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# UTILIZATION AND CHOICE OF HEALTH CARE: EMPIRICAL EVIDENCE FROM INDIA

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## *Abstract*

*Utilization and choice of health care services are two important decision-making issues once an individual perceives or realizes illness. Identifying and measuring the factors that influence health care utilization and choice are important concern for policy makers, to reduce health system inequality. Both demand and supply side factors influence the above-mentioned choice decisions. However, the nature and severity of illness can also affect the above choice decisions. This study has identified and measured the role of disease specification as an important determinant of choice decision along with its influence on other factors. This study also explored the regional and socio-economic variation of factors which hinder the utilization of government-provided health care services. Analyzing the data of women and child household members, the study found that disease specification affects the choice of health care provider and even influences the role of other important factors.*

***Key words:*** *Health care utilization; Choice of health care provider; Discrete choice model; Disease specification; Determinants of choice*

***JEL classification:*** *I11, I12, C35, D91*

## 1. INTRODUCTION

According to Alma Ata declaration (1978), health is a basic right for each and every individual. Across the world, almost all countries provide subsidized (fully or partially) public health facility for its citizens. Ensuring availability, accessibility and affordability of quality health care for all citizens is a challenging responsibility for any government, especially in developing and poor countries. In developed countries, the majority of the residents has health insurance coverage and is able to afford private health care. But in a developing economy, relatively less people can afford private health facility due to higher service fee (compared to their income) and low penetration of health insurance. Thus, provision of public health care is more important in context of developing countries. But, mere provision of health care service does not ensure its better utilization[1]. Inspite of having subsidized public health facility, people opt for private health facility, due to lack of availability and/or access (in terms of time or distance) to public health care, apart from particular preference or perception (like quality) about it.

Illness could be either perceived or visible and the state of illness can be either treated (utilization of health care) or ignored. In case of treatment, the ill person needs to make a choice between different available health care facilities. An individual can opt for self/home treatment vis-a-vis treatment from professional heath care providers. In later case, the available option is broadly public versus private health care service[2]. Every choice decision regarding illness could be individual decision or collective/family decision.

Ensor and Cooper (2004) classified the determinants for health care access into two groups, demand side factors and supply side factors. Demand side determinants are defined as those factors that influence demand and operate at the individual, household or community level. It includes cost of access, lack of information and cultural barriers. In contrast, supply side determinants are characteristics specific to the

[1] Noorali et al. (1999)

[2] However, from viewpoint of scientific evidence, option can be broadly classified as allopathic versus traditional (including AYUSH) medical care

health care service providers. It includes treatment cost, availability, technology and management of the service provider. There is debate among researchers regarding relative importance of these factors. Moreover, the importance of factors varies across regions and socio-economic classes.

India is the second largest home of the most poor people in the World[3]. Latest CSE report estimated that in 2016, India had 22.2 million and 35 million chronic COPD and asthma patients respectively[4]. On the other hand, as per latest Global burden of disease study, in terms of quality and accessibility of healthcare, India ranks 145th among 195 countries (in 2016)[5]. According to recent WHO estimate[6] India ranked 153th out of 188 countries in 2016 in terms of per capita current health expenditure (USD). In 2017, India's current health expenditure was only 4% of its GDP while it was 12% for Cuba and 9% and 5% for Brazil and China respectively. However, share of out of pocket health expenditure in current health expenditure in India (ranks 172 out of 189 countries in 2017) declined from 72% to 62% between 2000 to 2017. But, it is still higher than Sri Lanka (50% in 2017) and Pakistan (60% in 2017). Thus, financial burden of seeking health care is significantly high in India compared to many developing countries (Doorslaer et al. (2006), Garg and Karan (2009), WHO (2012), Berman et al. (2010)). Low penetration of health insurance makes the issue more challenging. However, role of health insurance in reducing financial burden is not very effective in India (Berman et al. (2010)).
The structure of the paper is such that, section 2 discusses important and preferably recent studies related to factors affecting health care utilization and choice of health care provider. Based on existing literature, section 3 has highlighted the objective of the study to address the research gap. Section 4 describes the data used in this study and section 5 describes the methodology required to address the objectives. Section 6 portrays the results and its analysis while study was concluded in section 7. Section 8, 9 and 10 shows references, data appendix and annexure.

## 2. LITERATURE REVIEW

### 2.A. International context

#### 2.A.i. Health care utilization:

The decision for health care utilization and choice of health care provider depends on many factors such as disease specification, individual and family characteristics, socio-economic factors, affordability and accessibility of health services, physical infrastructure and perception about health service, attitude of health care staffs etc. Presence of uncertainty and asymmetric information about potential and opportunity cost of treatment, risk and benefit of therapy, makes the issue very complex.
Availability of health insurance has a positive effect on the health care utilisation[7] and can reduce inequality in access to health care[8]. Studies like Alaba and Koch (2007), Sauerborn et al. (1996) observed that family structure strongly influences the health care utilization behavior. On the other hand, Hjortsberg (2006) finds that family size has moderate effect on the health care utilization while age of household head has significant impact on the same. However, presence of gender bias (in favour of male child) in health care utilization behaviour was reported by Chen et al. (1981) and Gantara and Hirve (1994).
Based on a study in Egypt, Nandakumar et al. (1999) found that utilization of health care depends on factors such as income, education and access to health facility. The study also found that factors like larger family size, living in rural area and age has inverse effect on health care utilization. However, Neumark et al. (1992) concluded that economic status is the driving force for utilization of health care. On the other hand, demographic and socio-economic factors were identified by Carr-Hill et al. (1996) as primary driver for consultation patterns. Disease severity was identified by Kloos (1990) and Bush and Iannotti (1990) as important determinant of health care utilization.

#### 2.A.ii. Health care provider choice:

Public health facility in any country is usually subsidized but suffered with barriers such as limited infrastructure (like long waiting time) and lack of access (both distance and transportation issue), especially in rural and remote areas. Over time, private sector increasingly fills the demand-supply gap but private health care being relatively expensive, it imposes a real challenge for the poorer/vulnerable section of the society. However, co-existence of different types of medical practitioners with their varying characteristics makes the provider choice decision more difficult.

[3] Business Today, June 27, 2018
[4] Down to Earth, India's burden of disease
[5] Hindustan Times, May 23, 2018 https://www.hindustantimes.com/health/india-ranks-145th-below-china-bangladesh-among-195-countries-in-healthcare-access-quality/story-31UgnP7QxpvqbeHJoLdtFP.html
[6] WHO Global Health Expenditure database, last accessed on 18th April, 2020 https://apps.who.int/nha/database/ViewData/Indicators/en
[7] Newachek et al. (1998), Jutting (2001), Oyekale and Eluwa (2009), Anderson and Bartkus (1973)
[8] Lille-Blanton and Hoffman (2005)

Inspite of subsidized price, majority in Egypt prefer to use private care in case of illness (Nandakumar et al., 1999) due to better perception about private care. Similar finding also observed in semi urban Guatemala (Van der Stuyft et al., 1997) due to poor infrastructure and attitude issue of public facility staffs.

Studies like Akin et al. (1986), Heller (1982), Schwartz et al. (1988) report that price of health care service is not an important determinant but Gertler and Van der Gaag (1990) argued that impact of price is significant mostly in developing countries. Moreover, due to presence of low income households along with low insurance penetration, the effect of price is higher in developing countries than that in developed countries. Studies like Akin et al. (1995), Bolduc et al. (1996), Dow (1999), Gupta and Dasgupta (2000), Mwabu et al. (1993, 1995), Sahn et al. (2003) also confirmed that price is an important determinant of health care demand. However, based on a study in Nigeria, Uchendu et al. (2013) concluded that quality of health care service is not always reflected by its price/cost. Inspite of being relatively cheap, quality of public health facility is found to be better compared to private care.

Based on household survey in Nigeria, Amaghionyeodiwe (2008) found that distance of the provider and cost of service are the two important determinants of choice of health care provider. Satisfaction of these two factors is sufficient for households to opt for modern care. The study observed that while cost factor motivate the poor households to choose self-care, rich households has a tendency to opt private care.

Another study in Nigeria (Abiodun et al. 2014) found that perception about the quality of care and waiting time are most important determinants of health care choice. However, cost of service, access and attitude of the staffs play important role in choice decision. Role of perception in health care provider choice was also highlighted by many other studies. For example, Andaleeb (2000) observed that quality of private sector is perceived to be better because they have to attract patients for their own sustainability. On the other hand, Berendes et al. (2011) concluded that quality of private as well as public health care providers is unsatisfactory in low and middle income countries. However, private sector is more patient centric in terms of responsiveness and effort. Palmer et al. (2003) also found that perception about private care make significant difference other than lack of access (both in terms of time and distance) to public facility. The study also highlighted that not only there is better perception about timely and efficient service in private sector, but perception about 'privacy' also play important role.

Based on China National Health Service data, Qian et al. (2010) found that proximity of the service is the most important factor while economic status, access to health insurance and severity of illness are other major determinants of choice of health care provider. On the other hand, Yip et al. (1998) also confirmed the importance of insurance pattern, income and disease pattern in choice of health care provider. However, in a study based on South Africa, Knight and Maharaj (2009) expressed that choice of health care facility may be different for usual morbidity vis-a-vis routine care like pregnancy, early childhood care etc.. In other words, disease specification could also motivate choice of health care provider.

**2.B. Indian context**

In India, mainstream health care sector is mostly catered by public and private providers. In public health facility, government provides different levels of health care facility ranging from primary health centre (PHC), anganwari (ANC) to nationally and internationally recognized multi facility hospitals like AIIMS. All these public health facilities are subsidized and even free or accessible with negligible user fee. Other than public facilities, private sector also provides varying ranges of health care facilities from individual doctor's chamber, doctor's clinic to multi-specialty hospitals. Inspite of being relatively expensive, these private health care facilities serve significant proportion of population seeking health care. Moreover, there exist number of clinics and hospitals run by trust or NGOs which are either charitable or charges subsidized service fee. Other than these mainstream health care facilities, there are significant numbers of alternative health care providers available to serve health care seeking population. The non-mainstream sector includes traditional healers, AYUSH facilities, alternative medicine/health care providers (like reiki, acupuncture, touch therapy etc.). In India, even paramedic and pharmacy/chemist and drug store (through suggesting and selling 'over the counter' drugs) also cater the requirement of sizeable share of health care seeking population.

The vast choice of health care providers, their diversified characteristics (including infrastructure), disease specification, patient, household and socio-economic characteristics along with perception about provider play crucial role in decision making regarding health care utilization and choice of health care provider. However, Sarma (2009) indicated that all providers are neither accessible not affordable for all households. Analysis of choice of health care provider is important because it helps the policy maker to arrange additional resources or improve services of public health care to target particular group of people who require it more than others.

**2.B.1. Health care utilization**

Using NFHS2 data for Kerala, Pillai et al. (2003) explored the factors responsible for health care utilization and choice of health care provider. They found that in case of child sickness, health care utilization depends on economic status of the family, place of residence (rural versus urban), severity of disease, age of child as well as frequency of antenatal visits by mother and her educational qualification. On the other hand, choice of healthcare provider (allopathic vis-à-vis alternative medicine) depends significantly on factors such as gender of

the child, social and economic status of the family as well as place of residence. Thus, while disease severity and economic condition determines utilization of health care facility, demographic factor like gender of child determines choice of health care provider. Pillai et al. (2003) found that mother's education has inverse impact on child care utilization, but positive role of mother's education was observed by studies like Fosu (1994); Neumark et al., (1992); Kutty (1989). On the other hand, presence of gender disparity in health care utilization was reported by studies like Ganatra and Hirve (1994) and Das Gupta (1987). However, Pillai et al. (2003) found role of gender disparity in choice of health care provider instead of utilization of health care. Using NSS 52nd round data for rural India, Borah (2006) found that health care utilization is higher for productive members compared to non-productive members in rural India.

**2.B.ii. Choice of health care provider**

Based on field survey of health care providers in Madhya Pradesh, India, De Costa and Diwan (2007) found that presence of public health facility is very limited compared to its demand. Private health care providers reduce this demand-supply gap but mostly operate in urban areas. Gautham et al. (2014) confirmed the inadequacy of public health facilities in rural India. On the other hand, Seebarg et al. (2014) observed that due to absence of effective public health care in India, poor households are bound to visit available private health facility even without formal/proper training.

The choice of health care provider depends on socio-economic factors as well as quality of public facilities. Makinen et al. (2000) found that wealthier households are more likely to choose private care. Other than quality of public facility, distance of the facility has significant inverse impact on choice decision. However, Nandi et al. (2013) found that household's perception of quality of health care rather than actual infrastructure is significant determinant of health care choice decision. Andaleeb (2000) study of Bangladesh also confirms the effect of perception about quality of health care provider on choice decision.

Using NFHS3 individual level data, Dey and Mishra (2014) concluded that weaker section (including aged, female, poor and less educated individuals) of the society in India usually prefers public facility over private care. However, based on district level household survey data, Gupta et al. (2016) found that poor quality of service and lack of accessibility of public facility are the major factors for choice of private health care provider, even for low income people. Similarly, based on cross section survey data from rural North India, Rajpurohit et al. (2013) found that utilization of public health care depends on socio-demographic factors like literacy rate. Longer distance is the primary challenge against choice of public health facility. Using NSS 52nd round data for rural India, Borah (2006) also confirmed that price and distance are the two most important factors that influence choice of health care provider. However, based on data from urban slums of Ahmadabad, Cernauskas et al. (2018) found that distance of health care provider is important but supply side factors like attitude of medical staffs are more important to determine choice of health care provider. On the other hand, based on a study in Odisha, Rout (2015) found that socio-economic status, physical access as well as quality of care are important determinants of provider choice decision. It observed that socio-economically disadvantageous households or households with easy access to public facility usually opt for public facility unless dis-satisfied with quality. But, studies like Elo (1992); Sawhney (1993) found that geographic access is more important determinants of health care choice than socioeconomic factors. However, Sarma (2009) found that even if distance inversely affect demand for health care in India, access to transport significantly influence the above effect.

Analysing NSS 52nd round data, Sarma (2009) also found that price of health service, income of the households and health status are important determinants of health care choice in rural India. However, according to Sarma (2009), price and income are not significant determinants of health care utilization. On the other hand, studies like Akin et al. (1986), Elo (1992) found that price of service is neither significantly determine health care demand nor choice of providers.

Based on district level household survey data, Nandi et al. (2013) concluded that vulnerable and weaker section of the society (economically and socially backward class) prefer public health care compared to private care. Borah (2006) confirms this finding. On the other hand, wealthier households are more likely to choose private health care, especially in rural area. In India, wealthier households usually have access to health insurance and are less likely to consult public health care providers. Nandi et al. (2013) also found that age and educational qualification of household head have significant effect on choice of health care provider.

**2.B.iii. Disease specific:**

Analysing NFHS2 data for Uttar Pradesh, Ghosh (2004) found that media exposure, standard of living and educational qualification are primary determinants of choice of maternal health care. On the other hand, Kumar et al. (2014) found that distance is the most important determinant of institutional delivery in rural India. Similarly, Sawhney (1993) found that access is more important factor than socio-economic factors to determine maternal healthcare choice in rural India. However, Kesterton et al. (2010) found that distance is important factor but impact of wealth is strongest determinant of institutional delivery. Kesterton et al. (2010) also found that birth order, region and education are other important factors to decide institutional delivery. On the other hand, using NFHS2 data, Mishra and Ratherford (2008) found that distance is important but not very significant for institutional delivery. Pillai et al. (2003) found that for early childhood health issues (like diarrhea or respiratory infection), choice of health care utilization depends on economic status of the households other than disease severity.

Above literature review indicates that India specific studies are either region specific or disease specific. This study addresses this gap by analysing health care utilization at macro level (all India). As per our knowledge, Dey and Mishra (2014) is the only available all-India study but it does not consider the effect of health insurance. The present study not only considered the role of health insurance, this study has explored the role of disease specification on health care utilization and choice of health care provider. To our knowledge this aspect has not been addressed atleast in Indian context.

## 3. OBJECTIVE

Based on the above literature review and literature gap, objective of the study is to

a. Identify the determinants of health care provider choice and health care utilization and measure the relative importance of the factors
b. Explore the role of disease specification on choice of health care provider

## 4. DATA

The study has used National Family and Health Survey, 3rd round (NFHS 3) data. NFHS 3 provides household level as well as individual, men and women (including children) level data. To address role of disease specification, the study has used women (including children) level data, i.e., IAKR52FL.dta. Data is provided in many common data formats including STATA format. For the analysis, the study has used STATA 12 version. Mother-child file consists of 51555 children and their respective mother data.

## 5. METHODOLOGY

Given the available data, the study has addressed the above research objectives using logistic regression framework. Since, each choice decision (utilization of health care and choice of health care provider) can be represented as binary outcome, and there are number of factors which can influence such decision, the study has used multivariate logistic regression.

## 6. ANALYSIS

There are many disease specific studies on health care utilization and choice of health care provider. But, role of disease specification on health care utilization (including choice of health care provider) is not properly addressed at least in Indian context. However, disease specification can play significant role in health care utilization and/or choice of health care provider. Due to inherent nature, importance of regular sickness (for example, delivery in case of women and early childhood diseases like diarrhea, cough and cold or old age problems like cardio-vascular and orthopedic problems) may be different from morbidity or non-regular sickness. Thus, health care utilization and choice of provider may be different in those instances. Usually, no treatment or home treatment (including delivery at home) is quite common in case of regular sicknesses.

This study has explored this dynamics in Indian context. NFHS3 has explicitly provides information on health care utilization and choice of health care provider for children in case of few common child-specific sickness (including regular sickness). This study will address both health care utilization and choice of health care provider for children. By nature children are most vulnerable to any disease. But, few diseases like cough, cold, fever, diarrhea are so common and frequent that parents mostly consider these lightly and do not utilize health care for these regular sicknesses. 'No treatment' rate for these diseases is quite high (29% and 31% respectively for cough-cold-fever and diarrhea). But at the same time, negligence can turn out fatal in few cases. Number of deaths of children in India and world, due to diarrhea only is quite significant (ttt). Thus, it is important to identify the factors that influence the decision regarding health care utilization and choice of health care provider. This will enable the policy makers to address those issues more efficiently and ensure better health for the children.

### 6.1.A. Health care utilization: Cough cold and fever

Cough cold and fever is one of the very common illness among children under five years of age. In many instances of such illness, parents do not give much importance to it and either do not treat it or treat by means of home remedies. As per the sample, 29% cases of cough cold and fever of children under age of five remained untreated/home treated. The parents consulted health care providers for remaining children who suffer from cough cold fever. The following table show the logit regression result for utilization of health facilities in case of cough, cold and fever. Average marginal effects of each of the variables have been shown in annex table A1.

**Table 1: Utilization of health care in case of cough, cold and fever of children**

| | Utilization of health care (no treatment over treatment) |
|---|---|
| | -0.300*** |
| place of residence | (0.058) |
| Insurance | -0.320** |

| | |
|---|---|
| | (0.122) |
| social status | -0.0287 |
| | (0.016) |
| occupation of father | -0.118*** |
| | (0.028) |
| presence of anganwari | -0.121* |
| | (0.060) |
| age of mother | 0.0167*** |
| | (0.004) |
| age of family head | -0.00901*** |
| | (0.002) |
| gender of family head | -0.163* |
| | (0.076) |
| gender of the child | -0.211*** |
| | (0.045) |
| number of child in the family | 0.0424 |
| | (0.024) |
| wealth index*education of family head | -0.00833*** |
| | (0.002) |
| Constant | -0.142 |
| | (0.173) |
| Number of observations | 9527 |
| Aic | 11529.9 |
| log likelihood | -5753 |

Note: Figure in ( ) indicates standard error while *Significant at 1% level, **Significant at 5% level and ***Significant at 10% level

The analysis suggest that (as indicated in table 1) place of residence, insurance coverage, access to anganwari, occupation of father, gender of the child and household head, age of mother and household head as well as wealth and education of household head are important determinants of health care utilization for children suffering from cough cold and fever.

As indicated in table A1, the probability of 'no treatment' when the child is suffering from cough cold and fever is 27.2% when the child is from an urban family vis-a-vis the probability of 31.5% when the child belongs to a rural family. Thus, probability of 'no treatment' is 4.3% higher when the child belongs to a rural family. It reveals that health care utilization for cough cold fever of children is lower in rural area. Pillai et al. (2003) also found importance of place of residence in health care utilization. The possibility of 'no treatment' is 6.2% lower (than a child without health insurance coverage) when the child is covered by health insurance. Similarly, presence of anganwari reduces the possibility of 'no treatment' by 3.1%. It indicates that a child with access to anganwari or covered by health insurance is more likely to utilize health care facility in case of cough cold and fever. A child whose father has white colored job is 7% less likely to utilize health care compared to a child whose father is engaged in agriculture. Gender disparity in health care utilization (for cough cold and fever) is significantly present in India. A female child is 4.2% more likely to remain untreated compared to a male child from similar family background. This finding of gender disparity in health care utilization is in line with Ganatra and Hirve (1994) and Das Gupta (1987). On the other hand, a child from a male headed family is 2.9% more likely to remain untreated compared to a child from female headed family. For 10 years increase of mother's age, probability of 'no treatment' increases by 16.7% while probability decreases by 9% when there is 10 years increase in age of family head. Hjortsberg (2006) also observed important role of family head in health care utilization. Level of experience gathered with age might resulted in such difference. Finally, wealth of the family and education of family head are highly correlated but have significant inverse impact on health care utilization of a child suffering from cough cold and fever. Thus, to avoid multicollinearity, an interaction term of them was used in the analysis. Probability of 'no treatment' reduced by 17.9% for a child from a richest family and highly educated (20 years of schooling) family head compared to a child from a poorest family or/and family head without any education. Instead of education of family head, education of mother (having more than five years of education) or father can also play similar role in decision for health care utilization of child suffering from cough cold and fever.

**6.1.B. Choice of health care provider: Cough cold and fever**

In case of treatment for cough cold and fever of children, broadly the parents have option of public and private health care. As per the sample, public facility was chosen for 16% of the children who were treated for their cough cold fever and private facility was consulted for 84% of the children suffering from cough cold and fever. The following table shows the logit regression result for choice of health care provider in case of children suffering from cough cold and fever. Average marginal effect of each of the variables have been shown in annex table A2.

**Table 2: Choice of health care provider: Cough cold fever of children**

| | Choice of public health care over private |
|---|---|
| place of residence | -0.277*** |
| | (0.079) |
| Insurance | 0.208 |
| | (0.142) |
| social status | 0.0192 |
| | (0.022) |
| occupation of father | -0.066 |
| | (0.039) |
| presence of anganwari | 0.156 |
| | (0.085) |
| age of mother | -0.00425 |
| | (0.006) |
| age of family head | -0.00547** |
| | (0.002) |
| gender of family head | -0.0692 |
| | (0.102) |
| gender of the child | -0.0471 |
| | (0.063) |
| number of child in the family | -0.0769* |
| | (0.035) |
| wealth index*education of family head | -0.00730*** |
| | (0.002) |
| constant | -0.586* |
| | (0.239) |
| Number of observations | 6204 |
| Aic | 6380.1 |
| log likelihood | -3178.1 |

Note: Figure in ( ) indicates standard error while *Significant at 1% level, **Significant at 5% level and ***Significant at 10% level

When a child is suffering from cough cold and fever, and parents of the child decided to treat that sickness, broadly they can opt for public health care or private health care. This analysis (as indicated in table 2) suggests that place of residence, number of child in the family, age of mother, wealth if the family and education of household head have significant impact on choice of health care provider decision.

According to table A2, compared to an urban child, a rural child suffering from cough cold and fever is 2.9% more likely to visit a public provider. As number of children in the family increases, they are more like to opt for private provider. The probability of choosing public care (for treatment of cough cold and fever) is 20.2% when the child is only child in the family. the probability of choosing public provider declined by 3.9% when there is two other children in the family. Contagious nature of Cough cold fever may be reason behind it. this study did not find presence of gender disparity in choice of health care provider which was observed by Pillai et a. (2003). As age of mother increase, it is more likely that the child will be treated at private facility. For 10 years increase in age of mother, there will be 4.25% more probability to treat in private care. Finally, both wealth index of the family and education of family head significant inverse impact on choice of health care provider decision but are highly correlated. Thus, to avoid multicollinearity and without dropping one of them, an interaction term of these two were used in this analysis. The analysis indicates that a child from a richest family and highly educated (20 years of schooling) family head is less likely to visit a public care compared to a child from a poorest family and/or family head without any

education. However, education of mother (having more than five years of schooling) or father can play same role played by education of family head.

**6.2.A. Utilization of health care: diarrhea**

Diarrhea is also a common illness among children under five years of age, especially in the area where water supply is not sufficient. In many cases of diarrhea, parents considered it as usual and do not take much care. As per the sample 8.42% of the children were suffering from diarrhea during past two weeks of the survey. Out of those children, 69% were treated while remaining was not treated for diarrheal sickness. The following table shows the logit regression result for utilization of health facilities in case of children suffering from diarrhea. Average marginal effect of each of the variables have been shown in annex table A3.

**Table 3: Health care utilization for child suffering from diarrhea**

| | healthcare utilization (no treatment over treatment) |
|---|---|
| Place of residence | -0.0828 |
| | (0.086) |
| Insurance | -0.530* |
| | (0.211) |
| social status | -0.0728** |
| | (0.026) |
| occupation of father | 0.000143 |
| | (0.043) |
| presence of anganwari | 0.243** |
| | (0.090) |
| age of mother | 0.0166* |
| | (0.006) |
| age of family head | -0.0130*** |
| | (0.002) |
| gender of family head | -0.159 |
| | (0.115) |
| gender of child | -0.158* |
| | (0.069) |
| number of child in the family | 0.0164 |
| | (0.036) |
| wealth index*education of family head | -0.0130*** |
| | (0.003) |
| Constant | -0.179 |
| | (0.258) |
| Number of observations | 3917 |
| AIC | 4889.2 |
| Log likelihood | -2432.6 |

Note: Figure in ( ) indicates standard error while *Significant at 1% level, **Significant at 5% level and ***Significant at 10% level

This analysis reveals that (as indicated in table 3), insurance coverage, social status, presence of anganwari, gender of the child, age of mother and family head, wealthieness of the family and education of family head are important determinants of health care utilization for children suffering from diarrhea. The following paragraph will measure (as indicated in annex. table A3) the relative importance of those factors. This study does not find significant role of place of residence in health care utilization when a child is suffering from diarrhea. But studies like Pillai et al. (2003) observed important role of place of residence in health care utilization in Kerala. If the child is not covered by health insurance, it is 9.9% more likely (compared to a child with insurance coverage) that he/she will not get any treatment for diarrhea. This indicates that insurance coverage will ensure treatment or better utilization of health care. Compared to a child from a hindu upper caste family, a child from muslim or hindu SC/ST family is more like to receive treatment for diarrhea. This sounds little odd but probably social insecurity or risk averseness among socially disadvantage class can explain it. Presence of anganwari (proxy for access to public care in survey area) does not ensure better utilization of health care. Insufficient infrastructure in anganwari centre or social mindset may explain it. On

the other hand, gender discrimination is present in health care utilization for diarrhea. A female child is 2.8% more likely to remain untreated compared to a male child. This finding of gender disparity in health care utilization is in line with Ganatra and Hirve (1994) and Das Gupta (1987).

This study found that increase in age of mother increases (by 1.7% for one year increase of mother's age) the probability of no treatment while increase in age of family head reduces (by 1.3% for one year increase in age of family head) the probability of non utilization of health care. Hjortsberg (2006) also observed important role of family head in health care utilization. Finally, wealth of the family as well as education of the family head are important determinants of health care utilization but both are highly correlated. Thus to avoid multicollinearity, an interaction term of wealth and education of family head was included. the interaction term has significant inverse impact on health care utilization. In an extreme scenario, a child from richest family with highly educated (18 years of schooling) family head has only 14.4% probability of non-utilization of health care while the probability is 37.4% when the child belongs to a poorest family and/or from a family where head has no education. Education of mother or father also plays similar role that of family head, but in case of mother, she must have at least five years of schooling.

**6.2.B. Choice of health care provider: diarrhea**

The parents who decided to treat their children (suffering from diarrhea); have broad choice of public and private facilities. As per the sample, public facility was opted for 19% of the children treated for diarrhea and private care was opted by 81% of such children. Remaining children were treated elsewhere (including home treatment). The following table shows the logit regression result for choice of health care provider in case of children suffering from diarrhea. Average marginal effect of each of the variables has been shown in annex table A4.

**Table 4: Choice health care provider: Diarrhea of children**

| | choice of public health care over private |
|---|---|
| place of residence | -0.499*** |
| | (0.123) |
| Insurance | 0.338 |
| | (0.227) |
| social status | 0.00542 |
| | (0.035) |
| occupation of father | -0.00879 |
| | (0.060) |
| presence of anganwari | -0.209 |
| | (0.125) |
| age of mother | -0.00771 |
| | (0.009) |
| age of family head | -0.00680* |
| | (0.003) |
| gender of family head | -0.12 |
| | (0.158) |
| gender of the child | 0.084 |
| | (0.098) |
| number of child in the family | -0.161** |
| | (0.053) |
| wealth index*education of family head | -0.0122*** |
| | (0.004) |
| Constant | 0.227 |
| | (0.366) |
| Number of observations | 2411 |
| Aic | 2621.9 |
| log likelihood | -1299 |

Note: Figure in ( ) indicates standard error while *Significant at 1% level, **Significant at 5% level and ***Significant at 10% level

The analysis suggests that (as indicated in table 4) place of residence, number of child in the family, age of family head, wealth index of the family and education of family head have significant impact on choice of health care provider for a child suffering from diarrhea. the following paragraph will measure (as indicated in annex. Table A4 ) the relative importance of these factors.

A rural child is more likely to utilize public heath care for diarrheal treatment while an urban child is more likely to utilize private care. Compared to an urban child, a rural child has 8.2% higher probability of using public care for treatment of diarrhea. On the other hand, if there are other children present in the family, it is more likely that the diarrhea affected child will be treated in private care. Contagious nature of diarrhea can explain this observation. As per the analysis, the probability of choosing public facility is 24.5% when the child is the single child in the family. The probability of choosing public care declined by 3.4% when there is two other children in the family. However, this study did not find gender disparity in choice of health care provider, which was observed by Pillai et al. (2003). As age of family head increases, the child is more likely to treat in private care. For 10 years increase in age of family head, probability of visiting public care decreases by 6.8%. Finally, wealth index of the family and education of family head both are important determinants of choice of heath care provider, increase in either of them will reduce the probability of choosing public care. However, both are strongly correlated and hence to avoid multicollinearity, an interaction term was used in the analysis. The interaction term has inverse significant impact on choice of public health facility. In an extreme scenario, a child from richest family and highly educated family head (17 years of education) has 11.3% lower probability of choosing public care compared to a child from a poorest family and/or with family head having no education. Education of mother (having more than five years of schooling) or father can also play the same role as played by education of family head.

### 6.3. Role of disease specification

This sub-section explores how nature of sickness influences health care utilization and/or choice of health care provider decision. The relative importance of other determining factors changes when it is regular illness like cough cold fever or diarrhea of child vis-a-vis unspecified sickness of children, which includes any type of morbidity related issues.

### 6.3.A. Disease specification in health care utilization:

Other factors remain same, parents may take different health care utilization choice depending on nature of illness. The following table shows comparative results in terms of factors influencing health care utilization decision:

**Table 5: Role of disease specification (for child) in health care utilization decision**

| | Cough Cold Fever | Diarrhea |
|---|---|---|
| place of residence | -0.300*** | -0.0828 |
| | (0.0580) | (0.0860) |
| Insurance | -0.320** | -0.530* |
| | (0.1220) | (0.2110) |
| social status | -0.0287 | -0.0728** |
| | (0.0160) | (0.0260) |
| occupation of father | -0.118*** | 0.000143 |
| | (0.0280) | (0.0430) |
| presence of anganwari | -0.121* | 0.243** |
| | (0.0600) | (0.0900) |
| age of mother | 0.0167*** | 0.0166* |
| | (0.0040) | (0.0060) |
| age of family head | -0.00901*** | -0.0130*** |
| | (0.0020) | (0.0020) |

| | | |
|---|---|---|
| gender of family head | -0.163* | -0.159 |
| | (0.0760) | (0.1150) |
| gender of the child | -0.211*** | -0.158* |
| | (0.0450) | (0.0690) |
| number of child in the family | 0.0424 | 0.0164 |
| | (0.0240) | (0.0360) |
| wealth index*education of family head | -0.00833*** | -0.0130*** |
| | (0.0020) | (0.0030) |
| Constant | -0.142 | -0.179 |
| | (0.1730) | (0.2580) |
| Number of observations | 9527 | 3917 |
| Aic | 11529.9 | 4889.2 |
| log likelihood | -5753 | -2432.6 |

Note: Figure in ( ) indicates standard error while *Significant at 1% level, **Significant at 5% level and ***Significant at 10% level
The above table 5 indicates that if the child is suffering from cough cold fever, place of residence, occupation of father and gender of family head play significant role in determining healthcare utilization decision. However, these factors do not have significant impact, if the child is suffering from diarrhea. On the other hand, social status plays important role in choice of health care utilization decision, if the child is suffering from diarrhea. But, social status does not have significant influence if the child is suffering from cough cold and fever. Moreover, level of significance (indicated by number of stars in the table) of many factors such as gender of child, age of mother also change based on disease specification. Thus, in brief the table 15 reveals that based on nature of illness, decision to treat (i.e., health care utilization) varies even for same child, when other factors remain same.

**6.3.B. Disease specification in Choice of health care provider:**
Similar to health care utilization decision, nature of illness can also influence choice of health care provider. The following table shows the comparative result in terms of factors influencing choice of health care provider decision.

**Table 6: Role of disease specification (for child) in choice of health care provider**

| | Choice of public health care over private (cough cold fever) | Choice of public health care over private for treatment of sickness | Choice of public health care over private (diarrhea) |
|---|---|---|---|
| place of residence | -0.277*** | -0.403*** | -0.499*** |
| | (0.079) | (0.025) | (0.123) |
| Insurance | 0.208 | 0.0475 | 0.338 |
| | (0.142) | (0.050) | (0.227) |
| social status | 0.0192 | 0.0354*** | 0.00542 |
| | (0.022) | (0.007) | (0.035) |
| occupation of father | -0.066 | -0.0208 | -0.00879 |
| | (0.039) | (0.012) | (0.060) |
| presence of anganwari | 0.156 | 0.0328 | -0.209 |
| | (0.085) | (0.025) | (0.125) |
| age of mother | -0.00425 | 0.0135*** | -0.00771 |

| | | | |
|---|---|---|---|
| | (0.006) | (0.002) | (0.009) |
| age of family head | -0.00547** | -0.00149* | -0.00680* |
| | (0.002) | (0.001) | (0.003) |
| gender of family head | -0.0692 | -0.0256 | -0.12 |
| | (0.102) | (0.033) | (0.158) |
| gender of the child | -0.0471 | -0.0461* | 0.084 |
| | (0.063) | (0.019) | (0.098) |
| number of child in the family | -0.0769* | -0.118*** | -0.161** |
| | (0.035) | (0.011) | (0.053) |
| wealth index*education of family head | -0.00730*** | -0.00587*** | -0.0122*** |
| | (0.002) | (0.001) | (0.004) |
| Constant | -0.586* | -0.265*** | 0.227 |
| | (0.239) | (0.074) | (0.366) |
| Number of observations | 6204 | 45246 | 2411 |
| Aic | 6380.1 | 60063.7 | 2621.9 |
| log likelihood | -3178.1 | -30019.8 | -1299 |

Note: Figure in ( ) indicates standard error while *Significant at 1% level, **Significant at 5% level and ***Significant at 10% level

Children (under five years) are most vulnerable to any disease, but few diseases are very common among children. Sample indicates that out of the children suffering from cough cold fever, diarrhea and non-specified sickness, 14%, 15% and 37% were treated in public facility. Thus, same child may be treated in public facility for cough cold fever/diarrhea while consulted private facility for non-specified sickness and/or vice-versa. This indicates that, other than household and socio-economic characteristics, disease specification is also important for choice of health care provider. The analysis based on table 6 reveals that social status, gender of the child and age of mother have significant impact on choice of health care provider only for non-specified sickness, but neither on cough cold fever nor on diarrhea related sickness. On the other hand, male child are more likely to be treated in private care for non-specified (significant impact) as well as cough cold fever related sickness (not statistically significant impact), but for diarrheal sickness, parents of male child preferred (not statistically significant) public care over private care. However, presence of anganwari in survey area motivate parents to opt for private care (not statistically significant impact) only when child is suffering from diarrhea, for other types of sickness, parents prefer public care if anganwari centre is present at survey site. Thus, this analysis indicates that impact of other important factors on choice of health provider vary due to variation in nature of sickness and confirms the role of disease specification on health provider choice decision.

## 7. CONCLUSION

This study finds that, disease specification plays important role in health care utilization decision as well as choice of health care provider, when analysis was specifically conducted for children members of the family. Not only healthcare utilization decision and/or choice of health care provider varies across diseases, but disease specification can even influence the effect of other important factors.

This study has identified the factors influencing utilization as well as choice of health care service for children and measured the relative importance of such factors. The factors which determine utilization and choice of health care service are mostly in line with existing literature. For example, gender disparity (bias against female child) is significantly present in India when it comes to health care utilization for treatment of child sickness. Patriarchal mindset of Indian families is responsible for this behaviour. Another important finding of this study is significant inverse impact of interaction variable between wealth index of the family and education of the household head. Both of wealthieness of the family and education of woman/mother/father/family head are highly correlated and inversely influence health care utilization as well as choice of health care provider. This finding indicates that policy for providing health services need to consider both income as well as education aspect of the households. Mere provision of subsidized public health care without addressing those issues will not be fruitful to ensure utilization of health care for each and every citizens. For proper utilization of health facilities and effective utilization of public health care, income and education of household members need to improve as a bundle of inputs (along with addressing other factors mentioned in the study). To overcome this challenge, along with provision of health care facility, simultaneous supplementary policy is required to enhance both livelihood/income opportunity of the households and education of the citizens.

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## 9. DATA APPENDIX

**Variable description:**

***Dependent:***

- choice of public facility to treat sickness of children over private facility = 1 if public facility was chosen for treatment of sickness of a child
  = 0 if private facility was chosen, missing otherwise
- choice of no testament for sickness of children over treatment = 1 if treatment was chosen for sickness of a child
  = 0 if treatment was chosen, missing otherwise

where, Public facility includes

- ✓ Govt./municipal hospital
- ✓ Govt. Dispensary
- ✓ UHC/UHP/UFWC
- ✓ CHC/rural hospital/PHC
- ✓ Sub-centre
- ✓ Anganwadi/ICDS centre
- ✓ Govt. Mobile clinic
- ✓ Other public sector health facility

Private facility includes

- ✓ Pvt. Hospital
- ✓ Pvt. Doctor/clinic
- ✓ Pvt. Paramedic
- ✓ Vaidya/hakim/homeopath
- ✓ Traditional healer
- ✓ Pharmacy/drugstore
- ✓ Dai (tba)

Other private sector health facility

***Independent:***

- Social status (based on sh44 and sh46) = 0 if (Hindu + Jain) upper caste
  = 1 if (Hindu + Jain) OBC
  = 2 if Christen + Sikh
  = 3 if Hindu (SC+ST) + Buddhist +no religion + other
  = 4 if Muslim
- wealth index of family (V190) = 0 if poorest
  = 1 if poorer
  = 2 if middle
  = 3 if richer
  = 4 if richest
- gender of child (B4) = 1 if child is male, 0 otherwise
- place of residence (v102) = 1 if area is urban, 0 if rural
- occupation of husband/father = 0 if occupation of husband/father is agriculture
  = 1 if blue color job
  = 2 if pink color job
  = 3 if white color job, missing otherwise
- gender of family head = 1 if male, 0 if female
- age of family head = age (in years) of household head
- education of family head = years of education for household head
- age of mother/woman = age (in years) of mother/woman
- presence of anganwari = 1 if the household member has access to anganwari centre, 0 otherwise
- insurance= 1 if the household /household member has access to any kind of health insurance, 0 otherwise
- number of child = number of child in the family

## 10. ANNEXURE:

**Table A1: Utilization of health care (no treatment over treatment): cough cold and fever of children**

| | Marginal effect | Std.Err. |
|---|---|---|
| place of residence | | |
| Rural | 0.315 | 0.007 |
| Urban | 0.272 | 0.009 |
| Insure | | |
| Insured | 0.301 | 0.005 |
| not insured | 0.239 | 0.022 |
| social status | | |
| Hindu upper caste | 0.292 | 0.012 |
| Hindu OBC | 0.275 | 0.009 |
| Sikh+Christian | 0.445 | 0.016 |
| Hindu SC+ST | 0.331 | 0.010 |
| Muslim | 0.229 | 0.010 |
| Occupation | | |
| Agriculture | 0.339 | 0.010 |
| blue color job | 0.286 | 0.007 |
| Pink color job | 0.288 | 0.011 |
| White color job | 0.269 | 0.016 |
| presence of anganwari | | |
| Anganwari | 0.322 | 0.011 |
| No anganwari | 0.291 | 0.006 |
| gender of family head | | |
| Male | 0.301 | 0.005 |
| female | 0.272 | 0.015 |
| gender of child | | |
| female | 0.321 | 0.007 |
| Male | 0.279 | 0.006 |
| number of child in the family | | |
| one child | 0.284 | 0.007 |
| two children | 0.302 | 0.008 |
| Three children | 0.327 | 0.013 |
| wealth index*education of family head | | |
| Poorest and/or household head with no education | 0.333 | 0.009 |
| richest and household head has 20 years of schooling | 0.154 | 0.140 |

**Table A2: Choice of public health care over private (cough cold fever)**

| | Marginal effect | Std.Err. |
|---|---|---|
| place of residence | | |
| Rural | 0.215 | 0.008 |
| Urban | 0.186 | 0.009 |
| Insure | | |
| Insured | 0.200 | 0.006 |
| not insured | 0.243 | 0.026 |
| social status | | |
| Hindu upper caste | 0.202 | 0.012 |
| Hindu OBC | 0.171 | 0.009 |
| Sikh+Christian | 0.308 | 0.021 |
| Hindu SC+ST | 0.223 | 0.011 |
| Muslim | 0.189 | 0.011 |

| | | |
|---|---|---|
| Occupation | | |
| Agriculture | 0.235 | 0.012 |
| blue color job | 0.199 | 0.008 |
| Pink color job | 0.160 | 0.011 |
| White color job | 0.242 | 0.018 |
| presence of anganwari | | |
| anganwari | 0.187 | 0.011 |
| No anganwari | 0.208 | 0.007 |
| gender of family head | | |
| Male | 0.202 | 0.006 |
| female | 0.202 | 0.016 |
| gender of child | | |
| female | 0.206 | 0.008 |
| Male | 0.200 | 0.007 |
| number of child in the family | | |
| one child | 0.202 | 0.008 |
| two children | 0.223 | 0.009 |
| Three children | 0.163 | 0.013 |
| wealth index*education of family head | | |
| Poorest and/or household head with no education | 0.204 | 0.009 |
| richest and household head has 20 years of schooling | 0.419 | 0.190 |

**Table A3: healthcare utilization (no treatment over treatment) (Diarrhea)**

| | Marginal effect | Std.Err. |
|---|---|---|
| place of residence | | |
| Rural | 0.323 | 0.011 |
| Urban | 0.324 | 0.015 |
| Insure | | |
| Insured | 0.328 | 0.008 |
| not insured | 0.229 | 0.037 |
| social status | | |
| Hindu upper caste | 0.331 | 0.019 |
| Hindu OBC | 0.320 | 0.015 |
| Sikh+Christian | 0.498 | 0.026 |
| Hindu SC+ST | 0.305 | 0.015 |
| Muslim | 0.256 | 0.017 |
| Occupation | | |
| Agriculture | 0.340 | 0.017 |
| blue color job | 0.306 | 0.012 |
| Pink color job | 0.328 | 0.018 |
| White color job | 0.351 | 0.027 |
| presence of anganwari | | |
| anganwari | 0.287 | 0.016 |
| No anganwari | 0.336 | 0.009 |
| gender of family head | | |
| Male | 0.328 | 0.008 |
| female | 0.291 | 0.023 |
| gender of child | | |
| female | 0.339 | 0.012 |
| Male | 0.311 | 0.010 |
| number of child in thw family | | |

| | | |
|---|---|---|
| one child | 0.314 | 0.013 |
| two children | 0.322 | 0.012 |
| Three children | 0.365 | 0.021 |
| wealth index*education of family head | | |
| Poorest and/or household head with no education | 0.374 | 0.013 |
| richest and household head has 18 years of schooling | 0.144 | 0.100 |

**Table A4: choice of public health care over private (Diarrhea)**

| | Marginal effect | Std.Err. |
|---|---|---|
| place of residence | | |
| Rural | 0.266 | 0.014 |
| Urban | 0.184 | 0.014 |
| Insurance | | |
| Insured | 0.226 | 0.009 |
| not insured | 0.307 | 0.049 |
| social status | | |
| Hindu upper caste | 0.253 | 0.022 |
| Hindu OBC | 0.182 | 0.016 |
| Sikh+Christian | 0.364 | 0.037 |
| Hindu SC+ST | 0.247 | 0.018 |
| Muslim | 0.211 | 0.019 |
| Occupation | | |
| Agriculture | 0.234 | 0.019 |
| blue color job | 0.229 | 0.014 |
| Pink color job | 0.209 | 0.020 |
| White color job | 0.267 | 0.032 |
| presence of anganwari | | |
| anganwari | 0.264 | 0.020 |
| No anganwari | 0.218 | 0.011 |
| gender of family head | | |
| Male | 0.232 | 0.010 |
| female | 0.216 | 0.026 |
| gender of child | | |
| female | 0.219 | 0.013 |
| Male | 0.239 | 0.012 |
| number of child in the family | | |
| one child | 0.245 | 0.015 |
| two children | 0.237 | 0.014 |
| Three children | 0.211 | 0.023 |
| wealth index*education of family head | | |
| Poorest and/or household head with no education | 0.240 | 0.015 |
| richest and household head has 19 years of schooling | 0.428 | 0.348 |