# **Original Research Article**

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20174828

# A probit model approach to know the effect of Arogyasri scheme, NHM indicator and knowledge of new borne care on utilization of PHCs, Hanwada mandalam, Telangana

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Received: 29 August 2017 Accepted: 01 October 2017 Accepted: 03 October 2017

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#### **ABSTRACT**

**Background:** The utilization of primary health care centre have prime importance in a country like India where most people lived in rural, allocation of budget is according to the disease situation is most likely in the country Therefor the study like this give policy makers, public health planner a direction in regard to proper utilization of fund.

**Methods:** This cross-sectional study was conducted from the 1<sup>st</sup> Feb to 28<sup>th</sup> Feb 2017. A simple random technique was used with a sample size 210 (169+41 (Health worker)). Analysis done using SPSS version 24. The descriptive statistics in percentages, probit method was used to identify the utilization of primary health care services.

**Results:** There are total 56.20% of male participant while female participant constituted 43.80% and after using probit regression model it is found that the indicators like -access to skilled obstetric care (0.002), access to skilled birth attendance (0.0013), institutional delivery service facility (0.0001), access to comprehensive abortion care (0.0015), essential newborn care and referral (0.0025) and demographic variable like age, income, out of pocket expenditure, female respondent\*health worker knowledge, income\*cost of medical care have significant impact on utilization of PHC also in selection of hospital under Aarogyasri 15-29 age group, male respondent, illiterate, literate and income more than 5000 have significant impact.

**Conclusions:** The primary health care centre services have a high impact in reducing the disease burden in rural area like Hanwada, So if there is an improvement in some of the basic services it can greatly impact in overall utilization rate.

Keywords: PHC, Rural, Utilization, Access, Preventable, Hanwada region, Mahbubnagar

#### INTRODUCTION

Bhore committee in 1946 put forward the recommendation to establish primary health care and mentioned for the very first time mentioned the term social physician. Now in modern India which becomes an inseparable part. Report of the Health Survey and Development Committee, commonly referred to as the Bhore Committee Report, 1946, has been a landmark report for India, from which the current health policy and

systems have evolved. The recommendation includes three tiered system for preventive and curative care and minimising the private practitioners. For ensuring the access of primary care by the deprived section of the population etc. <sup>2</sup> The National Health Mission is one such initiative initiated by the government of India to improve the Rural and Urban health, The priority focus of NHM is reproductive and child health services. <sup>3</sup> In case of New Born death, contribution of India accounts nearly 26 per cent of the neonatal deaths globally. <sup>4</sup> According to

NFHS4 (2015-1016) survey the data of IMR stood at 41 which is better than the NFHS3 (2005-2006) IMR at 57, and also from DEC-2016 SRS Bulletin report it is at 37.5,6 which is a decreasing trend but in terms of MDG (2015) and SDG goal it is far away to reach. Most of these deaths occur within the first days of life. Neonatal mortality is one of the major contributors (2/3) to the infant mortality. To address the issues Neonatal care unit need to be give a prime importance. The study also based on Arogyasri scheme, on 1st April, 2007 Aarogyasri scheme started as a PPP model for the BPL people. The scheme ensure at the moment of critical and catastrophic illness for the poor who live below the poverty line to proper health care. The beneficiaries are identified availability white ration cards provided as part of Annapurna and Antyodya Anna Yojna.8

The study was done in Hanwada Mandal, Mahbubnagar District, Telangana, where most of the people belong to BPL (below poverty line), so this study is valid in many way for the development of many sector, such the disease can be prevented at their origin, the study was important the government scheme in this area is untouched and many people have knowledge about the PHC but the people awareness to usage of it is valid to question, so in that it have its own importance. The study was done to assess the utilization of PHC in the area with the objective of:

- To assess the utilisation of primary health care services in primary centre
- To understand the role of NHM indicators in uses of PHC and selection of hospital under Aarogyasri.
- To know the health worker knowledge regarding new born care.

#### **METHODS**

A cross sectional, descriptive study design was used with Semi-structured and interview type of questionnaire

#### Study setting and time line

This study was done at the selected primary health centre and its residing of the catchment area, Hanwada Mandal, Mahbubnagar district, Telangana. This health centre covers the population of 30000, period of study 01-02-2017-01-03-2017.

#### Sample size

A sample size of 210 (Viz. who visited in the PHC, Health worker available at the time of study etc.) randomly selected respondents is chosen for the study.

#### Study design

A cross sectional study design was adopted for collecting information about different variables.

#### Statistical tool and methods

To try and measure the effect of various indicator and variable on utilization of primary health centre, we fitted probit model (probit regression model also known as probit model which is used to model dichotomous variables where inverse of standard normal distribution is modelled as combination of the predictor) of the following form:

$$Pr(Y|X) = \phi (\beta_1 X_1 + \beta_2 X_2 + \dots + X\beta)$$

Where  $\phi$  is the standard normal cumulative distribution,  $x_1$ ,  $x_2$ ,... are continuous. The explanatory factor includes age, education, income etc. and the outcome like selection of hospital (Govt., Private), utilisation of service (Good, poor) etc.

#### Inclusion criteria

Participants who are willing to participate in this study. Those are above 15 years age people

#### Exclusion criteria

Participants who are not ready to participate in this study.

#### **RESULTS**

The total of 210 subjects participated in this study. The distribution of age group as 24.3% adolescents (15-19), adult's 52.4% and 23.3% old age group. Majority of the population participated in this study are belongs to the rural area out of that married participant consist 56.20 percent, among the occupational groups housewife constitute 25.71, also illiterate 31.9 percent, literate people 68.1 percent and health worker constituted 19.52% (Table 1).

# Probit model for analysis of utilization of PHC with selected NHM indicator and selected demographic variables

From the Table 4 after using probit model we observed that most of the NHM indicator like access to skilled obstetric care(0.002) [CI-0.127-2.743], receive of antenatal and post natal care (0.028) [CI-0.082-4.321], institutional delivery service facility (0.0001) [CI-0.015-2.342], access to comprehensive abortion care (0.0015) [CI-0.210-1.132], post abortion contraceptive counselling and services (0.0337) [CI-0.112-0.987] have a significant impact on the utilization of PHC, whereas access to skilled birth attendance, (0.93) [CI-0.015-2.342], essential newborn care and referral (0.127) [CI- 0.003-0.0587] have not significant impact, so we can say that a unit change of access to skilled obstetric care there is 2.12 times effect on utilization of PHC, receive of antenatal and post natal care have 3.23 times impact, access to skilled birth attendance have 0.23 times impact on PHC utilization, institutional delivery service facility have 1.30 times effect, access to comprehensive abortion care have 1.007 times impact, post abortion contraceptive

counselling and services have 0.17 times impact and essential newborn care and referral have a 0.028 times impact on the utilization of PHC (Table 4).

Table 1: Frequency distribution of demographic variables.

Demographic variables		Frequency (N=210)	Percentage (%)
	Adolescent	51	24.30
Age group	Adults	110	52.40
	Old age	49	23.30
Gender	Male	118	56.20
Gender	Female	92	43.80
Educational status	Illiterate	67	31.90
Educational status	Literate	143	68.10
	Daily labour	51	24.29
	Farmer	30	14.29
Occupation	House wife	54	25.71
Occupation	Employment	21	10.00
	Health worker	41	19.52
	Others	13	6.19
	< 5000	62	29.52
Income	5000-10000	113	53.81
	>10000	35	16.67
	Married	122	58.90
Marital status	Unmarried	50	23.80
	Widowed	38	18.90

Table 2: Frequency distribution of different variables.

Sl. No.			Yes	No	Yes, bu	ıt not enough	
NHM indicators (N=169)							
1	Access to skilled obstetric care,		41 (24.3)	98 (58.5)	30 (17.2)		
2	Receive of ante-natal and post natal care,		45 (26.6)	105 (62.1)	19 (11.2)		
3	Access to skilled birth attendance,		44 (25.5)	71 (41.7)	54 (32.8)		
4	Institutional delivery service facility;		91 (53.8)	42 (25)	36 (21.	2)	
5	Access to comprehensive abortion care		58 (34.6)	88 (51.6)	23 (13.	8)	
6	Post abortion contraceptive counseling and services		25 (15.3)	132 (78)	12 (6.7	)	
7	Essential newborn care and referral		36 (21.2)	86 (51.1)	47 (27.	7)	
Indicators quality of care (N=169)							
1	Acute care facility		73 (43.3)	68 (39.9)	28 (16.	8)	
2	Chronic care facility		40 (23.4)	112 (65.7)	17 (10.	9)	
3	Preventive care facility		108 (63.9)	15 (8.9)	46 (27.	2)	
4	Screening facility		81 (48)	56 (32.8)	32 (19.	2)	
5	Access to Technology like Xray, Machine etc.		53 (37.5)	46 (27.5)	70 (35)	1	
6	Immunization service accessibility		58 (33.9)	71 (42.1)	40 (24)		
7	Satisfaction of the treatment		98 (58.1)	22 (13.3)	49 (28.	6)	
Sl. No.		100-5000	5001-2000	0 20000-1	00000	> 1lakh	
Cost of 1	nedical care (N=169)						
1	Medical services	31 (17.9)	39 (23)	80 (47.3	)	19 (12.8)	
2	Outpatient services	18 (10.7)	82 (48.5)	56 (32.9	)	13 (6.9)	
3	Inpatient services	17 (10.1)	65 (38.8)	60 (35.4	)	27 (2.7)	
4	Expenditure on preventive care	24 (14.2)	103 (60.9)	34 (20.1	)	8 (4.8)	
5	Expenditure on long term care	25 (26.3)	60 (35.4)	62 (36.3	)	22 (2)	

Sl. No.		Yes, I can	No, I can't	Yes, but with fear	Need more training	
Health worker knowledge and beliefs in handling the cases (N=41)						
1	Obstetric care,	24 (56.7)	3 (5.1)	5 (13.6)	9 (24.6)	
2	Ante-natal and post natal care,	20 (47.8)	4 (9.2)	2 (5.7)	15 (37.3)	
3	Skilled birth attendance,	11 (29)	2 (3.7)	10 (26)	17 (41.3)	
4	Institutional delivery;	27 (65.9)	2 (4.9)	3 (7.3)	8 (22)	
5	Abortion care	11 (28.8)	3 (9.2)	7 (17.8)	20 (44.2)	
6	Counseling and services	16 (39.6)	10 (23)	4 (11.2)	11 (26.2)	
7	Essential newborn care	20 (51.1)	5 (13.4)	2 (3)	14 (32.5)	

Table 3: Frequency distribution of new borne care indicators.

Frequency distribution of new borne care indicators (N=41)	Yes (%)	Others, (Combined- no, don't know, yes, but sometime
Before 90 minutes		forgot) (%)
1. Dry and provide warmth		
Immediately dry the baby (starting within the first 5 seconds after birth)	36 (86.8)	5 (13.2)
Remove wet cloth and place baby in skin-to-skin contact with the mother.	30 (72.5)	11 (27.5)
Cover the baby and mother with a clean warm cloth.	15 (37.2)	26 (62.8)
Cover the baby's head with a bonnet.	17 (41.6)	24 (58.4)
2. Start of positive pressure ventilation		
Clamp and cut the cord with sterile scissors and with sterile gloves on.	33 (79.3)	8 (20.7)
Transfer to warm, firm surface.	24 (57.8)	17 (42.2)
Inform the mother in a kind and gentle tone that the baby has difficulty breathing and that you will help the baby to breathe.	7 (17.3)	34 (82.7)
From 90 mins to 6 hours		
1. Check the baby's		
Temperature – normal axillary temperature is of 36.5–37.5 °C;	23 (56.3)	18 (43.7)
Eyes for redness, swelling or pus draining; or	25 (61.2)	16 (38.8)
Umbilical stump for oozing blood.	10 (23.6)	31 (76.4)
Check for abdominal distention.	8 (19)	33 (81)
2. Dry cord care		
Wash hands	33 (81.7)	8 (18.3)
Instruct the mother to:		
keep cord stump loosely covered with clean clothes;	14 (33.8)	27 (66.2)
Fold diaper below the stump	10 (25.3)	31 (74.7)
Care prior to discharge (but after the first 90 min)		
1. Ensure warmth of the baby		
Ensure the room is warm (25–28 °C) and draft-free	28 (68.4)	13 (31.6)
Explain to the mother that keeping the baby warm is important for the baby to remain healthy.	16 (39)	25 (61)
Keep the baby in skin-to-skin contact with the mother as much as possible.	18 (43)	23 (57.1)
Dress the baby or wrap in a soft, dry, clean cloth. Cover the head with a bonnet for the first few days, especially if the baby is small	12 (29.1)	29 (71)
*N=41, Out of 210 Respondent 41 health worker approach for the questions.		

Similarly, age, income, marital status, female respondent\* health worker knowledge, income\*cost of medical care have significant impact whereas education have not significant impact, from the probit analysis it is found that A unit change in age, education, income, marital status, female respondent\* health worker

knowledge, income\* cost of medical care there is 2.24 [CI-0.331-2.561], 1.35 [CI-0.788-1.682], 0.52 [CI-0.124-1.097], 1.64 [CI-0.564-1.897], 0.19 [CI-0.632-0.995], 0.21 [CI-0.078-1.230] respectively increase the utilization of the PHC (Table 4).

Whereas, in case of government hospital which is our focus in the study rather than private facility which shows in the Table 4, from probit approach we found the age group 15-29, 45 and above, male respondent, female respondent, illiterate and income group <5000, 5000-1000, >10000 have significant impact in the selection of government hospital. If we change a unit change in age

group 15-29, 45 and above, male respondent, female respondent, illiterate and income group <5000, 5000-1000, >10000 there is 1.27 [CI-1.12-1.892], 5.98 [CI-3.29-6.877], 0.679 [CI-0.119-1.271], 1.481 [CI- 1.287-1.677], 2.024 [CI-1.309-2.346], 1.79 [CI-1.89-2.672], 0.987 [CI-0.887-1.848], 1.634 [CI-1.563-1.679] unit impact in usage of Government hospital (Table 4).

Table 4: Probit model for utilization of PHC with selected NHM indicator and demographic variables.

NHM in	dicator with utilization of l	PHC (N=169)					
Sl. No.			Estimate	P-value	95% Confidence		
					interval		
1	Access to skilled obstetric		2.124	0.002	0.127-2.743		
2	Receive of ante-natal and p		3.232	0.028	0.082-4.321		
3	Access to skilled birth atte	ndance,	0.113	0.093	0.015-2.342		
4	Institutional delivery service	ce facility	1.295	0.0001	0.673-1.453		
5	Access to comprehensive a	bortion care	1.007	0.0015	0.210-1.132		
6	Post abortion contraceptive	e counselling and servic	es 0.172	0.0337	0.112-0.987		
7	Essential newborn care and	l referral	0.0283	0.127	0.003-0.0587		
Selected variable with utilization of PHC (N=169)							
1	Age		2.242	0.0001	0.331-2.561		
2	Education		1.346	0.552	0.788-1.682		
3	Income		0.522	0.0016	0.124-1.097		
4	Marital status		1.635	0.00025	0.564-1.897		
5	Female respondent*health	worker knowledge	0.192	0.00175	0.632-0.995		
6	Income*cost of medical ca	re	0.21	0.0018	0.078-1.230		
Selection	n of hospitals under Aarog	yasri (N=169)					
Sl. No.	Private facility			<b>Government facility</b>			
		Estimate (P-value)	95% CI	Estimate (P-value)	95% CI		
1	15-29	2.324 (0.0032)	1.92-2.562	1.27 (0.00067)	1.12-1.892		
2	30-44	1.1 (0.217)	0.897-2.191	0.934 (0.0542)	0.327-1.223		
3	45 and above	1.742 (0.365)	1.34-1.862	5.98 (0.0023)	3.29-6.877		
4	M	0.897 (0.116)	0.762-1.098	0.679 (0.0001)	0.119-1.271		
5	F	2.5 (0.021)	2.11-2.872	1.481 (0.0034)	1.287-1.677		
6	Illiterate	0.547 (0.0025)	0.322-0.890	2.024 (0.0011)	1.309-2.346		
7	Literate	3.32 (0.00082)	1.453-3.784	1.34 (0.0056)	1.09-1.982		
8	< 5000	0.767 (0.65)	1.890-2.109	1.79 (0.016)	1.89-2.672		
9	5000-10000	0.289 (0.0054)	0.212-1.866	0.987 (0.00028)	0.887-1.848		
10	>10000	1.945 (0.0017)	1.267-2.102	1.634 (0.0098)	1.563-1.679		

The values are estimates of probit model

In parenthesis we have considered p-value (p<0.05; significant level)

### Frequency distribution of new born care indicators

From the Table 3 it is observed that the newborn prior to the 90 minute period, out of 41 health workers, in dry and provide warmth category, 86% of the respondent says that immediately dry the baby, 72.5% remove wet cloth and skin to skin contact 37.2% respondent says that cover the baby and mother with warn cloth, 41.6% cover the baby head with a bonnet, in start of positive pressure ventilation category it is observed that 79.3% of the respondent clamp and cut the cord with sterile scissors with sterile gloves on, 57.8% says transfer to warm, firm surface (Table 3).

In the 90 min to 6 hour period, In baby care category 56.3% respondent maintain the temperature 36.5-37.5° C, 61.2% respondent check for eyes for redness, swelling or push draining, 23.6% respondent says that they check for Umbilical stump for oozing blood, 19% says they check for abdominal distention. In dry cord category 81.7% says they wash hands, 33.8% says that they keep cord stump loosely covered with clean clothes and 25.3% says they fold diaper below the stump (Table 3).

Care prior to discharge (but after the first 90 min) period under ensure warmth of the baby category 68.4% respondent ensure the room is warm (25-28°C) and draftfree, 39% respondent explain to the mother that keeping the baby warm is important for the baby to remain healthy, 42.9% respondent try to keep the baby in skinto-skin contact with the mother as much as possible, 29.1% respondent dress the baby or wrap in a soft, dry, clean cloth. Cover the head with a bonnet for the first few days, especially if the baby is small (Table 3).

#### **DISCUSSION**

The study based on 210 respondents, where 41 respondents are the health worker, which was considered to understand the knowledge of new born care. The study consist of maximum adult population which is 52.4% then adults and old age people subsequently, gender wise male percentage (56.20%) is higher than its counterpart. The study gives us idea that the demographic variable like age, income, marital status, female respondent\* health worker knowledge, income\* cost of medical care have a direct impact on utilization of primary health centre (PHC) similarly indicator of NHM also affect the utilization of PHC and in case selection of hospital under Aarogyasri 15-29, F, Illiterate, Literate, 5000-10000, >10000 have direct impact whereas 15-29,45 and above, M,F, Illiterate, Literate, <5000, 5000-10000, >10000 have direct impact on selection of government facility

According to the study by Dhingra et al lack of transportation facility, user charges at the hospital in delivery, lack of proper treatment by hospital staff are some of the obstacles for achieving higher institutional delivery.<sup>9</sup>

Similarly, in a study done by Moran et al most women reported having knowledge about drying the baby (64%), wrapping the baby after birth (59%), and cord care (46%). And the study by Sreeramareddy et al found - 92 (38.3%) birth attendants had washed their hands. Birth place was heated throughout the delivery in 88 (64.2%) deliveries. 100 (45.8%) newborns were wrapped within 10 minutes and 233 (97.1%) were wrapped within 30 minutes. Majority (93.8%) of the newborns were given a bath soon after birth. 11 Other study similar to this by Kayom et al, mothers did not bathe their babies within the first 24 hours of birth, Most of the mothers breastfed exclusively (93.2%) but only 60.7% initiated breastfeeding within the first hour of life, Majority of mothers washed their hands prior to handling their babies  $(83.4\%)^{12}$ 

From our study we also been observed that like the study of Tanzania, lack of facility, resource, transportation etc. factor responsible for unused of PHC and also respondent says that they immediately dry the baby was 86.8%, skinto-skin contact to mother was 72.5%, cover the baby with warm cloth was 37.2%, temperature maintenance 43.7%, wash hands in dry cord care was 81.7% and birth after 24 hours 36.4.

Study on selection of hospital by Gopi Madaboyina found that the middle age group patients and lower age groups,

education, caste, income have significant impact on the utilization of facility under the Aarogyasri scheme, the result found in the study partially similar to our study where we found income, age, marital status etc. Have significant impact and education have non-significant impact on Selection of hospital.<sup>13</sup>

The major issue we have found from the study is that: undeveloped infrastructure, lack of resource and lack of proper working knowledge in care of new borne. Lack of proper skill also needed to be taken into consideration, The main reason for this that they have training in various field but cannot translate them into the improvement of services for this lack of infrastructure, lack of resource's are act as roadblock to them. So we need to look mainly on the capacity building and need based training to the worker and needed to try maximize the available resource through proper management also at mean time there need to put a pressure on higher authority to make availability of all the necessary services to cope up with various situations.

Irrespective of all this NHM help in reduction of various health related problem at great extent but country like India which is slowly economically evolving there are also at the same time various problem need to be taken care of, so, it is the responsibility of the service provider to the usage of the available resources at great potential.

#### **CONCLUSION**

The study gives us a direction in the improvement of the indicators like access to care, providing a better well equipped and Knowledge towards Ante natal and Post natal services etc. have an ultimate effect in the usage of the facility. Overall we concluded that there is direct effect of Various NHM indicators and demographic variable in utilization of PHC, which give us a prospect that if we improved the services delivery system with what the resource we have with proper management, it will greatly impact in improvement of the economic situation of the people belongs to that area and also there uplift of poor status.

#### ACKNOWLEDGEMENTS

We are very much thankful to the Medical officer, Primary Health centre, HanWada, Mahbubnagar, Telangana for their kind of support and giving an opportunity to us for making this project possible and also our sincere and kindest thank to faculty members and colleagues/friends, University of Hyderabad for their valuable opinions in this regard.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee before the commencement of the study from university of Hyderabad

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Cite this article as: Kalita BK, Srikanth A. A probit model approach to know the effect of Arogyasri scheme, NHM indicator and knowledge of new borne care on utilization of PHCs, Hanwada mandalam, Telangana. Int J Community Med Public Health 2017;4:4198-204.