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# **Revisiting the Role of Geographical Accessibility in Women's Access to Healthcare**

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# **Revisiting the Role of Geographical Accessibility in Women's Access to Healthcare**

## **Abstract**

### **Objective**

Studying the differentials of health service availability and uptake of services particularly for women's health needs related to out-patient care and institutional childbirth. Understanding their various predictors, along with the issues related to geographical accessibility, in the context of the Sunderbans.

### **Methods**

The paper is constructed based on the emerging concept of mutability and the related model, suggested by Andersen (1995). Two separate regression models are built to study the impact of various predictors on out-patient care and institutional childbirth and meaningful post-estimation results are observed.

### **Results**

The impact of geographic hardships measured through useful identifier related to physiography and means of available transportation are not viewed having any significant influence on out-patient care seeking by the women. Impact of physical accessibility is however observed in case of institutional childbirth. Proximity of informal providers may be one the reason made the women even from inaccessible areas, seeking out-patient care for ailments particularly that lasted over a month. Unlike out-patient care, institutional childbirth is found considerably low overall for Sunderbans, as the state's rural standard, which is found further lower for the geographically inaccessible villages. This is probably attributed by the norms of beliefs of the household members regarding place of delivery, rather than any other hindrance including geographical accessibility.

### **Conclusion**

Best policy directives should focus on facilitating means of transportation for the population living in inaccessible parts within the Sunderbans, who continue to experience enormous hardships related to transport means, while accessing services for ill-health. Ensuring safety and efficacy of services provided by the informal providers remains as one of the major challenge for overall healthcare in the Sunderbans. Since norms related to place of childbirth might take a much longer time to get influenced, it is useful that maternal safety gets ensured through alternative arrangement made by the system that facilitates safe domiciliary childbirth in the nooks and corners of the Sunderbans.

## Introduction

Health care access has always been critical for policy makers, particularly from the viewpoint of understanding the extent to which a population benefit from the existing health services. Particularly, since fair access to health services shares its roots in ensuring social justice (Rice and Smith 2001, Sen 2002). To improve healthcare access it is crucial that its context and the patterns are clearly understood (Phillips and Lindbloom 2000). Many authoritative works have attempted defining the term 'access' to health care and suggested dimensions for measurement (Donabedian 1973, Aday and Andersen 1974, Penchansky and Williams 1981). The definition of health care access that earned unanimous agreement among the researchers includes- the timely use of services as per the need (Schneider & Symons 1971, Aday and Andersen 1974, Campbell et. al. 2000, Peters et. al. 2008). Among the multiple factors that influence such 'timely use' or in other words that acts as hindrance and interface with people's access to healthcare (Donabedian 1973, Aday and Andersen 1974, Penchansky and Williams 1981, Goddard & Smith, 1998; Mooney, 1987; Olson and Rodgers, 1991; Waters, 2000, Bradshaw 1972, Liss 1993, Percy-Smith 1996, Shengelia et. al. 2005); the factor related to geographical accessibility has been considered playing a significant role (Donabedian 1973, Aday and Andersen 1974, Penchansky and Williams 1981, Joseph & Phillips 1984).

The role of geographical accessibility in the overall dynamics of health care access is revisited in the present paper, specifically in the context of women's health care needs. The paper drawing some paradoxical evidences from household survey data from a largely poor community in India, contests for more in-depth understanding of the issue. It outlines that the role of geographical accessibility should always be studied together with health-need of the population, failing of which might attach undue importance to it. The best policy directives could reflect on initiatives that facilitate overcoming of geographical hurdles faced by the people, who are anyway observed accessing services having the utmost felt-needs for it.

In conventional literature, distance and other geographical factors are often viewed as major intervening aspects for access to medical care and resultant health outcomes, specifically for the disadvantaged population from both developed and developing nations (Jordon et. al. 2004, Cromley & Cromley 2009, Peters et. al. 2008). Studies in developing nations have shown that the absence of good roads and lack of proper communication particularly in the poor, remote and adverse physiography constrain access to healthcare and results in poor health outcomes (Baker & Gesler 2000, Rahman and Smith 2000, Gupta et. al. 2003, Peters et. al. 2008). Hence the innovative measures for facilitating geographical accessibility is viewed having control over the increased level of service utilization and help in achieving equity in health (Ayeni et. al. 1987, Rosero-Bixby 2003, Victora et. al. 2003, Oppong & Hodgson 2005).

However, an alternate school of thought suggests that the role of geographical accessibility differ as per the perceived health needs. Where, the population that has a higher perceived need for services gets less influenced by geographic inaccessibility (Arcury et. al 2005). Additionally evidence from India and other developing nations conform to the fact that for childbirth and maternal health needs in particular, the role of geographical accessibility gets overshadowed by the tradition linked to it (Basu 1990, Furuta & Salway 2006). In other words, even with favorable geographical accessibility, a pregnant woman may not seek health services, if it is not customary according to the culture. Along this line of thought the emerging view proposes that the role of geographical access is best evaluated when it is seen from the service user's perspective (Kumar 2003). The present paper adds to this specific knowledge base of the dichotomous role played by geographical access to health care. Drawing some paradoxical evidences from the Sunderbans delta region located in Indian subcontinent, the paper highlights the need for realizing differential impact of geographical accessibility in women's health seeking behaviour.

## Contextualizing geographical access in Sunderbans

Figure 1.

Aerial Photograph of Sunderbans: Courtesy Google Earth



The Sunderbans represents one of the last surviving mangrove forests of the world; sharing the expansion between Bangladesh (which possesses 60 percent of the forest land) and India. The Indian part of Sunderbans extends between 21°32"- 22°40" north latitude and 88°05"-89°00" east longitude, characterizing a sub-tropical climate, where about 47 percent of the land is inhabited. Politically, the delta is located in the major eastern Indian state of West Bengal; stretching over nineteen administrative blocks in the two southern most districts (i.e., North & South 24 Parganas) (Figure 1).

Literally meaning the 'beautiful forests' in Bengali, the Sunderbans derives its name from the predominant family of

mangrove trees i.e., 'Sundari' (*Heritiera fomes*) grown in that environ. The uniqueness in biodiversity has helped the region earn the status of natural heritage site (UNESCO 1997).

In-spite, the face of the nature is not always beautiful for the 40 million inhabitants of the Sunderbans that have been largely in-migrated from various parts of India and neighboring Bangladesh. The population primarily living on agriculture, fishing and gathering- often falls pray of nature's rage in the Sunderbans due to various physio-climatic challenges imposed by the land. This active delta shares a highly complex physiography with number of rivers cutting the land from north to south. Being a delta region and locked by the Bay-of-Bengal in south, the Sunderbans is prone to yearly climatic shocks of pre-monsoon cyclones that severely damage habitations. The adversities have already given birth to a sizable number of climatic refugees, who have lost homes due to sea level rise and resultant submergence of islands due to worldwide climatic change. This signifies the residents' extent of vulnerability related to economic, social and environmental insecurity, as an inheriting part of their survival in the Sundarbans.

Fortunately such utmost geographic adversities are not uniform throughout the region; the northern part which is closer to the mainland shares a stark difference in topography. However, the socio-economic characteristics of most the islanders do not conform to these abrupt physical differences shared between north and south of the land. It may be stated that the differential presence of geographical adversities within the Sunderbans gives an unparalleled opportunity to test the relation shared between geographical accessibility and health care usage. As mentioned earlier, here we focus on women's health in particular, since this is the group expected to get conditioned more by the constraints imposed by adverse geography.

## Objective

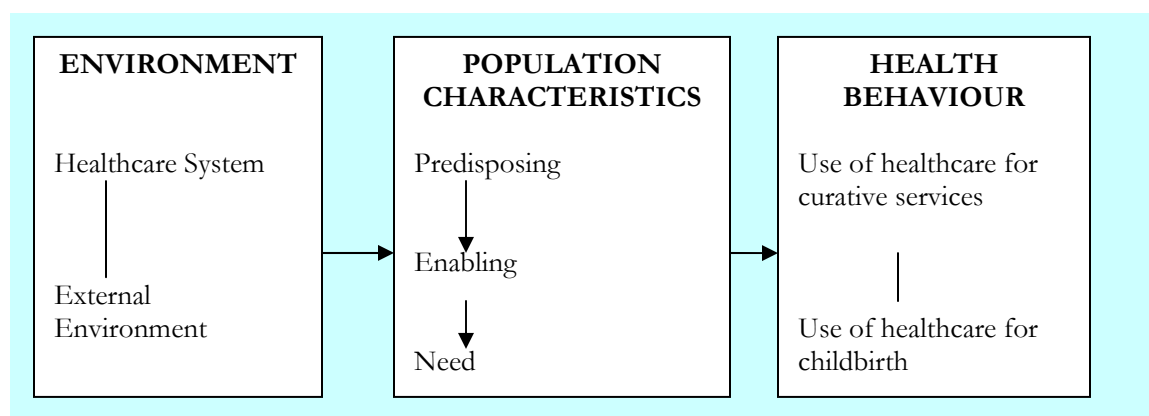
The broad aim of the study is to understand the differentials in health service availability across the diverse geographic regions within the Sunderbans and understanding differentials in health care

utilization by the women. The study seeks for opportunity to explain such differentials that can possibly be attached to geographic attributes.

## Conceptual framework

The conceptual framework of the paper is constructed based on the emerging concept of mutability and the related model, suggested by Andersen (1995). However here the outcome of interest stops at health behaviour particularly in studying the use of health-services (separately for curative and maternal care), and understanding its various other predictors along with the issues related to geographical accessibility (Figure 2)

**Figure 2: Conceptual Framework**



*Note: The arrows specified in the framework indicate direction of influence, while the straight lines specified between components indicate influence that are conceptualized to work both-ways.*

## Data and Methods

### Data

The utilization of health services by the women for curative and maternal health needs is studied in the paper based on a primary household survey data. The survey was conducted by the FHS-India team<sup>1</sup> during January to March 2008 covering, 6145 household members across various age-groups living in 1141 households, from 57 villages spreading across all the 19 administrative blocks of Sunderbans. The analysis in the present paper is based on a sub-sample of 2079 women aged 15 years to over 80 years, taken from the above survey data. The survey provides handful of information relating to women’s health needs and care seeking behaviour.

<sup>1</sup> Future Health Systems: Innovations for Equity is a research consortium working since 2005, involving six-countries with the grant awarded from the Department of International Development (DFID), United Kingdom. Institute of Health Management Research (IHMR), the Indian partner has identified West Bengal as the major focus state for implementing the research programmes in the country. Under these initiatives FHS-India has conducted number of studies across the districts of West Bengal primarily aligned to the guiding principle of the consortium “putting the poor first”. One of such study collected primary data from Sunderbans. A detailed description of the methodology and results can be obtained from the master document.

In addition, a complementary data source, i.e., Primary Census Abstract - Village Directory, published by the Registrar General Census of India 2001 was used, particularly to make a useful demarcation of the geographical accessibility across the 57 villages covered in the survey.

## **Methods**

### *Identification of village accessibility parameters*

Using the village directory of Census of India (2001), a village is identified as inaccessible when there was;

- No-availability of bus/rail service within 5 km distance, instead only had water way,
- No paved/mud road but possessed navigable ways to approach
- Distance to the nearest town over 10 kms, and
- Ten percent of the village area under forest cover

Similarly, a village is called accessible when there was,  
bus/rail service available within 5 kms,  
only had paved/mud approach roads,  
distance to nearest town less than 10 kms and,  
less than 10 percent of the village area under forest cover

According to this criteria of the 57 surveyed villages across all the blocks, 37 were identified as *accessible* and the rest 20 as *inaccessible*. In the data file, a village is coded '1' if found accessible as per the above mentioned criteria and '2' if was inaccessible. This dichotomous variable is considered as the proxy for geographical accessibility while predicting utilization of health-service separately for curative and maternal health needs. To be mentioned here that inaccessible villages was found present in both types of blocks, i.e., the ones adjacent to the mainland or to those that face the sea.

### *Modeling Healthcare Utilization: Out-patient care and institutional childbirth*

As mentioned earlier, the study focuses on influence of geographic accessibility and other covariates for curative and maternal health needs of the women. Uptake of healthcare for curative needs is considered specifically in the context of out-patient care, and maternal health services through institutional delivery. Both of these outcomes are studied using deterministic model of logit regression performed in STATA (version 9). Following binomial logit regression it is assumed that there remains non-linearity between the use of healthcare and its predictors. Two separate regression models are built to study the impact of various predictors on out-patient care and institutional delivery. The model covariates were selected based on three distinct causal domains, viz., predisposing, enabling and need factors. Besides, as mentioned in the conceptual framework (Figure 1) intervening variables such as, distance (in Kilometers) to qualified/unqualified doctors/facilities and the variable constructed on village accessibility parameter were accommodated as predictors. Duration and type of ailment have been used as *need* for outpatient-care models; for institutional delivery model a variable regarding household's preferred norms<sup>2</sup> on place of delivery was used. A brief description of the variables and coding structure is explained in Table 1 (Appendix- 1).

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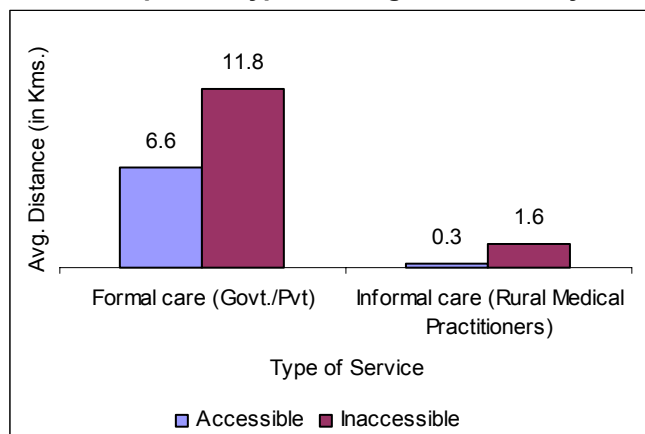
<sup>2</sup> In the survey, the household head was questioned, 'Where do the pregnant women in your family or your neighborhood usually have childbirth? We argue that if a household experience institutional delivery in its neighbourhood, it is most likely to feel the need for institutional care during delivery as a demonstration effect.

## Results

### *Differentials in available health services across the geographical accessibility, Sunderbans*

As mentioned earlier, of the total 57 villages surveyed according to the accessibility criteria 37 were found accessible, while the rest 20 were inaccessible. Along the expected lines, the villages showed differentials in terms of the average distance to health care (Figure 3), across accessibility parameter.

**Figure 3: Average distance of available healthcare service, as per the type of village accessibility**



As shown (Fig. 3), average distance to formal care in inaccessible villages (12 kms.) was almost double comparing their counter part of accessible villages (7 kms.). It can be viewed that informal care providers (rural medical practitioners), overall were found much closer to both types of villages, though similar differential pattern can be observed (inaccessible 1.6 kms, and accessible 0.3 km). It is to be mentioned that, the average distance to health services mentioned in Figure 3, was in actual added more difficulties through the broken linkages of transportation, in both the village types. None of the women living in Sunderbans could travel the distance by single mode of transportation for accessing health services. Over 80 percent

reported to traverse at-least a part of the distance by walking. Traveling by motorized land transportation was almost negligible in both the village types. Use of mechanized/non-mechanized boats was indicated almost by 5 percent of the women living in accessible villages, though it was rare for the ones otherwise. Overall, the time taken to reach any health service (formal/informal) in case of inaccessible villages was almost five times more (20 minutes/km), than was found required for accessible villages (4.3 minutes/km.).

The above facts together portray higher difficulties faced by the women to access health services when the villages were geographically inaccessible. It is to be mentioned here that, recognizing the overall misery of the people and villages in Sunderbans which to some extent gets aggravated by the geographical inaccessibility, a number of non-governmental organizations (NGOs) have chosen to work in the location. These NGOs apart from providing assistance to the residents on livelihood issues are also engaged in health service delivery through organizing mobile health camps, as public-private-partnership (PPP) schemes in collaboration with the state department of health. Though limited, these initiatives are likely to cover the clients living in hard to reach villages, who otherwise will go untreated for their health needs, due to the expected difficulties to accessing the services. However, we find that of the total 57 surveyed villages, only 20 were found having this alternative health services provided by the NGOs. A further close look revealed that the NGOs were in actual servicing more number of inaccessible villages from the administrative blocks closer to the main land. While these complimentary services were almost absent for the ones those adjacent Bay-of-Bengal and faced much harder geographic adversities.



All these facts taken together reflected surmounting importance of geographical hindrance for a woman to access services if she lived in an inaccessible village of the Sunderbans. In this backdrop, we study the women's health care uptake separately for outpatient care and institutional delivery. However, before going to the results on healthcare uptake, a brief profile of the women's background is presented in the following section.

### **Profile of the women**

Across the two types of village accessibility, women were found almost identical in terms of the selected background characteristics, except for certain indicators i.e, ethnicity, religion and employment status (Table 2). A large majority of the women from inaccessible villages seemed to belong from scheduled caste/tribe/other backward castes (70 percent), while such proportion was much lower in accessible villages (41 percent). The women from inaccessible villages were predominately Hindus (90 percent), while the proportion of Hindu women was much lower (64 percent) in accessible villages. Additionally, a slightly higher proportion of employed women were noticed in case of accessible villages (31 percent) than their counterparts from villages that were hard to reach (23 percent).

**Table 2: Background characteristics of the women across the types of geographical accessibility of villages**

| <b>Attributes</b>   | <b>Accessible</b> | <b>Inaccessible</b> |
|---|-------------------|---------------------|
| <b>Age</b>  |                   |                     |
| Mean age (in years)                                       | 35.54             | 35.22               |
| SD  | 16.94             | 15.95               |
| <b>Caste</b>  |                   |                     |
| General   | 58.41             | 30.47               |
| SC/ST/OBC   | 41.59             | 69.53               |
| <b>Religion</b>   |                   |                     |
| Hindu   | 64.2              | 89.99               |
| Others  | 35.8              | 10.01               |
| <b>Marital status</b>                                     |                   |                     |
| Currently married   | 75.07             | 78.25               |
| Otherwise   | 24.93             | 21.75               |
| <b>Education</b>  |                   |                     |
| Illiterate  | 36.01             | 35.77               |
| Upto primary level  | 50.07             | 50.36               |
| Above primary level                                       | 13.91             | 13.88               |
| <b>Employment status</b>                                  |                   |                     |
| Unemployed  | 69.28             | 77.4                |
| Employed  | 30.72             | 22.6                |
| <b>Household status of food availability in last week</b> |                   |                     |
| Always, two square meals for all members                  | 86.59             | 89.13               |
| Otherwise   | 13.41             | 10.87               |
| <b>Total (N)</b>  | <b>1380</b>       | <b>699</b>          |

### **Need and uptake of health services by the women across village types on accessibility**

The utilization of health services logically will depend on healthcare needs of any population. It was observed that in terms of need for health services, women showed no differential pattern across types of accessibility of the village. Of the total 2079 women, 909 women stated suffering from any kind of illness ever during 30 days reference. Of these, 770 were selected for in-depth investigation on their health seeking behaviour. Of which 44 percent and 43 percent from accessible and inaccessible villages reported suffering, respectively. A close look at the type of morbidity suggested that overall a majority suffered either from digestive problems (26 percent) or from the respiratory ailments (27 percent), followed by musculoskeletal complaints (16 percent). The pattern was almost uniform across the village accessibility types.

In respect to delivery services, of the total 2079 women, 585 were found having at-least one birth during the last five years. Of which, a total 562 women were interviewed on their maternal health and healthcare uptake issues. This included 28 percent and 29 percent of the women from accessible and inaccessible villages, respectively. While asked on the place of delivery for the last child, only 29 percent of the total 562 women reported to have institutional birth.

**Table 3: Uptake of care for curative needs and childbirth by the women, across village accessibility parameter**

| Village types | Type of care used                       |                                    |   |
|---------------|---|------------------------------------|---|
|               | Curative                                |                                    | Maternal Health                             |
|               | Out-patient care (in last three months) | In-patient care (in last one-year) | Institutional delivery (in last five years) |
| Accessible    | 82.77 (505)                             | 4.42 (1380)                        | 30.8 (373)                                  |
| Inaccessible  | 83.02 (265)                             | 4.86 (699)                         | 24.3 (189)                                  |
| Average       | 82.86 (770)                             | 4.57 (2079)                        | 28.7 (562)                                  |

\* figures in parenthesis refer to the respective denominator.

The uniformity in women's health needs from both the village types was also reflected in the healthcare uptake for curative services (Table 3). An overwhelming proportion of over 80 percent reported seeking out-patient care for their ailments within past three months. However, a majority of the women received outpatient services

from informal providers (65 percent as against 61 percent from inaccessible villages) (not shown in the table). It was logical since informal providers were much proximate to both the village types (Fig 3) and required much lesser travel-time to reach their facilities (10 minutes/km and 3minutes/km for inaccessible and accessible villages, respectively).

Surprisingly however, the use of formal healthcare services was higher among the women belonging to inaccessible villages (not shown in the table), in spite those facilities were considerably distant from such villages (Fig. 3) and required much higher travel-time (66 minutes/km and 10 minutes/km for inaccessible and accessible villages, respectively).

The pattern of health service uptake on the other hand was reversed in case of delivery (Table 3). Overall, only 28 percent of the women reported delivered at institutions among all of the women having at least one childbirth within last five years. The rate of institutional delivery was higher for the ones living to accessible villages (31 percent), comparing to their counter parts (24 percent) from the villages with difficult accessibility. The limitation of data restricts further investigation on the practice of safe delivery and their differential pattern across the types of villages.

### **Predictors of women's outpatient care seeking behaviour**

The result of logistic model on predicting women's outpatient care seeking behaviour is presented in Table 4. It outlines odds ratios of seeking outpatient care, derived from three separate models, i) run only with the predictor variables that are considered as proxy for *predisposing* factors towards utilization, ii) along with *predisposing* predictors, proxy variable for *need* was introduced, iii) the full

model incorporated all predictors of the former two models along with the proxy variables on accessibility.

**Table 4: Odds Ratios of Out-patient Curative Care Seeking**

| <b>Predictors</b>            | Predisposing<br>(Acceptability and<br>Affordability Model) | Need<br>(Predisposing+Need) | Full Model<br>(Predisposing+Need+<br>Environment)       |
|------------------------------|--|-----------------------------|---|
| q204                         | 1.014* (   | 1.012                       | 1.011   |
| mar_sta                      | 0.961  | 0.944                       | 0.951   |
| q1_11t                       | 1.029  | 1.019                       | 1.017   |
| caste                        | 1.300  | 1.254                       | 1.274   |
| religion                     | 0.875  | 0.799                       | 0.786   |
| _ledu_2                      | 1.828*   | 1.964**                     | 1.954**   |
| _ledu_3                      | 1.785  | 2.121*                      | 2.102**   |
| employment                   | 1.814*   | 1.870*                      | 1.860*  |
| meals_tsq                    | 0.647  | 0.661                       | 0.656   |
| outp_dur                     |  | 0.402***                    | 0.310***  |
| _lgr_mo_2                    |  | 1.041                       | 1.046   |
| _lgr_mo_3                    |  | 0.721                       | 0.721   |
| _lgr_mo_4                    |  | 0.998                       | 0.998   |
| r_access_psu                 |  |                             | 0.900   |
| dist_q                       |  |                             | 1.002   |
| dist_unq                     |  |                             | 1.005   |
| (-2 Log likelihood)          | -342.263   | -332.107                    | -331.976  |
| LR chi2                      | 21.02*   | 41.33*                      | 41.59***  |
| Hosmer-Lemeshow<br>(p value) | 3.61 (0.89)  | 10.14 (0.26)                | 7.38(0.50)  |
| lrtest                       | 20.57**  |                             | Assumption<br>(predisposing is nested<br>in Full model) |
| lrtest                       |  | 0.26                        | Assumption (need is<br>nested in Full model)            |

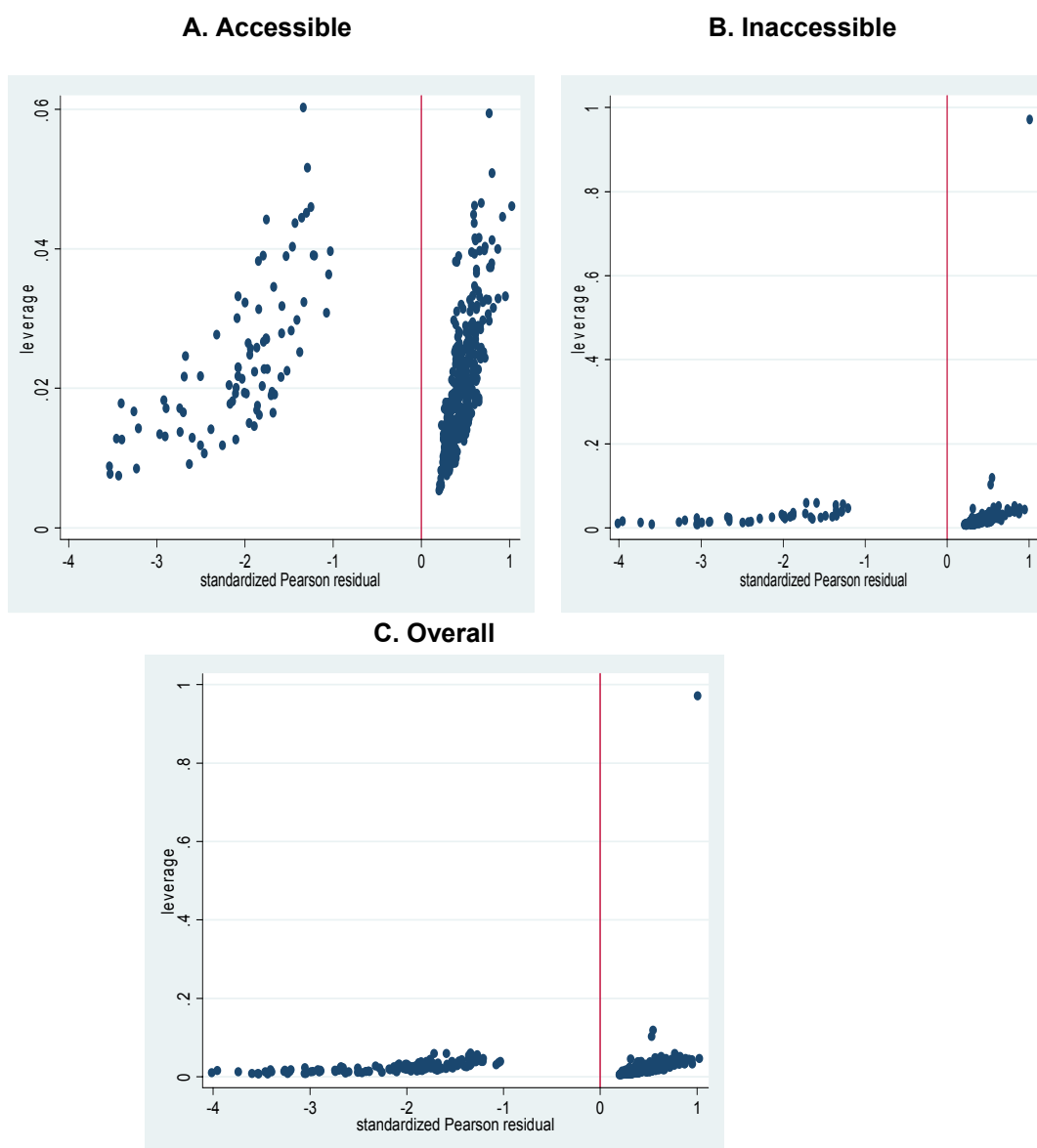
Note: Significance level \*  $p < .10$ , \*\*  $p < .05$ , \*\*\*  $p < .01$

In the first model of health utilization behavior, it showed with increasing age women demonstrates a positive influence on seeking treatment, controlling for various independent variables that can be categorized under *acceptability* and *affordability* domains. Similar influence of women’s education up to secondary level with reference to illiterate women on positive outcome of care-seeking can be viewed from the table (Table 4). The women who are economically engaged showed higher chances of seeking curative services for their ailments. Introduction of need factors in the second model (Table 4) diffused the influence of women’s growing age on the positive outcome. It however strengthened the effect of women’s education and employment status. Duration of suffering seems to influence women’s care seeking behaviour far more strongly, specifically when the reported suffering was over a month’s time. However the sequential inclusion of service environment in the final model (Table 4) in terms of accessibility, do not make any random changes in the predictors observed formerly. Inclusion of accessibility dimension in the final model leads to infer that, i) the accessibility represented in terms of average distance from formal or informal providers and type of village accessibility parameter, do not demonstrate any influence on the outcome variable, ii) however, the effect of women’s education, employment status and duration of ailment are observed reduced marginally. The predicted

probabilities for seeking out-patient care separately for village accessibility types are presented in the figure 4 (refer to Appendix-1).

Overall there existed no significant differentials in terms of estimated mean probabilities of women’s out-patient care seeking behaviour across the village types (i.e., accessible 82.7 percent and inaccessible 83 percent). Moreover, a wide uniqueness was observed in the covariate pattern of out-patient care seeking in respect to the logistic model, where the number of covariates exactly equaled the number of observation (n=770). An attempt was made to verify the leverage of covariate pattern on the predicted probabilities of women’s curative care seeking across village accessibility by plotting the value of leverage against the standardized Pearson’s residuals obtained from post-estimation measures after logistic regression was performed (Figure 5).

**Figure 5: Leverage of Covariate Pattern on the Predicted Probabilities of Seeking Outpatient Care by the Women across the Zones of Access; Sunderbans**



The figure denotes that overall for the Sunderbans the predictors of outpatient care seeking does not show any large scaled measure of distance from the average covariate pattern. It holds true even for

the care seeking behaviour by the women from inaccessible villages. These patterns seem almost close to the average, with or without large corresponding value of residuals. While a visibly different scenario is noticed in accessible zones, where for both the binary outcome of curative care seeking, women tend to have considerably unique covariate patterns. The leverage of independent variables on women those who sought curative care seems more interesting, particularly since the corresponding residual values do not come to be large in these case.

**Predictors of institutional delivery**

We made similar attempt to model women’s care seeking for delivery as to the curative services, with explanatory variables labeled in terms of four dimensions of access- discussed under methodology. Similar to outpatient-care models (Table 4), here two separate models are specified for predicting the positive outcome for institutional delivery (Table 5). The first model incorporates predictor variables linked with *acceptability*, *affordability* and *need* for services. While the second or the final model in addition to the variables specified in the former, includes the *accessibility* parameters.

The first model (Table 5) shows, controlling for other variables the women from non-hindu families demonstrated lower odds of seeking institutional care during childbirth. The effect of education for institutional birth, in reference illiterate women, was higher for those who studied beyond secondary level. The same is true when the women belonged to the household having more positive norm about institutional births, with reference to those having norms favoring domiciliary childbirth.

In the final model with the inclusion of accessibility parameters, the effect the higher education, delivery norms and religion on seeking institutional services were further increased comparing the first model (Table 5). Overall, controlling for all other predictors in the final model, the women showed lower odds of receiving institutional care during childbirth, if they belonged to geographically inaccessible villages.

**Table 5: Odds Ratios of Care Seeking for Institutional Delivery**

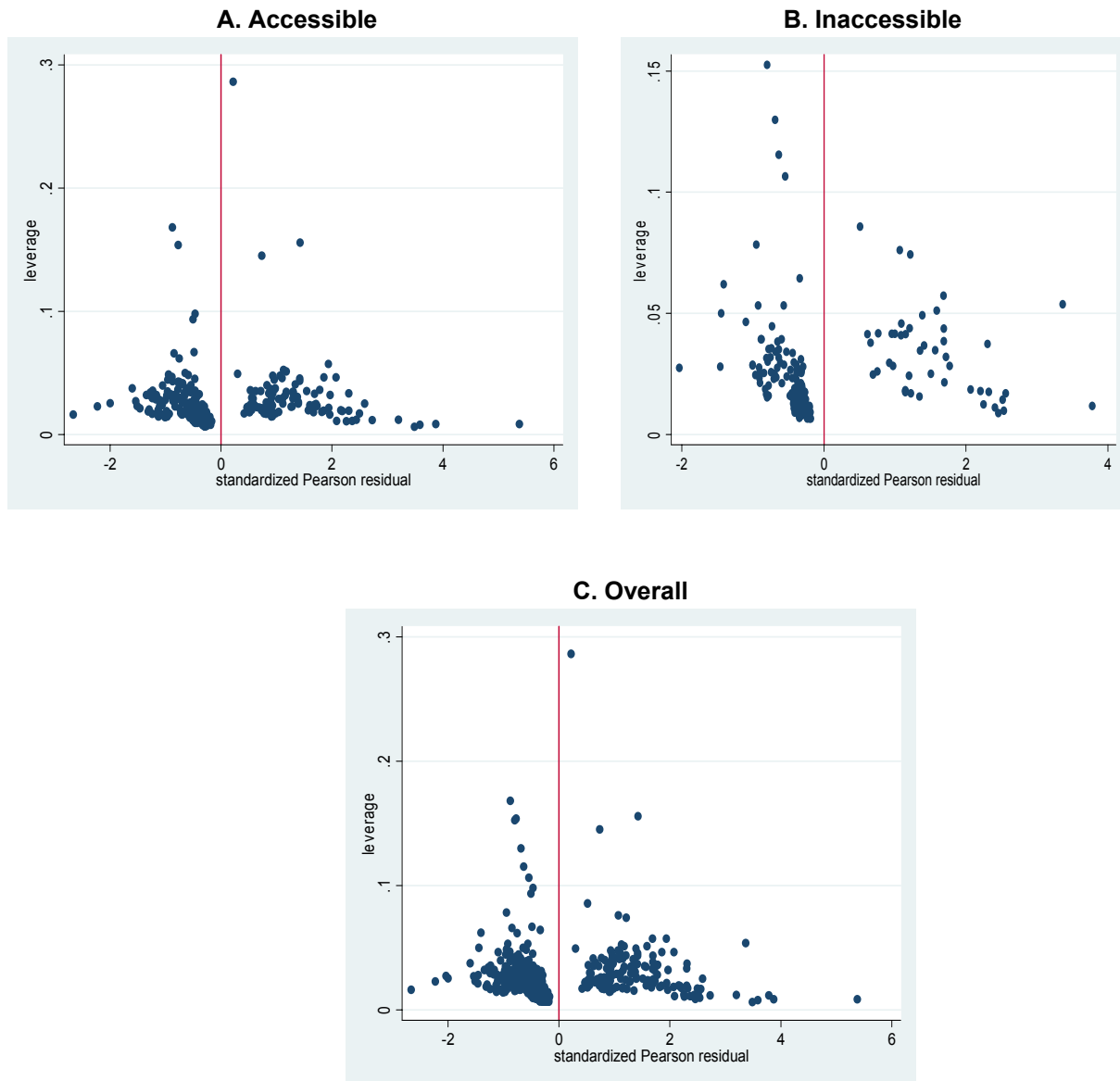
| Predictors                | Predisposing + Need (Acceptability, Affordability and need) | Full model (Predisposing+ Need+Environment)            |
|---------------------------|---|--|
| q204                      | 0.985   | 0.986  |
| mar_sta                   | 2.450   | 2.775  |
| q1_11t                    | 0.921   | 0.915  |
| Caste                     | 0.657   | 0.711  |
| Religion                  | 0.367**   | 0.337***   |
| _ledu_2                   | 1.013   | 0.978  |
| _ledu_3                   | 3.020**   | 3.070**  |
| Employment                | 1.271   | 1.126  |
| delivery_norm             | 5.024***  | 5.134***   |
| meals_tsq                 | 0.574   | 0.576  |
| r_access_psu              |   | 0.561*   |
| dist_q                    |   | 1.006  |
| dist_unq                  |   | 1.266  |
| (-2 Log likelihood)       | -279.246  | -274.694   |
| LR chi2 (p value)         | 114.75***   | 123.85***  |
| Hosmer-Lemeshow (p value) | 2.39 (p=0.966)  | 8.51(p=0.385)  |
| lrtest (p value)          | 9.10(0.027)   | Assumption (Predisposing+Need is nested in Full Model) |

Note: Significance level \* p <.10, \*\* p <.05, \*\*\* p<.01

The predicted probabilities for institutional delivery, separately for village types are presented in the Figure 6 (refer to Appendix 1).

Test of mean probabilities across the village types (accessible 33.4 percent and inaccessible 26.6 percent) suggests probability for seeking institutional care in case of inaccessible villages was significantly lower than the villages which were accessible. Similar uniqueness in the covariate pattern was also noticed in case of institutional delivery. The scatter plot between the values of leverage and residuals showed (Figure 7) that the leverage of covariate pattern on seeking institutional delivery for inaccessible areas was much stronger in terms of independent variables specified in the models. The similar leverage was noticed in a weaker form in case of accessible areas, which was followed even by the overall pattern of the Sunderbans.

**Figure 7: Leverage of Covariate Pattern on the Predicted Probabilities of Institutional Delivery, across the types of village accessibility**



## Discussion:

The dimensions of accessibility both that relate to service availability and utilization have been duly studied in health service research over the years. The conventional school of thought suggests that geographical inaccessibility of health centres hindrance healthcare uptake by the population. While an emerging alternative view suggests an overruling impact of cultural acceptability or perceived need behind health care uptake (Basu 1990, Kumar 2005). The present paper, largely drawing evidences from a poor community of the Sunderbans adds conformity to this later view.

As reflected by the study, the women from inaccessible villages in the Sunderbans were observed having multi-faceted difficulties in access to health services. They had to travel larger average distance, used higher number of transport means, required larger time to reach facilities and also seemed lacking alternative health services provided by the NGOs. However, in accordance with the equal health needs stated by the women from accessible villages, an equal proportion of women living in such hard to reach villages were found availing health services for outpatient care. This apparently implies that probably the attribute of geographical accessibility in curative care failed to hinder service uptake by the women and which could be paradoxical in a location like the Sunderbans. However as shown, that over sixty percent of these women from both the village accessibility types sought treatment from informal providers, who were the most proximate options for the locality. Hence, availability of informal providers within or near to the villages exerted wide influence on women's outpatient care uptake. The results show, on an average a slightly higher number of RMPs (mean 2.9 and 3.5 for accessible and inaccessible villages, respectively) was serving the inaccessible villages, though their mean distances were higher for these villages comparing to those practicing in accessible ones (shown in Fig. 3).

Nevertheless adding to the surprise, the women from inaccessible villages are found seeking formal care for outpatient services at a higher rate, comparing their counterpart. This evokes the need for further investigations, since formal health services due to their distant locations and higher required travel time, possibly could not have been the logical choice for the women living in inaccessible villages.

Overall, the influence on positive outcome was also noticed in case of few predisposing factors such as, women's increasing age, better level of education and status of employment. Nevertheless, the major predictor that explained women's care seeking behaviour was the duration of suffering. In other words, irrespective of hardships posed by geographical accessibility, women who suffered from an ailment that lasted over a month's time resulting in higher felt need for services, accessed care. The women from inaccessible villages are found acting in a more symmetrical way while seeking curative care (Figure 5), comparing their counterpart living in villages that are not such hard to reach. The apparent spatial difficulties seem to fall short of hindering women's curative care seeking behaviour, particularly for those who felt a genuine need for the services. The influence posed by the informal providers practicing in/around the villages is however does not found having influence in the model. Rather it shows that the perceived need for services, measured through duration of ailment was the major predictor of out-patient service uptake by the women, controlling for geographic hardships.

The proxy for perceived need in case of institutional care for childbirth i.e., households' norm regarding place of delivery, also observed to exert influence on the positive outcome. Overall for the Sunderbans, only a third of the women reported having institutional childbirth, which is pretty low by the state's rural standard (WB 43.4, RCH-DLHS 3). Differential likelihood was noticed in terms of predisposing factors related to level of education and religion. It needs special mention that the households' norm regarding the place of childbirth that is considered having embedded in the experiences of similar events in the family or neighbourhood; has explained the positive outcome with far more strength. To be elaborate, women who belonged to the households that often witness events of institutional childbirth among family members or neighbours, were more likely to give birth in institutions.

For institutional childbirth, geographical accessibility also is evidenced to exert impact, since the women from inaccessible villages showed lower odds of seeking delivery care in institutions. Overall, the lower rate of institutional birth and more so for the inaccessible villages in particular suggests that, women lacked seeking such services, since it was not customary. Generally, the decision about the place of childbirth largely taken at the household level. Hence, if the households had low perceived need for institutional childbirth, women lacked seeking such services. Therefore, similar to some other predisposing factors which hindered seeking services for childbirth, geographical accessibility emerged as one of such barrier.

However, the study calls for further in-depth understanding of the roles of geographical accessibility in care seeking behaviour of the population for specific health needs. Perhaps such blanket view that attributes lower use of health services due to geographical inaccessibility, will prove to be no more valid unless the perceived need for such specific care is verified in the population under study.

### **Policy implication and conclusions**

The paradoxical situation highlighted by the study findings emphasized on 'perceived need' as facilitating and hindering the healthcare uptake, rather than predisposing or enabling factor including the attribute of geographical accessibility. There will be genuine need to replicate similar studies in different population before certain policy implication is specified. However, from such a preliminary effort it can be stated that attempts could be directed to facilitate the availability of means of transportation for the clients living in inaccessible villages in the Sunderbans, so that they would face lesser hurdles in accessing services. Nevertheless, since changing population's norm regarding the place of childbirth is not matter that could be changed overnight, policy makers can think of extending the options of safe-delivery under professional attendance and starting such attempts from inaccessible villages that registered much lower rate of institutional births.

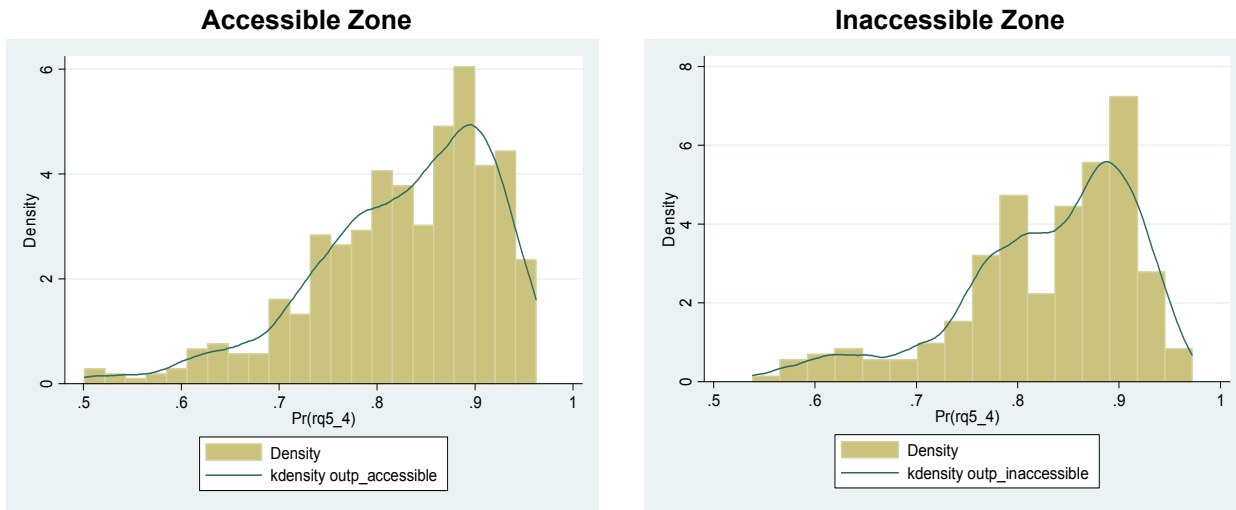


## Appendix-1

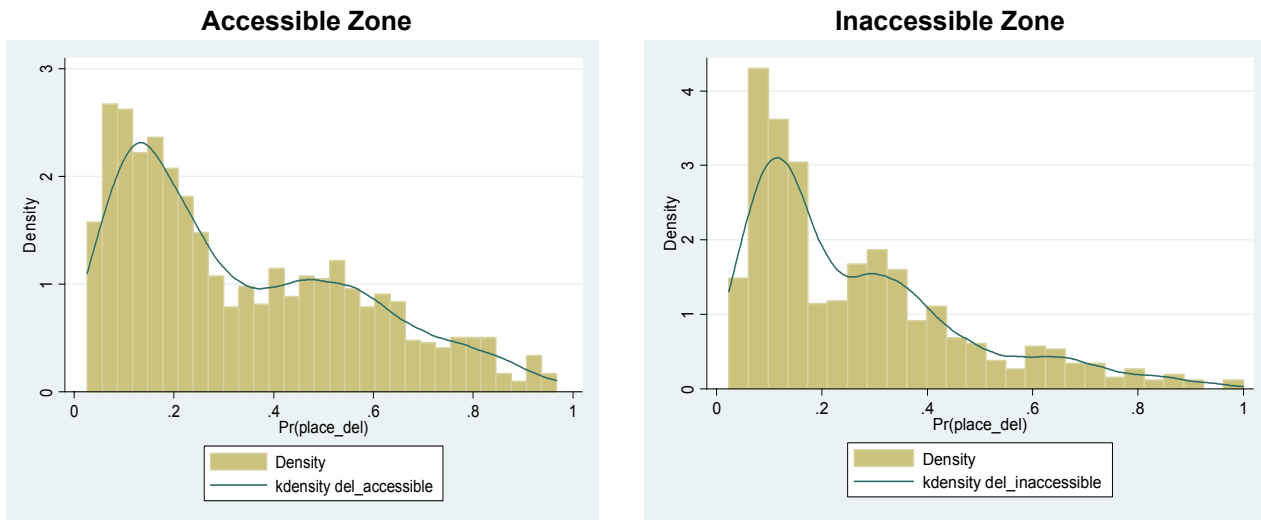
**Table 1: Descriptive statistics**

| <b>Dependent</b>     | <b>Obs</b> | <b>Mean</b> | <b>SD</b> | <b>Description</b>                                       | <b>Type</b>  |
|----------------------|------------|-------------|-----------|--|--|
| rq5_4                | 770        | 0.83        | 0.38      | Utilization of curative care                             | Dichotomous (0=no, 1=yes)  |
| place_del            | 562        | 0.29        | 0.45      | Place of delivery of last birth within past five years   | Dichotomous (0=domiciliary, 1=institutional)                                       |
| <b>Independent</b>   |            |             |           |  |  |
| <b>Acceptability</b> |            |             |           |  |  |
| q204                 | 2079       | 35.43       | 16.62     | Woman's current age                                      | Continuous   |
| mar_sta              | 2079       | 1.24        | 0.43      | Marital status   | Dichotomous (1=currently married, 2=others)  |
| q1_11t               | 2079       | 6.11        | 2.45      | Number of household members                              | Continuous   |
| Caste                | 2079       | 1.51        | 0.50      | Caste  | Dichotomous (1=general, 2=others)  |
| religion             | 2079       | 1.27        | 0.44      | Region   | Dichotomous (1=hindu, 2=others)  |
| edu                  | 2079       | 1.78        | 0.67      | Woman's level of education                               | Categorical (1=illiterate, 2=upto primary, 3=above primary)                        |
| employment           | 2079       | 0.28        | 0.45      | Women's status of employment                             | Dichotomous (0=unemployed, 1=employed)   |
| <b>Affordability</b> |            |             |           |  |  |
| meals_tsq            | 2079       | 1.13        | 0.33      | HH availability of two-square meals in last week         | Dichotomous (1=always, 2=otherwise)  |
| <b>Need</b>          |            |             |           |  |  |
| outp_dur             | 770        | 1.41        | 0.49      | Duration of illness for which outpatient care was sought | Dichotomous (1=>30days, 2=<30days)   |
| delivery_norm#       | 2079       | 0.36        | 0.48      | Norm on place of delivery in family/neighbourhood        | Dichotomous (0=home, 1=intitutions,)   |
| gr_mo                | 770        | 2.52        | 1.18      | Illness groups for which outpatient care was sought      | Categorical (1=digestive system, 2=respiratory system, 3=musculoskeletal, 4=other) |
| <b>Accessibility</b> |            |             |           |  |  |
| r_access_psu         | 2079       | 1.34        | 0.47      | Village accessibility index                              | Dichotomous (1=accessible, 2=inaccessible)   |
| <b>Availability</b>  |            |             |           |  |  |
| dist_q               | 2079       | 8.35        | 6.56      | Average distance form qualified doctors                  | Continuous   |
| dist_unq             | 2079       | 0.71        | 9.53      | Average distance from unqualified doctors                | Continuous   |

**Figure 4: Predicted probabilities for seeking out-patient care by the women, across access zones of Sunderbans**



**Figure 6: Predicted probabilities for seeking institutional care during delivery, across access zones of Sunderbans**



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