UTILIZATION OF PRIMARY HEALTH CENTRE SERVICES IN RURAL AND URBAN AREAS: A COMPARATIVE STUDY IN MYSORE TALUK

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Abstract- Primary Health Centre (PHC) is the most vital component of Public Health Care System as it is the first place of contact between the citizens and the Public Health System. The government is trying to improve the delivery of health care services through various programmes, so as to improve the health status of people. The most important aspect of the success of health programmes is the extent of availing of public health services by the people. Thereby, it would be necessary to ascertain the factors which help in better accessibility of public health care service by people especially at PHC level, so that health for all is achieved. As the government is trying to address health issues of rural and urban areas through separate programmes, there is need to examine whether there is any difference in the accessibility of PHC services in these areas. The present paper tries to address these questions by using Correlation, Chi-square test, Multiple Regression Model, Probit and Negative Binominal Regression models. It was found that there is no significant difference in the accessibility of PHC services in rural and urban areas and distance was the factor which determines accessibility in both urban and rural areas along with other factors.

Keywords- Distance, NBR model, Primary Health Centre, Utilisation

Introduction

Primary Health Care is the first level of contact of the individuals, the family and the community with the public health system, which brings health care as close as possible to where the common people live and work [6]. The experience and concern in health development and primary health care in India dates back to the Indus-valley civilization as early as 3000 B.C. In the modern time, the basis for organisation of health services in India through primary health care was laid by the recommendations of the Bhore committee in 1946. Later, based on the proposal of first integrated all round development programme (the community development programme) primary health centres were set up for each community development block [6].

With the passage of time extensive changes have taken place in the Indian health system in the backdrop of Alma Ata declaration (1978), Health for all and off late the Millennium development goals. The Governments both at central and state level have started playing an effective role in providing health care services to the poorest of the poor. Government of India (GOI) has launched various health schemes under National Rural Health Mission (NRHM, sub mission under National Health Mission) in 2005, provided health insurance coverage to the poor and the unorganised workers (Rashtriya Swasthya Bima Yojna, Yashaswini and Vajpayee Arogyasri in Karnataka state), established numerous primary health centres both in rural and urban areas (2346 as per May 2012 in Karnataka), Community health centres (146 as per May 2012) to include all in the web of health care system. Recently the GOI, has launched a new health programme named National Urban Health Mission (NUHM) under Ministry of Health and Family Welfare with an intention to upgrade the health status of the urban population in general and disadvantaged sections of the society in particular. Under NUHM,

the government plans to establish more PHCs in urban areas. In this regard, it becomes essential to crosscheck the success of the existing health care centres especially Primary Health Centres as they are bridge (referral) between Community Health Centre and Sub Centres and first tier health care units. As the success of Primary Health Centres lies in the maximum utilisation of its services by the people, there is a need for intensive research in this field. And, as the government is trying to address the health issues of rural and urban areas through separate programmes (NRHM and NUHM), there is need to examine is there any differences exists in the accessibility of PHC services in these areas.

Further, available literature confirmed that a number of studies were done in the area of accessibility and utilisation of health care services at national level as well as at state levels irrespective of type of health care centre. However, very few studies attempted to compare the health care service utilisation between rural and urban areas especially in Indian context; where disparity between rural and urban is a serious issue in all the fields i.e., in development, infrastructure, socio-economic status so on. In this background, the present study made an attempt to compare the utilization of PHC services in rural and urban areas by identifying significant determinants.

Materials and Methods

The present study is mainly based on primary data. Mysore taluk is selected for field work. A list of total PHCs in the Mysore taluk was taken from the District Health office, Mysore, along with the Sub-centres. For the purpose of comparison, two rural PHCs located in the hobli headquarters in Mysore taluk (namely Yelawala PHC and Varuna PHC) and two Urban PHCs located in Mysore city (namely Jalpuri PHC and Chammundipuram PHC) were selected.

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|| Bioinfo Publications || 16

Sixty respondents living in the surrounding areas of each PHC were selected randomly for interview based on three distance group (20 each in each distance group namely, near, little far and too far). Thereby a total of 240 respondents were selected, where 120 are from rural area and 120 from urban area. A well structured questionnaire was used for data collection. The questionnaire was administered by self, consisting of both close-ended and open-ended questions.

The study included the following variables: respondents socioeconomic characteristics - Age, Sex, Education (Primary and below, High school, PU, Degree and above), Employment status as employed or not employed (students, retired, house wife and unemployed), Monthly Income (from all sources), Family Type (joint or nuclear), Distance to PHC (near, little far, too far), Health status of the respondent (Good, average, poor), Health insurance (Yes or No), Accessed PHC services earlier, Utilized PHC services in the last 12 months (Yes or No), Respondents self reported number of visits to PHC in last one year, Awareness about PHC word (Yes or No), Awareness about Government Health programmes (Yes or No) and so on.

Descriptive statistics and frequencies were computed for each item in the questionnaire. The study used ordinal variables, nominal variables (sex, place of residence, education, satisfaction) as well as continuous variables (income, age, number of visits). Initially correlation was performed to check the directional relationship between utilisation of PHC and other variables. Later the chi-square test was used to find the association between utilisation of PHC services and other variables (ordinal, nominal and continuous variables).

Initially, to predict the determinants of utilisation of services, Probit regression [1] was performed separately for overall data, rural area and urban area with the help of binary dependent and independent variables along with continuous independent variables. The information taken (common variables) from all 240 respondents were included in probit analysis.

Later Poisson regression was performed by taking count data i.e., number of visits to PHC in last 12 months as dependent variables as it follows poisson probability distribution in order to get exact predictors. Due to the violation of homogeneity assumption, instead of regular poisson model, NBR model has been used; which is highly recommended than Zero-Inflated model in case of over dispersion in the dependent variable data. Likelihood ratio test was used to compare NBR model with poisson model, the associated Chi-squared value (305.32) with one degree of freedom strongly suggested that alpha is non-zero and the NBR model is more appropriate than the poisson model.

At last, NBR model was run on overall data, rural and urban data separately to find the predictors, significantly influencing the utilisation of PHC services by taking number of visits to PHC in last 12 months as dependent variable. The data was analysed using SPSS 16.0 and Stata 10.0 statistical software.

Results and Discussion

Out of 240 respondents [Table-1], 76.25 percent were females and 23.75 percent were males. The age of the respondents ranged from 17 to 97 years (mean 40.5 ± 14.4). 52 percent of the respondents were in 17-27 age group. 91.7 percent of the families reported type of family as nuclear and the remaining 8.3 percent as joint family. Less than half of the respondents (27percent) were employed and 73 percent were unemployed. The mean income was 10275rs and median income was 7000rs. More than half of the respondents (75 percent) were literate and 25 percent were illiterate, where 30 percent had higher primary school (secondary school) education. More than half (54%) of the respondents reported that they are aware of PHC word.

Table 1- Area-wise Socio-Economic Profile of Respondents

Sr. No	Variables	Rural	Urban	Total
	Sex			
1	Female	91(75.8)	92(76.7)	183
2	Male	29(24.2)	28(23.3)	57
	Total	120	120	240
	Monthly Income			
1	<= 3000	26(21.7)	23(19.2)	49
2	3001-5000	23(19.2)	13(10.8)	36
3	5001-7000	25(20.8)	11(9.2)	36
4	7001-10000	24(20.0)	20(16.7)	44
5	10001-16000	14(11.7)	22(18.3)	36
6	16001+	8(6.7)	31(25.8)	39
	Total	120	120	240
	Level of Education			
1	<= 0	36(30.0)	25(20.8)	61
2	01-07	30(25.0)	19(15.8)	49
3	08-10	31(25.8)	40(33.3)	71
4	11-12	9(7.5)	12(10.0)	21
5	13+	14(11.7)	24(20.0)	38
	Total	120	120	240
	Aware of PHC word			
1	No	63(52.5)	48(40.0)	111
2	Yes	57(47.5)	72(60.0)	139
	Total	120	120	240
	Accessed PHC earlier			
1	No	89(74.5)	86(71.7)	175
2	Yes	31(25.8)	34(28.3)	65
	Total	120	120	240

Note: Figures in bracket represent percentage.

Out of 240 respondents [Fig-1], 61 percent reported as having good health status, 15 percent as poor and 24percent as average. Both in rural and urban area majority of the respondents reported as having good health status. Overall 83.3percent of the respondents reported that they had "no health insurance coverage" [Fig-2], which accounted more than three fourth of the respective total in both the areas. Chi-square statistic 5.88 was found to be significant at five percent level, indicating significant difference in health insurance coverage between two areas.
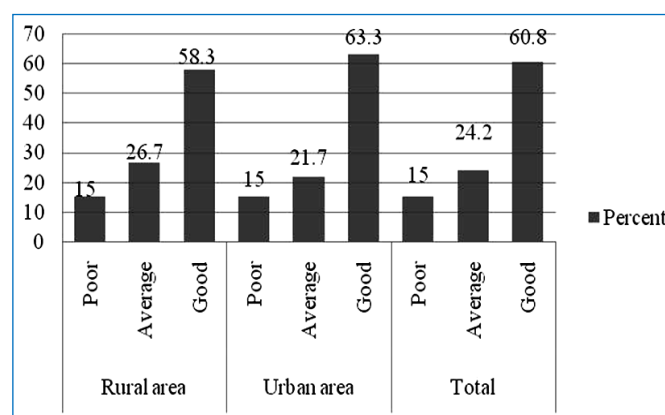

Fig. 1- Area-wise Health Status of the Respondents (in percentage)

Study reported that the utilisation of PHC services (last one year) was too low both in rural and urban areas, 21.7 percent and 20 percent [Fig-3] respectively.
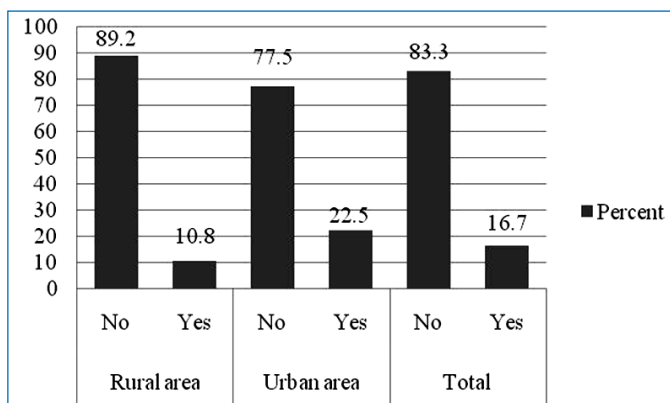

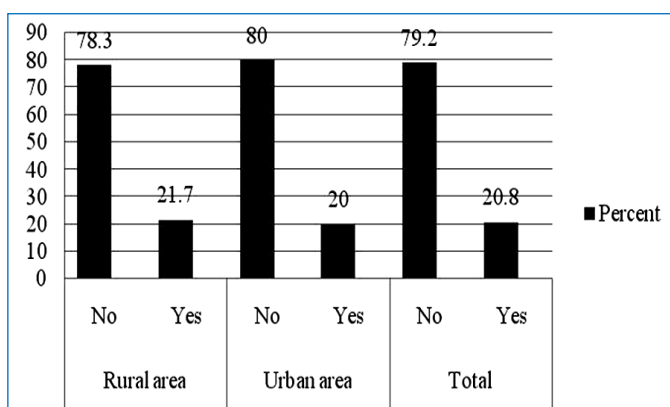**Fig. 2-** Area-wise Insurance Status of Respondents (in percentage)

Fig. 3- Area-wise percent Utilisation of PHC Services in Last One Year

Table 2- Association of Nominal, Ordinal and Continuous Variables with Utilisation of PHC Services

Variables	Overall Chi-square statistics	Overall Sig.	Rural area Chi-square statistics	Rural area Sig.	Urban area Chi-square statistics	Urban area Sig.
Sex	5.101	0.024**	-----	-----	------	-----
Distance	47.343	0.000*	23.66	0.000*	24.688	0.00*
Aware	5.434	0.020**	7.395	0.007*	-----	-----
FT	4.86	0.027**	------	----	6.136	0.013*

*Note: * Significant at one percent level. ** Significant at five percent level.*

Due to less difference in the utilisation significant difference was not observed between two areas. None of the continuous and ordinal variables reported significant association with utilisation of PHC service. Four nominal variables namely sex, distance, aware and FT reported significant association with utilisation in overall data [Table-2], which was observed only in two variables in rural

(distance and aware) and urban area (distance and FT). Further, area-wise analysis revealed one common association in both the areas found significant at five percent level, indicating significant association between distance and utilisation of PHC service [5].

Probit Model

Regression Model:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + e \quad (1)$$

Where,

Y= Utilization of PHC services in the last 12 months (0=No, 1=Yes)

a= intercept

$b_1, b_2, b_3, b_4, b_5, b_6, b_7, b_8, b_9$ = regression co-efficients of independent variables

X_1= Sex

X_2= Age

X_3= Education

X_4= Distance dummy one

X_5= Distance dummy two

X_6= Awareness about government programmes (aware)

X_7= Insurance

X_8= Monthly income

X_9= Family type (FT)

e = Error term

Rural model:

$$Y = 0.923 - 0.660 X_1 - 0.013 X_2 - 0.258 X_3 - 1.379 X_4 - 1.574 X_5 + 0.717 X_6 + 0.470 X_7 \; 0.001 X_8 - 0.542 X_9 \quad (2)$$

Urban model:

$$Y = -1.733 - 1.110 X_1 + 0.005 X_2 + 0.427 X_3 - 1.964 X_4 - 1.221 X_5 - 0.024 X_6 + 0.426 X_7 - 0.001 X_8 + 1.208 X_9 \quad (3)$$

Sex reported a negative sign in all the three models but it found significant only in overall model and urban model [Table-3] and [Table-4], [Eq-2] and [Eq-3], indicating the probability to utilise PHC services is decreases by about 16percent for overall model and 15 percent for urban model; if sex changes from female to male (indicating gender disparity in the utilisation of PHC services).

The probability of awareness about government programmes in rural area indicated a positive sign, indicating that the probability of utilising PHC services increases by about 14percent if the person aware of government health programmes [Table-4] [Eq-3].

Both the distance dummies reported negative sign both in rural and urban area [Eq-2,3]. This indicates that longer the distance from the PHC higher the incidence of non-utilisation of PHC services. The probability to utilize the PHC services decreases by about 24 percent, 27 percent in rural area and 28percent, 19 percent in urban area for disdum1 and disdum2 respectively as compared to reference group.

Table 3- Results of Probit analysis

Area	Negative effect	Positive effect	Sig. variables	Pseudo R2	Wald chi2 (9df)	Prob.
Overall	Sex, age, distance (2dummy), income.	Education, aware, insurance, FT.	Sex, distance (2dummy).	0.25	51.95	0.0000*
Rural	Sex, age, distance (2dummy), income, Education, FT.	Aware, insurance.	Distance (2 dummy), aware.	0.29	34.73	0.0001*
Urban	Sex, distance (2dummy), income.	Age, aware education, insurance, FT	Sex, distance (2 dummy), FT.	0.32	28.92	0.0007*

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|| Bioinfo Publications || 18

Table 4- Area wise probability of significant predictors (reporting marginal effects)

Variables	Overall	Rural	Urban
Sex*	-0.1603	------	-0.1502
Aware*	------	0.14349	------
FT*	------	------	0.22784
Disdum1*	-0.2776	-0.2397	-0.2789
Disdum2*	-0.2404	-0.2672	-0.186

* dF/dx is for discrete change of dummy variable from 0 to 1 z; P>|z| correspond to the test of the underlying coefficient being 0

NBR Model

Model Specification

$$Log(no.\,of\,visits\,to\,PHC) = Intercept + b1(age) + b2(income)$$
$$+ b3(insurance) + b4(aware) + b5(sex) + b6(education)$$
$$+ b7(disdum1) + b8(disdum2) + b9(FT)$$

This implies, in rural area model, [Table-5] coefficients of 3 variables namely awareness, distance and family type were reported statistically significant. The indicator variable Aware (awareness) is the expected difference in log count between aware of government programmes (1) and the reference group (0). The difference in the logs of expected counts is expected to be 1.94 units higher for holding other variables constant in the model. The Incident Rate Ratio (IRR) of aware indicates that the people aware of government programmes are expected to have 7.01 times greater access to health services in one year compared to counterpart.

Likewise, the expected log count for disdum1 is 2.4 lower and disdum2 is 4.0 lower than the expected log count of reference group (near) respectively. The respected IRR of disdum1 and disdum2 indicates that the respective incident rate is 0.20 and 0.21times lower than the incident rate of the reference group, holding other variables constant.

The indicator variable FT is the expected difference in log count between joint family and nuclear family. The expected log count for joint family (1) is 1.68 lower than the expected log count for nuclear family (0). The IRR output of FT indicates that the incident rate for joint family is 0.21 times lower than the incident rate of nuclear family.

In urban area model [Table-5] coefficients of six variables were found to be statistically significant. The indicator variable sex is the expected difference in log count between male and the female. The expected log count for male is 1.61 lower than the expected log count for female. The IRR output indicates that the incident rate for male is 0.20 times lower than the incident rate of female.

Table 5- Significant predictors as per NBR model

Variables	Rural		Urban	
	Co-efficient	IRR	Co-efficient	IRR
Sex	------	------	-1.605452*	.2007988*
Age	------	------	.0803945*	1.083715*
Aware	1.947384*	7.010321*	------	------
Disdum1	-2.408645*	.0899371*	-3.242726*	.0390573*
Disdum2	-3.824136*	.0218373*	-2.696863*	.0674167*
FT	-1.687084*	.1850584*	3.178116*	24.00149*
Quali	------	------	1.586025*	4.884294*
Constant	3.55*	-----	-6.87*	-----

Note: * Significant at five percent level

The variable age has a coefficient of 0.08, which is statistically significant. This means that for a year increase in age, the expected log count of the number of visits to PHC increases by 0.08. The IRR indicates that the no. of visits to PHC is increases by 1.1percent for every one year increase in age.

Likewise, the expected log count for disdum1 is 3.2 lower and disdum2 is 2.7 lower than the expected log count of reference group (near) respectively. The respective IRR of disdum1 and disdum2 indicates that the expected rate of visits to health care is 0.04 and 0.07 times lesser to the people living away from health centre than the people living near to the centre.

The expected log count for joint family is 3.18 higher than the expected log count for nuclear family. The IRR output of FT indicates that the incident rate for joint family is 24 times higher than the incident rate of nuclear family.

The expected log count for literate is 1.5 higher than the expected log count for illiterate. The IRR output of qualification indicates that literates compared to illiterates are expected to have a rate of 5 times greater visits to health centre.

To determine if distance is statistically significant, chi-square test is performed. The chi-square test with two degree freedom indicated that the distance is a statistically significant predictor of number of visits to PHC which is taken has a proxy for utilisation of PHC services.

Limitations of the Study

The response of the individuals may vary according to time and place.

The risk of recall bias given that respondents were asked to remember the number of times they visited to the PHC to get service in the last 12 months.

Conclusion

The study finds that the PHC service utilisation rate is about 21.7 percent in rural and 20 percent in urban area during the reference period (last one year) with an overall utilization of only 20.8 percent. Surprisingly, no significant difference was found between rural and urban areas in the utilisation of PHC services. But a sharp decline was observed in both areas between earlier access to PHC services and access in last one year; where earlier utilisation stood at 25.8 percent and 28.3percent in rural and urban areas [Table-1], which is serious issue of concern.

The relationship of selected predictor variables on utilisation of the services was found out by incorporating different econometrics tools. Majority of the predictors have taken expected sign. Significant difference was found in the list of predictors influencing the utilisation of health care services between rural and urban area. The NBR model has identified five significant predictors namely-Age, Sex, Distance, Family Type and Qualification in urban areas, where as in rural areas only three predictors such as Awareness about Government programmes, Distance and Family Type were found to be significant.

Even though there is a difference in the results of three test, distance is found as common predictor in all three tests for both areas, which not only strengthen the idea of longer the distance to PHC higher would be the non utilisation rate, but also supported the results earlier studies [2-5].

As distance is found as one significant predictor of utilization of

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|| Bioinfo Publications || 19

government health services the study recommends that the government should provide subsidized services, such as bus services to and from the centre or to provide 24*7 mobile clinic services in both the areas, particularly in rural areas where influence of distance is more on utilisation of services.

Awareness about Government health schemes and facilities is found statistically significant in determining the utilisation rates in rural area. Hence much needs to be done on increasing awareness of people on public health care services.

Thus, the study found that there is an urgent need of government action- in spreading the awareness about the Government health schemes and programmes in rural area through proper channel (by taking confidence of local organisation, trusts, leaders and effective persons), relocation of PHC and subsidized complimentary services to maximise the PHC service utilisation.

Finally, the study suggests that the Government instead of rushing in establishing new PHCs there is need to improve the effectiveness of the existing PHCs; so that maximum utilisation is possible and also calls for proper action towards the relocation of existing PHCs.

Conflicts of Interest: None declared.

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|| Bioinfo Publications || 20