family planning methods varies among different religious groups. The factors responsible for such a scenario function at individual, family and community levels with their root in socio-economic and cultural background of Indian Society^{8,9}. The religious beliefs played a significant role in determining the attitude of the people in controlling the fertility, revealed by many authors^{10,11}. Mahanan et al¹¹ found that among Muslim women, the non acceptance of family planning methods was highest (81.5%). National Family health Survey¹² (NFHS 2) also revealed that Hindu and Christian women had a lower unmet need than Muslim women. Women's education has a positive impact on fertility regulation as has been established by many studies^{6,10,12,13-16}. This study has shown that mother's education and age at marriage had a significant effect on reducing fertility. The study also indicates that even without use of family planning method, increasing the level of education and age at marriage can go a long way in reducing fertility.

CONCLUSION

From the above discussion, we may conclude that mother's education, use of family planning methods, age at marriage and sex preference of the child are the strongest predictors on reducing fertility. The study suggests that improvements in education, together with family planning services should receive priorities in policies for further reduction in fertility. Therefore, policy makers must design family planning strategies by paying more attention to the roles of education. Also, the government organization as well as NGOs can play a greater role to reduce the gap between actual and desired number of children among less privileged families.

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RURAL HEALTH CARE SYSTEM IN INDIA AND THE CHALLENGE OF RETENTION OF HEALTH MANPOWER IN RURAL AREAS

Renu Shahrawat* and Vinod Joon**

ABSTRACT

India has a well established Primary Health Care system in the form of Sub-centers, Primary Health Centers and Community Health Centers in rural areas. But it is not complemented by appropriate health workforce which resulted in critical shortage of health manpower in rural and remote areas. During NRHM period, the shortfall of nurses and ANMs has decreased whereas for doctors it has increased. The shortage of health workforce in rural areas is due to migration both outside and within the country because of financial gains in private, better amenities in urban areas in comparison to unfavorable working environments and weak health infrastructure in remote and rural areas. Privatization and rising cost of medical education and more focus on clinical aspects rather than public health in medical education have further contributed to this problem. To improve the manpower situation in rural areas a comprehensive human resource policy and maintenance of human resource database is required. To fill up the current gap, shifting manpower from alternative cadres can be considered as a short-term measure where as long-term measure requires continued investment and expansion of health education system through public Institutes. A uniform strategy across different states may not be effective due to multiple factors. Therefore, States need to devise their own strategies as per their requirement.

Keywords: Human Resource for Health, Shortage, Rural Areas, Health Manpower Retention.

Globally, both developed and developing countries face challenges of retention of health workers in rural and remote areas, as a result, these areas face a critical shortage of health workforce¹. This scenario becomes more grave for India where

*Reader, **Assistant Research Officer, National Institute of Health and Family Welfare, New Delhi-110067.

two-third of the country's population lives in rural areas in comparison to only half at global level. India has a well established Primary Health Care infrastructure in the form of Sub centers, Primary Health Centers and Community Health Centers in rural areas, but is not complemented by adequate number of health personnel to make them fully functional². Health sector is unique, in the sense, that it is human resource intensive. The advantage of well established infrastructure could affect if it is not complemented by a health workforce that is adequate in terms of number and skill.

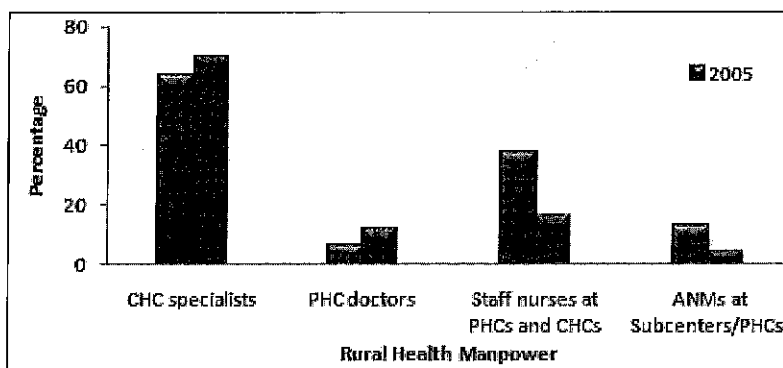
Government of India spends a huge amount of money on national level programmes like National Rural Health Mission implemented through Primary Health Care system. These programmes would not be able to achieve their goals if there is a shortage of health manpower in rural areas, where they intend to achieve maximum health benefit. Challenges in recruitment and retention of manpower need to be looked into if the critical shortage of manpower in rural and remote areas is to be addressed.

RURAL HEALTH MANPOWER

After the launch of National Rural Health Mission (NRHM) in 2005 there has been a substantial improvement in rural health infrastructure as well as in manpower. At the national level, there is an increase of 2098 Sub-centers, 651 Primary Health Centers (PHCs) and 1463 Community Health Centers (CHCs) in 2011 as compared to those existed in 2005. This implies an increase of 43.7 per cent in number of CHCs, 2.8 per cent in PHCs and 1.4 per cent in Sub-centers in 2011 as compared to 2005. Still there is a shortage of medical officers by 12 per cent at PHCs; shortfall of specialists by 63.9 per cent at CHCs; shortfall of nurses by 23 per cent at PHCs and CHCs combined; 3.8 per cent of Auxillary Nurse Midwives (ANMs); 22.5 per cent and 47.4 per cent shortfall of Pharmacists and Lab technicians at PHCs and CHCs respectively².

NRHM envisages additional manpower for strengthening human resources for health. There is a provision of second ANM at sub-center and two additional staff nurses for 24x7 PHCs. This has resulted in recruitment of more ANMs and staff nurses under the NRHM. A comparative analysis shows the gains in health workforce between 2005 and 2011 for staff nurses and ANMs, the shortfall in ANMs was reduced by 8.5 per cent and staff nurses by 21 per cent. On the other hand, manpower shortage for doctors became more acute during this period, PHC doctors increased by 5.9 per cent and for CHC specialists by 6.8 per cent (Figure 1).

FIGURE 1
SHORTFALL OF RURAL HEALTH MANPOWER FROM 2005 TO 2011



Note: Data extracted from Rural Health Statistics in India, Ministry of Health and Family Welfare, Government of India, 2011. The states with missing data for the year 2005 were excluded for calculating the percentage (Bihar & Jharkhand for ANMs; UP, Jharkhand, Bihar and Assam for Staff nurses; UP for PHC doctors; UP, Odisha, Jharkhand, Himachal, Bihar and Assam for CHC specialists).

FACTORS CONTRIBUTING TO POOR RETENTION IN RURAL AREAS

India experiences shortage of health workforce mainly due to migration of doctors and nurses. This migration is both outside the country and within the country. The inter-country migration is mostly of doctors and nurses to more developed countries for better career and financial prospects. India is the one of the major source countries for international health workforce migration³. Within the country migration is from rural to urban and public to private health system. Due to the shortage and mal-distribution, many rural and remote primary health care facilities are managed by untrained staff. As a result, poor people are constrained to seek care from unqualified and unlicensed rural practitioners⁴. Staff shortage and high turnover of patients lead to additional work load for the remaining staff leading to dissatisfaction⁵. To develop a strategy to address recruitment and retention of health workforce in rural and remote areas, first there is a need to understand the factors influencing migration of health workers.

Better Quality of Life in Urban Areas

The factors contributing towards rural to urban migration are varied like better financial gains in private (mainly for doctors), family concerns like children's

education, better living conditions, better amenities in urban areas in comparison to lack of security, unfavorable working environments and weak health infrastructure in remote and rural areas⁵⁻⁷. Other factors that contribute to poor recruitment and retention in rural and remote areas include lack of motivation due to lack of job satisfaction, poor career prospects, and low wages^{5,7-9}.

Privatization and High Cost of Medical Education

The production of manpower has not matched with demand in health sector. Many states faced difficulty in filling the post of second ANM under NRHM as the ANM training was suspended in the past¹⁰. Due to mismatch between demand and supply, there was a need to rapidly increase the number of trained nurses and doctors passing out each year to fill the existing gap. As a result, there has been an extensive increase in private medical and nursing institutes. The quality of education in such institutes was not up to the mark due to shortage of faculty in many of these institutes, moreover these institutes were poorly regulated. Therefore, privatization has not only increased the cost of education but also impacted the production and quality of trained health manpower in the country¹¹.

High Cost of Medical Education

The strategy that focuses on increasing health manpower in the country is not likely to result in filling up of posts in rural areas as the increase in number of medical and nursing schools in the past decade is largely due to opening of more nursing schools and medical colleges in private^{4,11}. The private education being costly, there is least likelihood that graduates from private school/college would be willing to work in public health system that too in rural and remote locations. Majority of these graduates would either seek private employment or migrate to other country in a bid to recover their education costs. On the other hand many students who get good quality, highly subsidized education in a public institute migrate out of the country for better career prospects and financial gain⁴. Studies show that the mobility of male workers is guided more by financial concerns whereas for females it is their family concern¹².

Privatization of medical and nursing education and increased cost of education have declined the opportunity of candidates who are financially weak for entering into medical education in rural and remote areas. The likelihood of health workers serving in a rural or remote area increases, if they belong to those areas^{13,14}. Under NRHM, the advantage of this fact is being taken by states like West Bengal and Madhya Pradesh where the ANM's and Staff Nurses from local area are trained to be posted in rural and underserved areas¹⁰.

Clinical Vs Public Health

The medical education curricula have not kept pace with the changing requirements of the population or skills required for implementing health and family welfare programmes. The current system of medical education does not appear to enable the students to develop clinical and analytical skills required for functioning effectively in the primary health care settings¹⁵. Medical education in the country lays emphasis on clinical education but not on public health⁶. In keeping pace with the changing times, majority of medical graduates wish to proceed for post-graduate education rather than wanting to join the government system to serve under primary health care system⁶. Planning Commission in its 10th five-year plan document observed that the number of family physicians with clinical skills and community orientation is declining. The medical graduates prefer clinical and diagnostic specialties rather than going for public health and Para-clinical subjects. These trends may have an adverse impact on public health programmes in the country and need to be reversed¹⁶.

Other Factors

Poor human resource (HR) management, long recruitment procedures, weak enforcement of deployment and transfer policies; and limited opportunities to exercise their skills are the other factors that contribute to poor retention of health manpower in rural and underserved areas^{5,7-9}.

RETENTION STRATEGIES

To address inequalities in access to health care, there is a need to look for strategies regarding recruitment and retention of health workers in rural and remote areas.

Global Scenario

Different strategies were adopted by different countries. More developed industrialized countries fill their manpower shortage in rural and remote areas through recruitment of international health workforce as these countries have failed to attract their own doctors¹⁷. In these countries it was found that financial incentives may help in recruitment and short-term retention but their effectiveness in long-term retention is doubtful. Various retention measures tried in different countries are both financial and non-financial incentives. These vary from providing hardship allowance, compulsory service, vehicle loans, accommodation, to training of more health workers, local recruitment and guarantee in public service employment^{7, 18-21}. Various effective retention strategies for professional issues

address professional development, improving work force management, better working conditions and better equipments^{7, 10}.

Indian Scenario

In India, various strategies undertaken by different states for retention of health manpower in rural areas are;

- Compulsory rural service,
- Rural service benefit for admission in post-graduate courses,
- Training of health workers from rural background,
- Financial incentives in the form of difficult area allowances,
- Improving HR management practices- minimizing recruitment delays,
- Regularization of contractual posts

To address the service gaps in underserved areas other initiatives taken are, bringing in private providers, contracting out health facilities, multi skilling and task shifting of health workforce⁹⁻¹¹.

Current strategies to augment the workforce under NRHM in primary health care include second ANM at sub center and three staff Nurses at 24x7 PHC's. Their long term effectiveness and sustainability in terms of long term retention and provider satisfaction remain to be seen. These are contractual posts and there is lack of appropriate HR policies to regularize these appointments, with an exception of Tamil Nadu where they regularize the contractual Staff Nurses after certain period of service on contract¹¹.

CHALLENGES IN RETENTION OF HEALTH MANPOWER IN RURAL AREAS AND THE WAY FORWARD

Comprehensive Human Resource Policy

To address HR issues, no comprehensive Human Resource Policy is available at national level. Though causes are multiple but often strategies address one or few factors only. An effective HR retention strategy needs to take into account both their professional and personal concerns. Institutional delays in recruitment and lack of transparency in transfers and promotions act as hindrances for deployment and retention of health work force in rural and remote areas. The HR processes like recruitment, deployment, transfer and promotion in different states need to be streamlined and implemented in a transparent manner.

Human Resource Database

The strategies already in operation across different states need evaluation to identify their efficacy for their ability to fill up the pre-existing vacant posts in rural and remote areas. As long-term retention is one of the critical areas of concern, it is helpful if the retention of health manpower in terms of average length of stay post-recruitment is known. The data on HR is mostly poor in quality and does not allow this effect to be studied. A human resource data base tracking their movement and duration of employment could help in finding the average length of stay in their rural and remote areas of posting.

The design and implementation of a Human Resource Management Information System can help tracking the health workforce to their place of posting, identifying any mismatch between the skills and place of posting. This would further help making human resource management (recruitment, deployment and transfer) more need based and transparent.

Supportive Measures

Other supportive measures like task shifting can help to fill the gap for service provision. Practitioners of other systems of medicine like AYUSH could be integrated to fill manpower gaps. Training of other cadres for rural practice as in Assam and Chhattisgarh; and training of nurse practitioners for better coverage and more cost-effective service provision are other possible alternatives.

Strengthening of Government Medical Institutions

Enhanced investment in public education system in health in the form of opening more government institutes, better infrastructure and strengthening faculty position is required. The strong public education system in health in the country would help achieving long-term dividends in the form of better human resource availability, more avenues to train health workforce from rural and underserved areas; and improved service coverage in these areas.

Due to multiple factors determine the retention of manpower, addressing a multitude of factors needs to be targeted simultaneously. A uniform strategy across different regions is not effective, therefore, the states need to devise their own strategies as per the pull and push factors determining the movement for their respective workforce and their geopolitical environment.

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EFFECTIVENESS OF EDUCATIONAL INTERVENTION FOR MANAGEMENT OF HYPOTHERMIA BY THE NURSING PERSONNEL

Jyoti Sarin,* Nanthini Subbiah,** Jeeva*** and Geetanjali***

ABSTRACT

Neonatal hypothermia is widely recognized as an important contributing factor to neonatal morbidity, especially in low and middle income countries. Newborns are predisposed to develop hypothermia which is more common during the first 12 hours of life and nursing staff play a vital role in controlling this problem. The aim of this study is to strengthen the knowledge and practices of nursing personnel regarding assessment and early identification, implementing appropriate interventions for prevention and management of hypothermia to reduce neonatal mortality. The findings of the study indicated that educational intervention was very effective in enhancing the knowledge and improving the practices of the nursing personnel. This study reflects the need to keep a constant vigil on hypothermia in neonates and to be aware of its potential complications. Health education of expectant mothers and in-service training of physicians and para-medical workers would go a long way in dealing with the problem of hypothermia.

Keywords: Educational Intervention, Hypothermia, Nursing Personnel.

Neonatal hypothermia is widely recognized as an important contributing factor to neonatal morbidity, especially in low and middle income countries and has been associated with mortality risk in newborns and young infants aged 0-2 months.^{1,2,3} Hypothermia is an important determinant of the survival of newborns, especially among low-birth-weight (LBW) babies. Thermoregulation in the neonate is a critical physiological function that is strongly influenced by physical immaturity, extent of illness and environmental factors. The neonate's susceptibility to temperature instability needs to be recognized and understood in order to appropriately manage and limit the effects of cold or heat stress.⁴

* Principal, *** Faculty, MM College of Nursing, Ambala, Haryana, **Reader, Department of Community Health Administration, National Institute of Health and Family Welfare, New Delhi-110067.

World Health Organization (WHO) has included thermal care (including the prevention of neonatal hypothermia) as a component of essential care in newborn among the package of basic interventions recommended universally for all babies. However, in low-resource settings, adequate thermal care of newborns is difficult to achieve and hospital-based studies in South Asia and Sub-Saharan Africa have demonstrated a high incidence of primary hypothermia, especially in the first 24 hour after birth.^{5,6,7,8,9} Newborns suffer from hypothermia as they lose heat because of little subcutaneous fat, poorly developed autonomic thermoregulatory response and body surface area is more in relation to weight¹¹. According to WHO reports, most of the newborn deaths are due to hypothermia that is about 42 per cent and 3.6 million develop moderate to severe hypothermia.¹² Thermoregulation is one of the challenging aspects of neonatal care. Mastering the art of maintaining the neutral thermal environment is one of the most influential interventions the bedside nurse can perform for the full term and pre term infant.

According to UNICEF, neonatal deaths make up 37 per cent of under five deaths world-wide. In India, 50 per cent of all infant deaths occur in the first 28 days of life.¹ Early neonatal mortality and morbidity was studied in Medical College, Kolkata and found that neonatal mortality and morbidity rate were 66.85 and 32.86 respectively. About 48 per cent of early neonatal deaths occurred within the first 48 hours and 80 per cent within the first 72 hours of life. The coverage evaluation survey 2009 revealed that the infant mortality rate in India is 53 per 1000 live births. More than 50 per cent of this is contributed by neonatal mortality. Neonatal mortality rate is 36 per 1000 live births. India contributes about a quarter of global neonatal deaths. More than 100 neonates die every hour. One of the major causes is hypothermia. Neonatal hypothermia often occurs due to lack of attention by health care providers and continues to be a very important cause of neonatal deaths.

Unless someone gives immediate attention to heat loss, the neonate's temperature can drop approximately 4.5°C (8.1°F) during the first minute after birth. Because the infant is dependant on environmental temperature, providing thermal support is a primary nursing objective.¹⁰ A study conducted to identify the incidence and the risk factors of neonatal hypothermia at referral hospitals has shown that more than 50 per cent neonates become hypothermic soon after birth. This is one of the most serious health problems which contribute to a 3 fold higher morbidity and mortality¹³.

Newborns are predisposed to develop hypothermia which is more common during the first 12 hours of life. Neo-natal hypothermia at birth increases mortality, morbidity and hospitalization period. A study undertaken to evaluate the knowledge, attitude and practices about neonatal hypothermia among para-medical staff dealing with newborn care, it was found that only 18.6 per cent had knowledge about the correct method of recording the temperature of newborn. Nursing personnel, being a direct care provider to the newborn babies, must have adequate knowledge and practice on management of hypothermia. Improving their knowledge and making them competent can help reduce the morbidity and mortality level among neonates.¹³ Therefore, this research problem was chosen for conducting the study.

MATERIALS AND METHOD

Experimental Research Approach was adopted to conduct the study. The research design used for the study was one group pre-test post-test design. The sample respondents of the study comprises nursing personnel working in Neo-natal and allied units across the country. 74 nursing personnel were selected purposefully. Sample size was determined by using power analysis. A structured knowledge questionnaire and an observational checklist were used to collect the data related to knowledge and practices of the staff nurses. The structured knowledge questionnaire comprised 50 objective type items containing assessment, prevention and management of hypothermia. Each correct response was awarded score (1) and incorrect response was given score (0). Thus, maximum mark on the structured knowledge questionnaire was 50. To assess the practices of nursing personnel, an observational checklist was used which consisted of 30 behaviours, to be observed in simulated situations, covering the areas like prevention of hypothermia in the labour room, at birth and in the post-natal ward. Data collection was done in the month of August 2011 during the workshop conducted at the Trained Nurses Association of India. On the first day the baseline data on knowledge and practices of nursing professionals with regard to management of hypothermia were obtained and the next day the knowledge regarding management of hypothermia was imparted through lecture cum discussion and demonstrations followed by hands on training by using mannequin. On the fifth day, the post-test was conducted. Data were analyzed using descriptive statistics and inferential statistics.

FINDINGS

All the nursing personnel were working in newborn and allied health units. The sample consisted of Staff Nurses (36.67%), Sister In-charge (33.33%), Assistant Nursing Superintendents (13.33%), Public Health Nurses (10.0%) and Nursing Superintendents (6.67%).

Knowledge and Practices of the Nursing Personnel Regarding Management of Hypothermia

TABLE 1
MEAN, MEDIAN, RANGE, AND STANDARD DEVIATION OF PRE-TEST AND POST-TEST KNOWLEDGE AND PRACTICE SCORES OF NURSING PERSONNEL

N=74

Domain	Test	Mean	Median	Range
Knowledge	Pre-Test	18.62±4.81	18.5	8.5-29
	Post-Test	28.77±5.71	29.2	19-40
Practice	Pre-Test	13.41±3.62	12.88	9-18
	Post-Test	21.3 ±4.36	21.0	16-26

Data presented in Table 1 indicate that the mean post-test knowledge score (28.77) was higher than the mean pre-test knowledge scores (18.62). Data also reveal that the median of pre-test was 18.5 whereas it was 29.2 in the post-test. The range of post-test score (19-40) was higher than the pre-test score (8.5-29). The post-test knowledge scores were more homogenous (SD 5.71) as compared to the pre-test knowledge scores (SD 4.81).

Data further indicate that the mean post-test practice score (21.3) was higher than the mean pre-test practice scores (13.41). Data also reveal that the median of pre-test was 12.88 whereas it was 21.0 in post test. The range of post-test score (16-26) was higher than the pre-test score (9-18). Data also revealed that the post-test practice scores were more homogenous (SD 4.36) than the pre-test practice scores (SD 3.62).

TABLE 2
AREA WISE MEAN, MEAN PERCENTAGE AND MODIFIED GAIN OF PRE-TEST AND POST-TEST OF KNOWLEDGE AND PRACTICE SCORES OF NURSING PERSONNEL

N=74

Domains	Areas	Max score	Pre-test	Post-test	Actual gain score	Possible gain score	Modified gain score
			Mean score & Mean % score	Mean score & Mean % score			
Knowledge	Concept of hypothermia	23	7.36 (31.99)	12.94 (56.25)	5.58	15.64	0.35
	Mechanism of heat loss	14	5.68 (40.56)	7.88 (53.75)	2.2	8.32	0.26
	Prevention and management of hypothermia	13	5.49 (42.23)	7.64 (58.80)	2.15	7.51	0.28
Practice	Preparation before birth	05	3.6 (72)	4.5 (90)	0.9	1.4	0.64
	Preparation after birth	10	0.11 (11)	1.0 (100)	0.89	9.89	0.08
	Assessment of temperature	09	5.1 (56.6)	8.3 (92.2)	3.2	3.9	0.82
	Prevention of hypothermia in post-natal ward	06	4.6 (57.5)	7.5 (93.7)	2.9	1.4	2.07

Maximum score= 50 (knowledge), Maximum score =30 (practice).

The lowest pre-test percentage score of (5.49) was in the area of prevention and management of hypothermia and the highest mean pre-test percentage score (7.36) was in the area of concept of hypothermia in relation to the knowledge of the nursing personnel (Table 2). Data further in Table 2 show that the lowest pre-test percentage score of (0.11) was in the area of preparation after birth and highest mean pre-test percentage score (5.1) was in the area of assessment of temperature in relation to practices of nursing personnel. (The area with the lowest mean percentage score indicates the highest deficit area and with highest mean percentage indicates the lowest deficit area). The mean percentage score in all the areas of the post test was higher than the mean percentage score in the pre-test indicating the effectiveness of the educational intervention in enhancing the knowledge and improving the practices of nursing personnel regarding prevention of hypothermia.

TABLE 3
MEAN, MEAN DIFFERENCE AND STANDARD ERROR OF MEAN DIFFERENCE AND 't'
VALUE OF PRE-TEST AND POST-TEST KNOWLEDGE SCORE AND PRACTICE SCORES OF
NURSING PERSONNEL

N=74

Domains	Knowledge test	Mean	M _D	SE _{MD}	't' value
Knowledge	Pre-test	18.62	16.79	1.45	7.22*
	Post-test	28.77			
Practice	Pre-test	13.41	7.9	0.56	11.32*
	Post-test	21.3			

't' (72) = 1.663 * Significant at 0.05 level of significance.

Data presented in Table 3 show that the mean post test knowledge score of nursing personnel was (28.77) and mean pre-test knowledge score was (18.62) with a mean difference of 16.79. The mean post-test practice score of nursing personnel was (21.3) and mean pre-test knowledge score was (13.41) with a mean difference of 7.9 which was found to be statistically significant as evident from 't' value of 1.66 for df 72 at 0.05 level of significance. This shows that the obtained mean difference between the pre-test and post-test knowledge and practice score was a true difference and not by chance. Thus, it can be inferred that the educational intervention on management of hypothermia was effective in enhancing the knowledge and improving the practices of nursing personnel regarding prevention of hypothermia.

DISCUSSION

Hypothermia is an important and independent risk factor for neo-natal death. In addition, as indicated in previous studies, hypothermia is one the most important causes of neo-natal morbidity. For instance, it has been shown that hypothermia is associated with neo-natal complications such as pulmonary haemorrhage, acidaemia, scleroderma, jaundice and hypoglycaemia.¹⁴ All newborn babies are prone to heat loss, particularly in the first minutes and hours after birth.^{14,15} If adequate thermal protection is not begun immediately after birth, the newborn will lose heat rapidly, with the skin temperature losing up to 4°C in the first minutes.¹⁵ Thus, immediate actions, such as wrapping and drying the baby is recommended as part of the essential newborn care, further emphasis is placed on encouraging nursing personnel to enhance their knowledge and skill in management and prevention of hypothermia in Newborns.¹⁶

In many parts of the world, health personnel are not aware of the importance of keeping babies warm by simple methods such as drying and wrapping immediately

after birth, avoiding harmful traditional practices, encouraging early breastfeeding and keeping newborns in close contact with their mothers.

Methods of thermal control and managing hypothermic infants are strongly related to the traditional beliefs and medical resources in each country. In Malaysia, cleaning newborn infants with coconut oil shortly after birth is a common practice in labour rooms. A study on 227 randomly selected normal-term infants in this country revealed that this traditional method of cleaning is significantly associated with hypothermia. The researchers concluded that the labour room temperature should be set at a higher level and cleaning infants using coconut oil should be discouraged. In the Himalayan state of north India, a warm heated room for delivery and lying-in, early rooming in, oil massage and layers of warm clothing are traditional means for thermo-regulation^{17,18} which have also been observed in the present study.

Knowledge on the prevention and management of hypothermia was somewhat better among the respondents (70.4%). However, when professionals were questioned about the specific methods of prevention of hypothermia, many health professionals did not give adequate descriptions of specific procedures. Among specific procedures to prevent hypothermia, the skin to skin method was known to many participants although seldom practiced. Care practices immediately following delivery contribute to newborns risk of morbidity and mortality. A set of practices that reduce neo-natal mortality have been outlined as essential newborn care practices which include thermal care and initiating breastfeeding within the first hour after birth. These interventions have been identified as proven interventions that save newborn lives.

CONCLUSION

The knowledge and practices of health care professionals with respect to hypothermia are grossly inadequate, revealed by various studies conducted so far both in India as well as abroad. The need of the hour is to keep a constant vigil regarding hypothermia in neo-nates and to be aware of its potential complications. Health education of expectant mothers and in-service training of physicians and para-medical workers would go a long way in dealing with the problem of hypothermia. There is also an urgent need to generate data on the problem of hypothermia.

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A CRITICAL EXAMINATION OF THE PROCESS OF DISBURSEMENT OF INCENTIVES UNDER JANANI SURAKSHA YOJANA IN GHAZIABAD, UTTAR PRADESH

Ashoo Singh,* M.M. Misro** and Utsuk Datta**

ABSTRACT

Almost all of the study subjects (99%) received the incentives themselves as given under the JSY scheme and were found to possess the JSY card (100%). While incentives were disbursed by a Lower Division Clerk (LDC) in the district hospital, it was either the immunization officer at Hapur or Health Education Officer at Muradnagar who disbursed the incentives at the Community Health Centres (CHCs). The mode of payment was in the form of bearer cheque of the State Bank of India. All the beneficiaries from the urban area (100%) received Rs.1000/- as compared to Rs.1400/- for those coming from rural areas (98%). 59 per cent of the beneficiaries received the incentives at the time of discharge, 14 per cent within 07 days, 19 per cent within 14 days, and the rest (7%) beyond 14 days of discharge. Majority (82%) did not face any difficulty but a few (18%) faced some problems while receiving the incentive and some (7%) encashing the same. The difficulties encountered were frequent visits to the Institution (11%) as the concerned person was either on leave (2%), the cheque was not ready (2%) the photo was not clicked (2%) or some error in the ration card (1%). Majority of the beneficiaries (96%) had spent their own money on transport to reach the place of delivery but received no reimbursement. Efforts are needed to remove these difficulties under JSY which would provide further impetus to the programme and improve the public perception and acceptance in institutional deliveries.

Keywords: Janani Suraksha Yojna (JSY); Institutional Delivery; Incentives; Disbursement.

Maternal mortality is one of the major health challenges and plagues women all over the world including India. It is stated that every five minutes one woman dies somewhere in India because of pregnancy related complications which lead to one lakh maternal and ten lakh newborn deaths each year¹. As per the latest

*MD (CHA) student, **Professor, National Institute of Health and Family Welfare, Baba Gangnath Marg, Munirka, New Delhi-110067

National Family Health Survey (NFHS)²⁻³ and Sample Registration System (SRS)³ 2007, maternal mortality at the national level stands at 301 and 254/lakh live births respectively which still continues to be very high as compared to 9/lakh live births among the developed regions⁴.

Reduction of maternal mortality is one of the strategies aimed at alleviating maternal health. The Millennium Development Goal (MDG 5)⁵ has set the target of reducing the maternal mortality by three fourths from 447 in 1990 to 109 by 2015. Similarly, National Rural Health Mission (NRHM) has also set-up identical priorities to reduce the maternal deaths by providing quality obstetric care in time. Skilled attendant at delivery, access to obstetric care and maintaining an effective referral system are important key factors to save maternal lives. Improved access to comprehensive essential obstetrics care can avert 40 per cent of the maternal deaths⁶. Against this rationale, Government of India (GoI) under NRHM 2005, modified the National Maternity Benefit Scheme⁷ from nutrition improving initiative to the 'Janani Suraksha Yojna' (JSY)⁸ with the dual objective of reducing maternal and neo-natal mortality by promoting institutional deliveries. The scheme is 100 per cent centrally sponsored and integrates cash assistance with maternal care.

Though the JSY has been implemented in all the states and Union Territories, its focus is on states having low institutional delivery rate. Uttar Pradesh (UP) is a low performing state with 22 per cent of pregnant women opting for institutional deliveries and ranks 25th in the list of states with Kerala topping the chart (NFHS-3)². However, as per DLHS-3 data⁹, District Ghaziabad presents a relatively better statistics of 39.3 per cent of total institutional deliveries as compared to 24.5 per cent for the whole of Uttar Pradesh. As cash incentive is the major attraction for people under the scheme, its proper and smooth disbursement would contribute a lot to the success of the scheme. An assessment of the functioning and impact of JSY from Odisha and Madhya Pradesh has recently been reported^{1,10,11}. However, in both the studies, the aspect of the process of disbursement of incentives was not investigated in detail. The present study was therefore initiated to critically examine the process of disbursement of incentives under JSY in the District Ghaziabad, Uttar Pradesh and find out deficiencies, if any, to suggest measures for improvement.

MATERIALS AND METHOD

The study was conducted in Ghaziabad District of Uttar Pradesh (UP) between July and December, 2009. The study population included the providers of JSY, Chief Medical Officer (CMO), District Hospital, Chief Medical Superintendent (CMS) of Women's Hospital, Ghaziabad, Superintendents of CHCs, Staff Nurse, ANM, ASHA

and the beneficiaries. The study was exploratory in nature. Ghaziabad district has five CHCs under the district hospital and two out of five were selected by simple random method. Beneficiaries under JSY totaling one hundred who delivered three months prior to the date of data collection at Women's Hospital Ghaziabad (50%), and at the selected CHCs of Hapur (25%) and Muradnagar (25%) were included in the study. JSY register was screened and beneficiaries were selected by systemic random sampling from the urban area i.e. District Hospital Ghaziabad (50) and 25 each from the rural areas of Hapur and Muradnagar CHCs. In order to track the mothers correctly, the ASHA of the area was contacted. The list of the beneficiaries collected from the JSY register was matched with the list of deliveries available with ASHA. The beneficiary was tracked and visited at her home for the interview. If the beneficiary was not tracked, the next beneficiary in the serial order was contacted for completing the sample size. Data were analyzed with the help of SPSS version 15.0.

FINDINGS

Background Characteristics

Most of the beneficiaries (80%) were in the age group of 20-29 years followed by 7 per cent in 15-19 years and 2 per cent in 35 years and above. Majority of the beneficiaries (45%) were illiterates followed by primary, middle and senior class education levels, 17 per cent each and the rest (2%), graduation and above. 68 per cent of husbands of beneficiaries had an income of Rs.3000/- to Rs.4000/- and the rest had above Rs.4000/-per month. More than half of these people belonged to labour class and the rest were salesman, drivers or self employed. Out of the total beneficiaries interviewed, 64 per cent belonged to APL, 12 per cent to Below Poverty Line (BPL) category and the rest not sure of their status with no card. 79 per cent of the beneficiaries were Hindus and the rest was Muslim. Among Hindus, 43 per cent belonged to Scheduled Caste, 18 per cent other backward classes and the rest general class.

Primigravida comprised 30 per cent, 2nd Gravida 26 per cent, 3rd Gravida 22 per cent and 4th and 5th gravids 11 per cent each, among the beneficiaries. In terms of birth order, 31 per cent of the beneficiaries were of 1st, 30 per cent 2nd, 21 per cent 3rd and 18 per cent 4th and above. Out of the total beneficiaries, 98 per cent had live births while 2 per cent recorded still births during the period under investigation.

Majority of the beneficiaries (62%) were registered by the doctors during the 1st ante-natal checkup, 21 per cent by the staff nurse, 14 per cent by the ANM and rest by LHV. The registration for ante-natal checkup was during 3rd (32%), 4th (12%),

5th (11%) and 6th and above (17%) months of pregnancy. There was no ante-natal checkup for 23 per cent of the beneficiaries who reported to the health institution at the time of delivery. Out of these, 20 were from rural and 3 from urban areas.

JSY Registration and Disbursement of Incentives

46 per cent of the beneficiaries had registered for JSY at the 7th month of pregnancy, 17 per cent at 8th month and 11 per cent at 9th month. Those beneficiaries (22) who registered for JSY at the time of labor were mostly from rural area but four belonged to urban area. Ghaziabad district hospital had registered the beneficiaries after 7th month of pregnancy when the fetus becomes viable. The individuals are registered for JSY on the basis of MCH card. After the registration, all relevant investigations were done free of cost.

Following the delivery, the JSY form was made available to all the beneficiaries, which was duly filled up and deposited in the institution concerned. The completed form, discharge certificate along with the birth certificate once reached the LDC at women's hospital, SPS at CHC Hapur or the Education Officer at CHC Muradnagar, the process of disbursement of incentive was initiated. Details of the beneficiary were entered in the JSY register and the cheque was prepared by the concerned person as per guidelines.

Almost all the beneficiaries (99%) to have received their incentive except one, who stated that the cheque was not ready at the time of discharge.

Those in the district hospital (urban area) had received Rs1000/- while those in the CHCs of Muradnagar and Hapur (rural area) received Rs1400/- for the institutional delivery. The mode of payment to the beneficiaries was in the form of a bearer cheque of State Bank of India, which carried the name, signature or thumb impression of the beneficiary and JSY registration number. The incentive was disbursed by an LDC at district hospital while SPS and Health Education Officer disbursed the incentive at CHCs Hapur and Muradnagar, respectively.

On average, 59 per cent of the beneficiaries received the incentive at the time of discharge, more from urban (96%) and very less from rural (22%) (Table 1). Only few (7%) of the beneficiaries did receive the incentives after 14 days of discharge. The delay in disbursing the incentive in urban area was due to non-availability of the LDC for 4 per cent of the beneficiaries. The delay in receiving the incentives was more pronounced in rural areas as compared to urban areas.

TABLE 1
DISTRIBUTION OF THE BENEFICIARIES AS PER THE TIME OF RECEIVING THE CHEQUE

Time of receiving incentive	N=100 (%)	Rural N=50(%)	Urban N=50 (%)
At the time of discharge	59(59%)	11(22%)	48(96%)
With in 07 days of discharge	14(14%)	14(28%)	Nil
After 07 days of discharge	19(19%)	17(34%)	2(4%)
After 14 days of discharge	7(7%)	7(14%)	0
NA	1(1%)	1(2%)	0
Total	100	50	50

Though, majority of the beneficiaries (82%) did not face any difficulty, the rest (18%) faced some problem while receiving the incentive as shown in Table 2. Similarly while encashing the cheque, majority (93%) did not face any difficulty. During encashment, the signature/thumb impression of the beneficiary on the reverse of cheque was matched by the bank for verification. However, due to non-availability of money in JSY account, few beneficiaries (2%) could not receive the incentive on time.

TABLE 2
DISTRIBUTION OF THE BENEFICIARIES AS PER THE TYPE OF DIFFICULTY FACED

Difficulty faced in receiving the incentive (N=100)	Percent
Concerned person on leave	2.0
Had to visit a number of times	11
Cheque not ready	2.0
Wrong name in Ration card	1.0
Photo was not clicked	2.0

DISCUSSION

Monetary incentive is one of the major attractions of the JSY scheme. Data from the present study firmly indicate that there are still few bottlenecks in the disbursement process which need to be appropriately addressed in order to make the scheme more popular, particularly in the rural areas.

To the best of our knowledge, this forms one of the first such studies in a low performing state (LPS) like UP which has a poor record of institutional deliveries. As per the guidelines of Ministry of Health and Family Welfare, Government of

India, all pregnant women delivering in Government health centers like Sub-centre, PHC/CHC/FRU/General wards of District and State Hospitals or Accredited Private Institutions are eligible for cash assistance in a LPS. For the disbursement of incentive, it is stated that ANM/ASHA should carry out the entire disbursement process. In case ASHA has not joined, AWW or any identified link worker, under the guidance of the ANM is empowered to do the same. However, this was in complete contrast to what was being observed in the District hospital as well as in CHCs in the present study. Though the incentive was strictly in the form of a cheque, it was an LDC at district hospital or Immunization Officer/Health Education Officer at CHCs who was disbursing the incentive to the beneficiaries. A study in Rajasthan¹² revealed that for institutional deliveries, ANM was the main source for cash disbursement, followed by the medical officer and accountant at CHCs. However, in West Bengal¹³, in majority of the cases, ANM (82%) followed by Panchayat (14%) handled the cash assistance to JSY beneficiaries. Accountant, block/bank officials made the payment in some cases. However, no such process deviations were found in other studies recently reported^{1,10,11}.

While probing for the reason, it was explained by one of the CHC superintendents in the present study that beneficiaries, in few cases, had claimed higher incentives (Rs.1400/-) in spite of being residents of an urban area. To avoid such irregularity, it was made compulsory that confirmation of area of residence by the village Pradhan is mandatory. If the identity proof of the beneficiary was not available, signature of the concerned ASHA was taken as a proof of the area of residence. ASHA was then made responsible for submission of the proof of residence by the beneficiary duly signed by the village Pradhan. Though the process made a little deviation from the prescribed guidelines, it ensured right payment but might be instrumental for some delay in the disbursement of incentive to the beneficiaries.

In the present study, the amount of incentive received by the beneficiaries under the JSY scheme was as per the guidelines. 98 per cent of the beneficiaries had received Rs 1400/- for institutional delivery in the rural areas. Majority of the beneficiaries from urban area had received incentive at the time of discharge. There was a delay in the payment of the incentive to 41 per cent beneficiaries, mostly from rural areas, (Table 1). The difficulties faced by the beneficiaries are listed in Table 2. Similar findings were also reported from a study in Himachal Pradesh which stated that 37 per cent of beneficiaries who received the incentive late had to make several visits and even received the financial assistance in installments¹⁴. As multiple visits has been cited as one the difficulties, the process of disbursement of incentive, though simplified still needs to be amended and improved so as to address this shortcoming.

Incentive under the JSY was given to almost all the beneficiaries in the present study (99%), which is a marked improvement as compared to data from similar studies in Rajasthan (88%)¹², West Bengal (83%)¹³, Himachal Pradesh (85%)¹⁴ and Assam (62%)¹⁵. The successful implementation of the JSY scheme is mainly determined by the timely disbursement of the incentive which was a major motivation factor to come for institutional deliveries. To attain the same, the documentation process should be made simple and the JSY form could be filled during the ante-natal visits so that the identity proof of the beneficiaries could be established before hand for avoiding any delay in the disbursement of the incentive. However, as revealed in the present study, a significant percentage (22%) of the beneficiaries from rural areas reported for registration just at the time of delivery. As such, they had no ante-natal check-ups and the formal requirements for registration were to be carried out at the time of labour.

Only one beneficiary did not receive the incentive at the time of interview. As explained by the beneficiary herself that she did not get the incentive at the time of discharge as the cheque was not ready. She was told that the cheque would be given to the concerned ASHA who would later deliver the same to her. The beneficiary was asked to give her signature in the JSY register at the time of discharge. However, when she again contacted the ASHA after some time, she was informed by ASHA that the cheque has not been signed by the superintendent as he was not available. The beneficiary was asked by the ASHA to be present herself again at the health centre for the collection of the cheque.

Majority of the beneficiaries did not face any difficulty in encashing the cheque (93%). Only 4 per cent of the beneficiaries faced some problems during encashment. It was found that 2 per cent of the beneficiaries had difficulty in encashing the cheque due to non availability of money in the JSY account of the bank. This is to be considered seriously as it reflects a major lapse in the fund flow which ultimately affects disbursement process. A few urban beneficiaries were not sure of as to which bank they should go to collect the incentive. In contrast, beneficiaries from rural areas had no problems as they were assisted by concerned ASHAs.

Findings of the study revealed that 97 per cent of the beneficiaries had used transport to reach the place of delivery. The most common mode of transport used to reach the place of delivery was autorickshaw (54%) followed by car (29%) and other modes of transport. Transport was facilitated by ASHA for 47 per cent of the beneficiaries to reach the place of delivery. However, the money spent on transport was mostly paid by the beneficiaries themselves (96%). As per the guidelines, in case ASHA fails to arrange transport for the pregnant woman to go

to the health institution, transport assistance money available within the ASHA's package should be paid to the pregnant woman immediately upon her arrival at the institution for delivery. However, in the present study it was found that none of the beneficiaries was reimbursed the transport cost which was borne by them to reach the institution of delivery. The findings of the study confirm the findings of other studies.¹¹ However, the situation is better in other states like Himachal Pradesh (30%), West Bengal (15%) and Assam (6%), where the cost was reimbursed to the beneficiaries to some extent.

The guidelines advocate that advance money of either Rs. 5000/- or Rs.10000/- is to be given to each ANM of a high performing state (HPS) or a low performing state (LPS) respectively, in the form of recoupable imprest money from the JSY fund, which may be utilized for transport. This money is usually kept in the joint account of ANM and Gram Pradhan, as in case of untied fund placed with sub-centre, so that the ANM could 'roll' the entire amount by advancing Rs.1500/- to Rs. 2500/- to ASHA/AWW per delivery to meet the transport cost as and when the need arises. Later she could recoup it from the PHC or CHC, where JSY fund is marked by the authorities. However, it was learnt during the study that none of the ASHAs had received the advance money from the ANM which could have been used towards disbursement for arranging the referral transport for escorting the pregnant women to the institution. On the other hand, the superintendent from the CHC revealed that an amount of Rs. 2500/- was indeed given to ASHAs as advance money for the purpose. ASHAs, when confronted again, agreed that they had received the money after their first training but were not clear as to how the money could be spent or utilized. It appeared that in spite of the training, communication gap still persisted among the providers affecting the success of the scheme in all respects.

On the basis of the above findings, it is concluded that though JSY scheme is doing well in the district Ghaziabad, there are many critical gaps in the process of disbursement which need to be appropriately plugged for improving its acceptance among the masses. Few important aspects like timely disbursement, reimbursement of the transport cost and clearing the confusion regarding the encashment of cheque, if adequately addressed, would provide a major thrust to the Government of India efforts to increase the institutional deliveries.

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A LOGISTIC REGRESSION ANALYSIS FOR ASSESSMENT OF AGE AND GENDER FACTORS ASSOCIATED WITH LEPROSY: A PILOT STUDY FOR ESTIMATION OF DISEASE BURDEN OF LEPROSY IN BAREILLY DISTRICT, UTTAR PRADESH, INDIA

Abha Aggarwal,* Arvind Pandey, and Anita Agarwal*****

ABSTRACT

The present paper presents the findings of the logistic regression analysis in assessing the age and gender factors associated with leprosy. Inverse sampling technique which is appropriate in case of rare event like leprosy was adopted to collect the data for the pilot study. Under inverse sampling, number of rare events are fixed in advance and sampling is continued till the desired number of predetermine events are found in the population. Here 25 new cases of leprosy were fixed assuming 20 per cent co-efficient of variation and prevalence of leprosy as 1 per ten thousand. The findings reveal that among the 25 new cases 76 per cent (19 cases) was found to be male as compared to 24 per cent (6 cases) female. 44 per cent (11) new cases belong to the age group of 21-40 years. Logistic regression analysis shows that the risk of developing leprosy in males is 2.86 times more as compared to females (OR=2.8, $p=0.025$, 95% CI= 1.1 - 7.2). The risk of developing leprosy in the age group of 21-40 is 4.6 times more as compared to less than 20 yrs. (OR=4.6 $p=.005$, 95% CI = 1.6 - 13.6). The study concludes that males in the age group of 21- 40 years are at risk of developing leprosy.

Keywords: Inverse Sampling, Logistic Regression, Odds Ratio, Co-efficient of Variation

Leprosy elimination has been a public health issue during the past many years. The magnitude of the problem is often expressed by the number of cases registered by the leprosy programmes. The Government of India set the goal of elimination of leprosy by the year 2005. This is defined as a goal of <1 case per ten thousand population at the national level.

*Scientist 'E', **Director, *** SRF(Statistics), National Institute of Medical Statistics, Indian Council of Medical Research, Ansari Nagar, New Delhi-110029.

The goal was achieved at the national level and government declared elimination of leprosy during December 2005¹⁻². It would be then desirable to assess whether progress towards the goal of elimination is satisfactory, particularly at the State level. Further, the 131st report of the committee on petitions of Rajya Sabha, 2008, strongly recommended a survey involving Panchayati Raj Institutions (PRI) to have realistic figures of Leprosy Affected Persons (LAPs) and to devise a national policy. The final survey involving PRI was to be undertaken by December, 2009. Therefore, a multi-centric study was proposed to assess the burden of active leprosy cases, leprosy person with grade-I and II disability and the magnitude of stigma and discrimination prevalent in the society.

Conventional sampling techniques for estimation of disease burden of leprosy are difficult to apply due to large sample size requirement. In addition, conventional sampling when used to detect rare events there is likelihood of not getting even a single event even after covering a large sample. In such situations, sampling techniques for rare event are more appropriate. Accordingly, inverse sampling³⁻⁴ was tested in one block PHC namely Fatehganj of Bareilly, Uttar Pradesh on pilot basis⁵ and validated by comparing with the findings of the conventional sampling procedure adopted in another block PHC of Bareilly district. The inverse sampling is found to be feasible in terms of cost and time effective for estimation of disease burden leprosy⁶. This paper presents the analytical approach to the data collected by inverse sampling in Fatehganj block PHC, Bareilly in assessing the gender and age factors in developing leprosy.

MATERIALS AND METHOD

One district with high endemicity status of Annual New Case Detection Rate (ANCDR) 24.15/100,000 namely, Bareilly of Uttar Pradesh was taken for the pilot study. Inverse sampling was adopted to collect the data in Fatehganj block PHC. Inverse sampling is a sampling design used in case of rare events like leprosy. Under inverse sampling, number of rare events is fixed in advance and sampling is continued till the desired number of rare events appears in the population. Here 25 new cases of leprosy was fixed considering co-efficient of variation as 20 per cent and data were collected till these 25 new cases were detected in the population. A new case of leprosy was defined in this study as a case that was detected during the survey and never taken treatment of Multi Drug Therapy (MDT). A case where treatment with MDT is completed referred to as RFT case (Relief from treatment). The reference period for the study was April 2009 -October 2009. All the new cases detected during the survey were validated or confirmed by Central Leprosy Division, MOHFW, New Delhi. The study was approved by the institutional ethics committee.

A well designed questionnaire was used to collect data on leprosy status after examination, type of leprosy, disability status and treatment status. A team consists of five members: one medical co-ordinator, one Non-Medical supervisor, one health supervisor male, one health supervisor female and one village volunteer (ASHA) collected the data. All the cases where the treatment with MDT was completed with no visible disability were treated as cured cases. The completed cases with visible disability were counted for estimating the disease burden of leprosy. A logistic regression analysis was applied by considering leprosy status as dependent variable and age and gender as predictor variables to assess the risk in developing leprosy. A total of 14734 populations were covered to get the 25 new cases of leprosy in Fatehganj block PHC. These 25 new cases of leprosy were considered as cases and the remaining population 14109 excluding non response was considered as controls for applying logistic regression analysis. The age was categorized into four categories such as 1-20 years, 21-41 years, 41-60 years and 60+. The risk of developing leprosy was assessed by repeated methods in which categories are compared consecutively. The reference category for gender was taken as female.

FINDINGS AND DISCUSSION

Data were collected on 14734 populations to get 25 confirmed new cases of leprosy. Analysis was carried out on 14134 populations who were physically examined for status of leprosy. The family members not examined were excluded from the analysis. In all, 36 cases of leprosy were found in Fatehganj BPHC, of which 25 were newly diagnosed cases and remaining 11 cases were old cured cases of leprosy. These 11 cases were considered as control for the purpose of logistic regression analysis. The general characteristics of the population is presented in Table 1.

TABLE 1
GENERAL CHARACTERISTICS OF STUDY POPULATION

Characteristics	n=14134	
Age Group(in Yrs.)	Number	Per Cent
1-20	8066	57.1
21-40	3914	27.7
41-60	1708	12.1
61-80	446	3.2
Gender		
Male	7427	52.5
Female	6707	47.5

Leprosy Status		
Yes	25	0.2
No	14109	99.8
Type of Leprosy (36 Cases)		
MB	7	19.4
PB	29	80.6
Treatment Status		
Not Taken	25	69.4
Completed	11	30.6
Disability Status		
Grade I	1	2.8
Grade II	5	13.9
No Disability	30	83.3

Among the 25 newly diagnosed cases, 19 cases were male and 6 were females. Further, 11 cases belong to the age group of 21-40 years (Table 2). The study reveals that higher proportion of leprosy cases were found to be in the age group 21-40 yrs which is consistent with the findings of the earlier studies⁷. Similarly, it was found from the study that leprosy is more prevalent among males as compared to females. The finding is comparable with the past studies⁸.

TABLE 2
AGE AND SEX DISTRIBUTION OF CASES AND CONTROLS

Characteristics	Cases(n=25)		Control(n=14109)	
	Number	Per Cent	Number	Per Cent
Age Group (in Years)				
1-20	5	20.0	8061	57.1
21-40	11	44.0	3903	27.7
41-60	6	24.0	1702	12.1
61-80	3	12.0	443	3.1
Gender				
Male	19	76.0	7408	52.5
Female	6	24.0	6701	47.5

The logistic regression analysis was applied to identify the age and sex factors for development of leprosy. Logistic analysis reveals that the risk of developing leprosy is 2.8 times more in males as compared to females (OR=2.8, $p=0.025$, 95% CI= 1.1 - 7.2). Further, the risk of developing leprosy in the age group of 21-40 is 4.6 times more as compared to the age group of 1-20 years. (OR=4.6 $p=.005$, 95%CI = 1.6 – 13.6). The risk of developing leprosy in 41-60 years as compared to 21-40 years was found to be non-significant.(OR=1.2, $p=0.686$ CI=0.453-3.327).

Similarly, when the age group of more than 60 years was compared to 41-60 years, the risk of developing leprosy was found to be non-significant (OR=1.9, p=0.375, CI=0.467-7.539) Table 3.

TABLE 3
RESULTS OF THE LOGISTIC REGRESSION ANALYSIS

Variables	Odds Ratio	P-Value	95% Confidence interval	
Age Group (Years)			Lower Limit	Upper Limit
1-20				
21-40	4.615	.005	1.602	13.295
41-60	1.228	.686	.453	3.327
61-80	1.876	.375	.467	7.539
Gender				
Male	2.86	.025	1.143	7.182

Reference categories for age are consecutive categories.

The findings show that the risk of developing leprosy is more prevalent in the age group of 21-40 years and the males are more exposed in developing leprosy. This may be due to the reason that males could be diagnosed at an early stage.

CONCLUSION

Analysis shows that leprosy is more prevalent in males as compared to females. Further, the risk of developing leprosy is more in the age group of 21-40 years as compared to the other age groups.

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