***Childhood diarrhea and Health seeking behavior in India: An Application of Morkov-Chain Statistical model in Child health and Survival research***

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***Importance of problem***

Every year around 12 million children in developing countries die before they reach their fifth birthday and a substantial proportion of them during the first year of their life. Seven in ten of these deaths are due to malaria, acute respiratory infection (mostly pneumonia), diarrhea, measles and malnutrition or a combination of these conditions (Gupta et al, 2007). Infectious disease like diarrhea continues to be the major scourge in childhood. Globally acute diarrheal disease constitutes 17% of mortality under age five as it is one of the most common causes of morbidity and mortality in children all over the world especially in developing countries. The median global incidence of diarrhea was 5.0 and 2.6 episodes per child per year in infants (6-11 months) and for all children between 1-4 years respectively (WHO 2004a). Therefore, United Nations' Millennium Development goals (MDGs) is committed to the two-third reduction of childhood mortality by 2015 from 1990 levels (WHO, 2004 b). In India there has been an improvement in the situation from 6 diarrheal episodes per child per year in infants in 1984-85 to 2-3 episodes per child per year a decade later. In 1980, it was estimated that 4.6 million children under age 5 die annually due to diarrhea. Ten years later, the annual number of deaths attributable to diarrhea was estimated to be 3.3 million, which was further reduced in 2000 with an estimate of 1.6- 2.5 million (Kosek M, 2003).

It is worth mentioning that social and economic development in India has led to substantial improvement in living conditions and in child survival in the last two decades. However, these gains have been unevenly distributed as several regions in the country continue to experience relatively high child mortality rates despite significant decline in the overall child mortality in the country. The primary causes of persisting high mortality are infectious diseases, especially those diseases for which effective immunization is not widely available such as diarrhea. As evident from the developed countries, effective interventions, including correct management (ORT, continued feeding and antibiotic in case of dysentery), promotion of exclusive breast-feeding, better weaning practices, improvement in socioeconomic and literacy status have the potential of reducing the diarrheal diseases. Though simple and effective treatment measures are available which can markedly reduce diarrhea associated morbidity and mortality, yet in India due to poor diarrheal and Oral Rehydration Solution (ORS) related knowledge in the community, diarrhea remains to be the major public health concern.

In fact, these deaths can be averted by providing appropriate or timely treatment, either at home or from a health care provider. Family members and mother in particular, are generally the key actors in determining how childhood illnesses are treated. They decide what type of remedies and care a child receive at home; weather the child sees health care provider, what type of provider and whether to follow the provider’s advice or to change the place of treatment. Effective early management at home level and treatment seeking behavior in case of appearance of danger sign are key strategies in diarrheal diseases where majority of episodes are self-limiting and bacterial in origin. Integrated management of childhood illnesses (IMNIC) also envisages that family and community health practices especially in case of treatment seeking is to be removed to reduce childhood morbidity, mortality and cost of admission to hospitals. Therefore ‘treatment choice’ and the ‘place of treatment’ are key to reduction in morbidity and mortality from diarrheal disease.

Considering the importance of the problem the Diarrheal Disease Control Program (DDC) in India was launched in 1978, which was further expanded as National Oral Rehydration Therapy (ORT) Program in 1985-86, Subsequently, it became the part of Child Survival And Safe Motherhood Program in 1992-93 and Reproductive and Child Health (RCH) Program in 1997 and WHO proposed Integrated Management of Neonatal and Childhood Illness (IMNCI) in 2005 in RCH-2. Through these Programs the under five mortality in India has declined from 173 in 1980 to 69 in 2008 (SRS, 2009). Consequently, the IMNCI component of RCH-2 has addressed the disease in major way. IMNCI has concentrated on health care practices and treatment seeking as their prime strategies in order to provide effective treatment during the diarrheal episodes.

Social and medical scientists have clearly established the importance of treatment seeking behavior and association between the various characteristics of socio-economic factors and prevalence of illness in a population and within its different groups. These factors however, not only affect the occurrence of illness, but they also play a vital role in determining its pattern of treatment. This paper analyses the relationship between child illness and treatment seeking behavior using the application of ‘**Morkov-chain** **model’** with focus at the probabilities of transition from one health facility to other by condensing the reported place of treatment in five categories. In view of treatment seeking behavior among the children suffering from diarrheal episodes, any public or private health care facility, doctor, community health worker are considered as appropriate sources of advice or treatment , whereas, pharmacies, shops and traditional practitioners are considered to be an inappropriate source (DHS, 2004).

***Objectives***

In view of the above importance of addressing diarrheal problems and treatment seeking behaviour for strengthening the child survival programme in the country, this paper aims to analyze the prevalence of diarrhea among under five children in India and their treatment seeking behaviour. The specific objectives of the paper are,

1. To analyze the prevalence of diarrhea and the child feeding practices during the most recent episode of diarrhea.
2. To examine the treatment seeking behavior in case of diarrhea and estimating the probability of transition from one health facility to other using Markov-chain model

***Data and Methodology***

The basic data used in this paper has been taken from 2005-06 National Family Health Survey (NFHS-3). The information about morbidity among children was obtained from mothers of children under age five years. In NFHS-3, mothers were asked a number of questions on child feeding practices in addition

to their morbidity and treatment seeking. Some of these questions are: whether the child had diarrhea in the last two weeks? If the child suffered from the disease, mother was further asked about various symptoms and fluid or food offered to the child during diarrhea episode. Mothers were also asked about their use of oral rehydration salts (ORS) and local recommended home fluid (RHF) for rehydration during the diarrheal treatment either of which is an appropriate treatment. In addition, they were asked whether anything else was given to the child as a treatment. These responses which most frequently included pills or syrups injections, intravenous fluids, home remedies and herbal medicines are generally considered to be an inappropriate treatment by WHO. Eligible mothers were asked whether they have sought advice or treatment for diarrhea and, if so, then where they had treatment. Thus, the paper uses information about a total of 56438 children and 4755 among them reported to suffer with diarrheal episodes in the reference period . Bivariate techniques have been used to analyze the prevalence of diarrhea and child feeding practices, while multinomial logistic regression has been used to examine the preferred source of treatment in case of diarrhea. Further, among those who reported to visit more than one health facility for treatment, the probability of transition from one source of treatment to other has been computed using Markov chain model. For completeness a brief description of the transition probability using Markov-chain model has been discussed in this section.

***Transition probability***

One of the priority issues in child hood morbidities has been the treatment seeking behavior, especially changing preferences in source of treatment seeking once a child is not getting cured soon. Therefore, this study has used Morkov-chain model to study the transition probabilities from one health facility to other by condensing the reported places of treatment in the following five groups:

1. Government health facility
2. Private health facilities
3. N GO/ Trust hospitals
4. Traditional Practitioners
5. Others/Home- made treatments

To have significant number of observation, place of first visit is also grouped into five categories same as above. Once the place for treatment seeking is obtained the estimation of transition probabilities are derived using the Markov-chain model.

***Estimates of transition probabilities for change in place of treatment***

Let **p10 p20 p30….. pk0** are the probabilities that a child was treated in places **O1, O2, …..Ok** initially (place of first treatment). Suppose **pij** be transition probability that child initially treated in the place **i** moves to place **j** after certain duration of time, where **i** and **j** vary over to **1, 2, 3….k** (in the present case **i** and **j** vary from 1 to 5). As per the properties of transition probabilities,

**Pij >=0** and =1.

It is worth mentioning here that the probability of moving from **ith**place of treatment to the **jth** place does not depend upon how it reaches to the **jth**place. Under such condition, if the probability of **p**io and **p**ij are known, one step current probabilities **p1c, p2c .….pkc** of a child being finally treated at **O1, O2, …Ok** can be obtained using the formula:

**pjc**= for j=1,2,3…k

Where **Pio=nij/n** and **Pij =nij /ni**

**nio =** and **n**ij that is the number of children suffering sample initially in the place of first treatment **Oi** which move further to **Oj** currently for one step for **ij = 1, 2, 3, ….k**. the **Pjc**is given by:

**Pjc**= for j= 1, 2, 3…k

The estimates of transition probabilities are given in result and discussions.

***Results and Discussion***

Diarrhea is a frequent complication of other infectious illness, including measles. Including measles. A byproduct of measles vaccination, which is recommended in most cases to be administered to infants at nine month of age, is a potential reduction in diarrheal incidence and related morbidity. Age is found to be strongly associated with diarrheal infection. Newborn infant’s benefits from maternal antibodies acquired in-utero and through breast milk. By age 6-9 months, when complementary foods are recommended to be introduced, passively acquire immunity diminishes greatly. As the child ages, his/her own age matures and he/she is increasingly less vulnerable to common infectious agent causing diarrhea. This section aims to analyze prevalence of Diarrhea by different socio-economic, demographic and environmental factors. The issues emerged from this analysis may have a larger potential to enable us to make better assessment and care and consequently will enhance our understanding for the programmatic response.

Empirical studies of diarrhea among children have often found that diarrhea was more strongly correlated with age of child, education of mother and place of residence. Residence is multidimensional factor with respect to disease risk. In **table-1** Variation in prevalence of Diarrhea is shown by different background characteristics. Age of the child is an important indicator to show the variation in prevalence of Diarrhea. In the age group of child less than one year, the immunity system is low but at the child age increases his or her immune system matures and he/ she is increasingly less vulnerable to common infectious agents.

Table shows that the prevalence of Diarrhea is found to be more (14.4percent) among the child in below 1 year age group than 1-5 year age group (7.7 percent). The prevalence of diarrhea is significantly higher among male child (9.5 percent), number of surviving children four and above (9.4 percent), with little education of mothers (9.5 percent), other backward classes (9.5 percent) and child belongs to low standard of living (9.2 percent) than their counterparts. The table represents that the marginal difference in Diarrhea prevalence in rural and urban areas. In urban areas the prevalence rate is 8.9 percent whereas in rural areas it is 9 percent. The prevalence rate is higher among Muslims (10 percent) than Hindu (8.7 percent) and other religion (9.6 percent).

**Table-1: Variation in prevalence of Diarrhea by different background characteristics**

|  |  |  |  |
| --- | --- | --- | --- |
| **Risk factor** | **Total number of cases** | **Prevalence of Diarrhea** | **%** |
| **Age of the child** |  |  |  |
| < 1 year | 10401 | 1498 | 14.4 |
| 1-5 year | 42445 | 3257 | 7.7 |
| **Sex of child** |  |  |  |
| Male | 27617 | 2630 | 9.5 |
| Female | 25227 | 2125 | 8.4 |
| **No of surviving children<5** |  |  |  |
| 1 | 17687 | 1640 | 9.3 |
| 2 | 21240 | 1836 | 8.6 |
| 3 | 8073 | 728 | 9 |
| 4 and above | 2785 | 236 | 9.4 |
| **Place of residence** |  |  |  |
| Urban | 13660 | 1215 | 8.9 |
| Rural | 39186 | 3540 | 9 |
| **PSU Altitude in Meter** |  |  |  |
| <1000 | 47843 | 4054 | 8.5 |
| >=1000 | 3712 | 368 | 10.4 |
| **Mothers education** |  |  |  |
| No education | 25925 | 2246 | 8.7 |
| Primary | 7396 | 706 | 9.5 |
| Secondary and above | 19496 | 1803 | 9.2 |
| **Religion** |  |  |  |
| Hindu | 41265 | 3080 | 8.7 |
| Muslim | 9081 | 909 | 10 |
| Others | 2452 | 235 | 9.6 |
| **Type of house** |  |  |  |
| Kuccha | 7736 | 709 | 9.2 |
| Semi pucca | 22250 | 1987 | 8.9 |
| pucca | 18086 | 1582 | 8.7 |
| **SLI** |  |  |  |
| low | 15593 | 1429 | 9.2 |
| Medium | 16557 | 1470 | 8.9 |
| high | 15271 | 1332 | 8.7 |
| **Vaccination coverage** |  |  |  |
| No immunization | 4549 | 401 | 8.8 |
| Partial immunization | 32386 | 2836 | 8.8 |
| Full Immunization | 19503 | 1518 | 7.8 |
| **Household density** |  |  |  |
| 2 | 21375 | 1080 | 5.1 |
| 3-4 | 23966 | 1334 | 5.6 |
| 5+ | 11097 | 644 | 5.8 |
| **Type of toilet facility** |  |  |  |
| No facility | 30688 | 2813 | 9.2 |
| Pit toilet | 2921 | 279 | 9.6 |
| Flush toilet | 14642 | 1211 | 8.3 |
| **Ways of disposal of stool of child** |  |  |  |
| Always use toilet | 5164 | 367 | 7.1 |
| Risen in toilet | 4437 | 395 | 8.9 |
| Risen into drain/ditch | 4392 | 472 | 10.9 |
| Throw into garbage | 15627 | 1564 | 10 |
| Not disposed | 22840 | 1931 | 8.9 |
| **Total** | **52845** | **4755** | **9** |

The prevalence of Diarrhea is varies by immunization coverage. As mentioned above diarrhea is a frequent complication of other infectious illnesses so the children who are fully immunized (7.8 percent) are less affected by diarrhea than those children who were are not immunized (8.8 percent). To measure variation in prevalence of Diarrhea altitude shows a vital effect. With increasing altitudes the prevalence of Diarrhea is increasing from 8.5 percent in less than 1000 meter to 10.4 percent above 1000 m. Thus the results of the analysis clearly depict that prevalence of diarrhea increases with increase in altitude. Household density depicts the variation, if the household density is 5 and above the prevalence of Diarrhea is higher (5.8 percent). Those household uses modern flush toilet, the prevalence rate is much lower than those who have no toilet facility. Ways of disposal of stool of child has an effect on Diarrhea prevalence. Those who use always toilet the prevalence of Diarrhea is lower than others those who are not using toilet for disposal of stool of child.

***Feeding Practices during Diarrhea***

The diarrheal disease control program was started in 1978 with objective of reducing mortality and morbidity due to diarrheal disease. Since 1985-86, with the inception of National Oral Rehydration Therapy Program, the focus of activities have been strengthening case management of diarrhea for children under the age of five years and improving the maternal knowledge related to use of home available fluids, use of ORS and continued feeding. From 1992-93, the program has been a part of child survival and safe motherhood program and all activities are integrated with those of CSSM program. There have been constant efforts over the years to enhance maternal knowledge related to use of home available fluids, use of ORS and continued feeding in case of diarrhea and the same has also been integrated with the CSSM program. It is against this backdrop, this section aims to study child feeding practices and treatment seeking behavior in case of diarrhea.

Dehydration due to diarrhea is a major cause of morbidity and mortality among Indian children. If dehydration is prevented, most deaths can be averted. The diarrheal disease control program in the country has promoted the use and awareness of Oral Rehydration Therapy (ORT) during dehydration, yet the prompt use of Oral Rehydration Salt (ORS) which is an effective and quick remedy for diarrhea is still lacking **Table-2** shows Percentage of children less than five years of age who received ORS during diarrheal episode according to selected background characteristic. Percent of children who received ORS during diarrheal episode reveals that the overall prevalence of ORS among children suffering with diarrhea in the last two weeks prior to the survey is 26 percent, though it has not been uniform across different socio-economic characteristics. There is a positive association between mother’s education and administration of ORS among children below age five. However, there are no sex differentials in administering ORS in case of children suffering with diarrhea. There has been drastically low use of ORS among children below age one year (19 percent) as against those suffering with diarrhea among age1-5 years (30 percent). A relative larger proportion of children from high standard of living are given ORS (36 percent) than among those coming from low and medium standard of living. On the other hand, first birth order children are more likely to receive more ORS (30 percent) than those having birth order 2-3 or four and above.While analyzing theby amount of fluid given according to selected background characteristic. In the time of diarrhea more fluids are given to the children in the age group 1-5 years (12.2 percent). Earlier table shows that male children are suffered more from diarrhea, so they are given more fluid during diarrhea (10.7 percent) than the female child (9.8 percent). More fluids are given in the household which have 1 or 2 surviving children (11 percent and 10.7 percent respectively). But it is decreasing with increasing number of children. If mother’s education is secondary and above they are given more fluids during diarrhea (12 percent) rather than those who have no educational exposure (8.5 percent). Four percent rural children received nothing fluids during diarrheal episode. On the other side urban children are received more fluids (11.3 percent) than rural children. Muslim children are received more fluids (12.9 percent) than Hindu and Other castes (9.7 percent and 9.8 percent respectively). Four percent and 4.1 percent children received nothing fluids whereas only 2.1 percent Muslims are not received anything at the time of diarrhea. Among other castes group (38.2 percent), if mothers are not working (10.7 percent), those who have mass media exposure (11 percent), belonging from high standard of living (11.8 percent) are given more fluids than those belongs to other backward class, working mother, no mass media exposure and from low standard of living. In case of first birth order only2.3 percent are given nothing but in 2-3 birth order it is more than four percent.

**Table-2:** Percentage of children under five years of age who received ORS and other liquid during diarrheal episode according to selected background characteristic.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **ORS (%)** | **Other liquid (%)** | | | |  |
| **Characteristic** | **Same** | **More** | **Less** | **Nothing** | **N** |
| **Age of the child** |  |  |  |  |  |  |
| < 1 year | 18.6 | 52.2 | 6 | 34.0 | 7.8 | 1494 |
| 5-Jan | 29.5 | 47.2 | 12.2 | 38.6 | 1.9 | 3237 |
| **Sex of child** |  |  |  |  |  |  |
| Male | 26.2 | 49.0 | 10.7 | 36.4 | 4 | 2623 |
| female | 25.8 | 48.6 | 9.8 | 38.0 | 3.6 | 2107 |
| **No. of surviving children** |  |  |  |  |  |  |
| 1 | 30.1 | 47.7 | 11.0 | 38.5 | 2.8 | 1637 |
| 2 | 23.6 | 48.5 | 10.7 | 36.5 | 4.2 | 1815 |
| 3 | 24 | 53.0 | 7.0 | 35.4 | 4.5 | 728 |
| 4 and above | 22.1 | 52.5 | 8 | 35.7 | 3.8 | 263 |
| **Mothers Education** |  |  |  |  |  |  |
| No | 18.4 | 50.1 | 8.5 | 37.4 | 4.0 | 2238 |
| Primary | 24.2 | 49.9 | 11.6 | 36.0 | 2.6 | 700 |
| Secondary and above | 36.2 | 46.8 | 12.0 | 37.3 | 4.0 | 1793 |
| **Residence** |  |  |  |  |  |  |
| Urban | 32.7 | 51.7 | 11.3 | 33.7 | 3.2 | 1210 |
| Rural | 23.8 | 47.8 | 9.9 | 38.3 | 4 | 3520 |
| **Religion** |  |  |  |  |  |  |
| Hindu | 26.5 | 49.8 | 9.7 | 36.6 | 4 | 3591 |
| Muslim | 21.9 | 45.5 | 12.9 | 38.9 | 2.7 | 904 |
| Others | 35.7 | 46.4 | 9.8 | 36.7 | 4.1 | 235 |
| **Caste/tribe** |  |  |  |  |  |  |
| SC/ST | 25.7 | 37.4 | 4.1 | 10.1 | 48.4 | 1381 |
| OBC | 23.3 | 36.6 | 3.7 | 9.0 | 50.7 | 2017 |
| Others | 30.7 | 38.2 | 4.0 | 11.5 | 46.4 | 1213 |
| **Mothers occupation** |  |  |  |  |  |  |
| Not working | 27.8 | 48.3 | 10.7 | 37.4 | 3.5 | 2996 |
| Working | 23.0 | 49.6 | 9.5 | 36.6 | 4.3 | 1731 |
| **Mass media exposure** |  |  |  |  |  |  |
| No | 18.2 | 48.0 | 8.7 | 39.2 | 4 | 1532 |
| Yes | 29.8 | 49.2 | 11.0 | 36.1 | 3.7 | 3199 |
| **SLI** |  |  |  |  |  |  |
| Low | 20.7 | 46.0 | 9.8 | 40.1 | 4.1 | 1418 |
| Medium | 22.3 | 53.3 | 9.5 | 33.4 | 4.1 | 1463 |
| Higher | 35.8 | 47.4 | 11.8 | 37.8 | 3.1 | 1327 |
| **Birth order** |  |  |  |  |  |  |
| First | 29.7 | 46.7 | 9.6 | 41.0 | 2.7 | 1429 |
| 3-Feb | 28.1 | 47.8 | 10.8 | 36.8 | 4.6 | 1987 |
| 4+ | 18.9 | 52.6 | 10.2 | 33.5 | 3.8 | 1320 |
| **Total** | **26** | **49.2** | **10.1** | **37** | **3.8** | **4730** |

**Figure-1:** **Percent distribution of children less than five years of age by amount of food given to them during diarrhea in two weeks preceding the survey**

It is now firmly established that oral rehydration treatment can be safely and successfully used in treating diarrhea. Most diarrhea episodes are not severe and are self-limiting and can be successfully managed by mothers or caretakers at home by following the WHO/UNICEF (2004) recommendations: administer an oral rehydration salt solution or appropriate fluid available in home early on to prevent dehydration; continued feeding or increased breastfeeding during the episode; and increase all feeding following the episode. **Figure 1:** represents the percentage of children under five years of age with diarrhea in two weeks preceding the survey by amount of fluid given. Figure shows that overall 42 percent of children were given less amount of food whereas only 2 percent were given more amount of food during diarrheal episodes and about 18 percent of children were stopped getting food which is against the WHO recommendation.

**Figure 2: Percent of children whose mothers reported to completely stop food in the recent episode of diarrhea by some selected background characteristics.**

**Figure-2**: shows the percentage of children whose food stopped during diarrheal episodes. For 42.4 percent children foods given are stopped for the children in the age group less than one year as against 7 percent among those above one. About 19 % of Male children’s food supplements were stopped than those of female (17%). On the other side urban children whose foods were stopped were 15% than rural children (19%) reflect more belief of traditional practices and norms in rural areas regarding the feeding practices.

***Treatment seeking behavior***

This sections examines the ways by which diarrhea is treated, including the seeking of care from health providers in response to a child recent episode of diarrhea. In case where child becomes severely dehydrated it is appropriate for mother to take advice from a health care provider. When a child is seen by a health care provider he/she should be assessed for dehydration, the possibility of dysentery, and danger sign indicating the need of urgent referral to a hospital. In case of dysentery which is estimated to occur about ten percent of diarrheal episodes among children under age five (USAID, 2004), it is recommended to go for better treatment. Otherwise, in majority of cases, the provider should initiate the use of an oral rehydration salt solution in the treatment centre and instruct the mother to continue at home.

**Table-3:** Percentage of children under five years of age suffering with Diarrhea in two weeks preceding the survey who were taken to health facility and source of treatment according to selected background characteristic

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Characteristic** | **% who sought treatment** | **Number** | **Diarrhea (%)** | | | | |
| **Govt.** | **Private** | **NGO** | **Traditional** | **Others** |
| **Age of the child** |  |  |  |  |  |  |  |
| < 1 year | 71.1 | 1073 | 11.6 | 49.9 | 0.1 | 3.0 | 3.5 |
| 1-5 | 81.2 | 2626 | 14.3 | 52.8 | 0.2 | 1.9 | 4.9 |
| **Sex of child** |  |  |  |  |  |  |  |
| Male | 78.4 | 2064 | 14.4 | 51.7 | 0.2 | 2.1 | 4.7 |
| female | 77.7 | 1635 | 12.2 | 52.0 | 0.2 | 2.4 | 4.1 |
| **Mothers age** |  |  |  |  |  |  |  |
| <20 | 79.5 | 339 | 13.5 | 46.6 | 0.4 | 2.1 | 3.6 |
| 20-30 | 78.6 | 2766 | 13.7 | 52.6 | 0.2 | 2.1 | 4.5 |
| 30+ | 75.0 | 593 | 12.3 | 51.8 | 0.0 | 3.1 | 4.5 |
| **Mothers Education** |  |  |  |  |  |  |  |
| No | 74.6 | 1638 | 21.1 | 48.8 | 0.1 | 1.9 | 4.5 |
| Primary | 81.9 | 556 | 16.4 | 48.9 | 0.7 | 4.1 | 4.5 |
| Secondary and above | 81.1 | 1505 | 13.9 | 56.8 | 0.1 | 1.9 | 4.5 |
| **Residence** |  |  |  |  |  |  |  |
| Urban | 87.6 | 1023 | 13.4 | 58.8 | 0.2 | 2.1 | 3.2 |
| Rural | 75.0 | 2676 | 13.4 | 49.5 | 0.2 | 2.3 | 4.5 |
| **Caste/tribe** |  |  |  |  |  |  |  |
| SC/ST | 76.9 | 1030 | 16.4 | 47.4 | 0.1 | 2.7 | 4.9 |
| OBC | 76.0 | 1565 | 10.8 | 52.9 | 0.2 | 1.6 | 5.0 |
| Others | 81.6 | 1002 | 13.3 | 55.8 | 0.2 | 2.2 | 3.4 |
| **Mothers occupation** |  |  |  |  |  |  |  |
| Not working | 80.5 | 2423 | 12.8 | 55.4 | 0.1 | 2.2 | 4.2 |
| Working | 74.1 | 1274 | 14.4 | 45.7 | 0.3 | 2.4 | 4.8 |
| **Mass media exposure** |  |  |  |  |  |  |  |
| No | 75.4 | 1112 | 10.8 | 48.4 | 0.1 | 1.8 | 5.9 |
| Yes | 79.3 | 2587 | 14.7 | 53.5 | 0.2 | 2.4 | 3.7 |
| **SLI** |  |  |  |  |  |  |  |
| Low | 72.7 | 1044 | 15.5 | 45.3 | 0.0 | 1.9 | 5.0 |
| Medium | 75.5 | 1113 | 12.9 | 47.7 | 0.5 | 2.4 | 5.2 |
| Higher | 85.9 | 1150 | 11.9 | 63.8 | 0.2 | 2.6 | 3.5 |
| **Birth order** |  |  |  |  |  |  |  |
| First | 81.3 | 1133 | 13.0 | 53.1 | 0.2 | 3.0 | 4.3 |
| 2-3 | 81.4 | 1599 | 14.9 | 53.0 | 0.3 | 2.6 | 3.9 |
| 4+ | 69.5 | 967 | 11.7 | 48.9 | 0.7 | 1.0 | 5.4 |
| **Total** | **78.0** | **3699** | **13.4** | **51.9** | **0.2** | **2.2** | **4.5** |

**Table-3** presents the treatment seeking for diarrhea. Percentage of children under five years of age suffering with Diarrhea in two weeks preceding the survey who were taken to health facility and source of treatment according to selected background characteristic. Children are suffered from diarrhea among those 78 percent are soughting for the treatment of diarrhea. The treatment seeking is more among the children 1-5 years age group (81.2 percent) than the children less than one year age group (71.1 percent). Among male children (78.4 percent), mothers age less than 20 years (79.5 percent), mother’s education primary and above (81 percent), belonging from other caste group (81.6 percent), and belonging from higher standard of living (85.9 percent) treatment seeking is more than female children (77.7 percent), mothers age more than 30 years (75 percent), mothers have no education (74.6 percent), belonging from other backward class (76 percent) and low standard of living (72.7 percent). Urban children are soughted more for treatment seeking (87.6 percent) but among rural children it is 12.6 percent points less than the urban children. Among working mother treatment seeking is less (74.1 percent) than those are not working (80.5 percent). Mass media exposure is also a very good indicator to represent treatment seeking. Those who have mass media exposure (79.3 percent), they are 3.9 percent points more soughted for treatment than those have no exposure (75.4 percent). In the first birth and 2-3 birth order treatment seeking is high than 4 and more birth order of the child. Those who sought for treatment seeking among them more than fifty percent (51.9 percent) had taken the facility from private sources. 13.4 percent, 2.2 percent and 4.5 percent had taken the facility from government, traditional and other sources respectively. Only 0.2 percent has taken treatment from NGO.

**Table 4.** presents the result of adjusted proportion of children who have sought treatment from different facilities for diarrhea. The table reveals that irrespective of background characteristics higher proportion of children have sought treatment from private facilities compared to government or other facilities. It is seen that irrespective of age of the child significantly higher proportion of children sought treatment from the private facilities than government or others facilities. Sources of treatment for diarrhea have not changed with the sex of the child. Irrespective of age of the mother more than two third of the children have sought treatment from private facilities. Significantly higher proportion of urban children (75%) compared to rural children (68%) have sought treatment from private facilities. Significantly higher proportion of children from OBC category (75%) has sought treatment from private facilities compared to children from SC/ST (67%) or other (71%) categories. It was expected that higher proportion of working mothers will opt for private facilities for treatment compared to non working mothers. But the result reveals that higher proportion of children of non working mothers have sought treatment (73%) from private facilities compared to children of working mothers (68%). Children whose mother had exposure to mass media a lesser proportion (70%) of them have sought treatment from private facilities compared to children whose mother did not have such exposure (76%). This finding was statistically significant at 1 percent level of significance. Significantly higher proportion of children from higher standard of living have sought treatment from private facilities (78%) compared to children from low (65%) or medium (66%) SLI households.

**Table-4:** Adjusted proportion of sources of treatment for diarrhea by selected background characteristics

|  |  |  |  |
| --- | --- | --- | --- |
| **Characteristic** | **Government** | **Private** | **Others** |
| **Age of the child** |  |  |  |
| < 1 year | 21.0 | 72.2 | 6.2 |
| 1-5 | 23.5 | 70.7 | 5.8 |
| **Sex of child** |  |  |  |
| Male | 23.1 | 70.5 | 6.5 |
| female | 22.4 | 72.3 | 5.2 |
| **Mothers age** |  |  |  |
| <20 | 23.6 | 68.4 | 7.5 |
| 20-30 | 22.9 | 71.6 | 5.4 |
| 30+ | 21.9 | 70.8 | 7.3 |
| **Mothers Education** |  |  |  |
| No | 20.2 | 74.4 | 5.4 |
| Primary | 22.0 | 68.7 | 9.3\* |
| Secondary and above | 25.1 | 69.3\*\* | 5.6 |
| **Residence** |  |  |  |
| Urban | 19.4 | 75.1 | 5.5 |
| Rural | 25.4 | 68.4\*\*\* | 6.2 |
| **Caste/tribe** |  |  |  |
| SC/ST | 26.7 | 66.7 | 6.6 |
| OBC | 18.6 | 75.1\*\* | 6.3\*\* |
| Others | 24.3 | 70.8 | 4.9 |
| **Mothers occupation** |  |  |  |
| Not working | 21.7 | 73.0 | 5.3 |
| Working | 24.9 | 67.6\*\* | 7.5 |
| **Mass media exposure** |  |  |  |
| No | 17.0 | 76.1 | 6.9 |
| Yes | 24.7 | 69.6\*\*\* | 5.6\*\* |
| **SLI** |  |  |  |
| Low | 29.8 | 64.5 | 5.7 |
| Medium | 28.6 | 65.6 | 5.7 |
| Higher | 16.1 | 77.9\*\*\* | 6.0\*\* |
| **Birth order** |  |  |  |
| First | 22.9 | 70.5 | 6.6 |
| 2-3 | 24.0 | 70.5 | 5.6 |
| 4+ | 20.6 | 73.5 | 5.9 |

Note \*\*\* p<0.01, \*\* p<0.05, \* P<0.1

By using the application of **Morkov-chain model** to estimate the probability of transition from one health facility to other by condensing the reported place of treatment. The estimates of transition probabilities are given in **table 5.1.** The table represents the estimates of transition probabilities for treatment during recent episodes of diarrhea. The table revels that among children who sought treatment in a government facility have probability 0.86 to stay in same place. However, they have probability 0.086 to move in a private facility. While, the probabilities of transition government facility to NGO is 0, to traditional or AYUSH is 0.001 and to other facility is 0.046 which includes friends, pharmacy shop etc. If the probabilities of transition from private health care providers is being analyzed, it is observed that children getting treatment in private facility have a probability 0.98 to retain at same place. However, 0.008 is the probability of transition from private to government facility and 0.005 from private to others. In the similar fashion, focusing attention on the other places of treatment, it is found that with probabilities 0.683, 1 and 0.829 remain at same place for treatment where as from NGO the probability of transition in private is o.357 and to all others is 0. Similarly from traditional, the probability of transition to all other health care facility is 0. And from “others” to government, private, NGO and traditional are 0.038, 0.114, 0.019 and 0.829 respectively.

**Table-5.1: System followed by mothers practicing multiple system of medicine during recent episodes of diarrhea**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Second visit**  **First visit** | **Govt** | **Private** | **NGO** | **Traditional** | **Others** |
| **Govt** | 0.867 | 0.086 | 0.000 | 0.001 | 0.046 |
| **Private** | 0.008 | 0.986 | 0.000 | 0.000 | 0.005 |
| **NGO** | 0.000 | 0.357 | 0.643 | 0.000 | 0.000 |
| **Traditional** | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 |
| **Others** | 0.038 | 0.114 | 0.000 | 0.019 | 0.829 |
|  |  |  |  |  |  |
| **Probability for first visit** | **0.217** | **0.700** | **0.005** | **0.028** | **0.049** |
| **Probability for last visit** | **0.196** | **0.720** | **0.003** | **0.030** | **0.054** |

The last two rows of the table presents marginal figures of probabilities, representing the movement in treatment seeking during recent episode of diarrhea from place of first visit to a health care provider to next place for treatment. These figures indicate that the probability to seek treatment in government centre has decreased slightly from 0.217 to 0.196 and for Ngo (0.005 to 0.003). but the values considerably increases for all other categories.

**Tables 5.2.1, 5.2.2** and **5.2.3** represent the estimate of transition probabilities for treatment seeking behavior of recent episode of diarrhea by “stander of living”. It is observed in the table that the probabilities of to retain in same group for low SLI are .917, .978, 0, 1 and .843 for government, private, traditional and others respectively. However for medium SLI it is, 0.853, 0.988, 0.700, 1 and .958 for government, private, Ngo, traditional and others respectively. For child of higher stander of living the probabilities to retain in the same group are .822, .987, .667, 1 and .766 which is for government, private, traditional and others respectively. However probabilities of transition to other groups are not uniform among all SLI. While for low SLI probability to move from government to private facility is .031, .004 for traditional and for others it is .048. It is .086 for government to private, and .064 for government to others in medium SLI and for high SLI transition from government facility to private facility is .150 and .028 for others. While, In case of private, the probabilities of transition to different group for low SLI are .001, 0, 0 and 0.011 for government, Ngo, traditional and others respectively. It is .004 for government and .007 in case of, medium SLI. Whereas For high SLI it is .010, .001, and .002 for government, traditional and others.

**Table-5.2.1: Transition probabilities showing pattern of movement from one type of health facility to others for the treatment of Diarrhea for Children belonging to Low SLI**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Second visit**  **First visit** | **Govt** | **Private** | **NGO** | **Traditional** | **Others** |
| **Govt** | 0.917 | 0.031 | 0.000 | 0.004 | 0.048 |
| **Private** | 0.011 | 0.978 | 0.000 | 0.000 | 0.011 |
| **NGO** | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| **Traditional** | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 |
| **Others** | 0.059 | 0.098 | 0.000 | 0.000 | 0.843 |
|  |  |  |  |  |  |
| **Probability for first visit** | **0.253** | **0.666** | **0.000** | **0.025** | **0.056** |
| **Probability for last visit** | **0.243** | **0.664** | **0.000** | **0.026** | **0.067** |

**Table-5.2.2: Transition probabilities showing pattern of movement from one type of health facility to others for the treatment of Diarrhea for Children belonging to Medium SLI**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Second visit**  **First visit** | **Govt** | **Private** | **NGO** | **Traditional** | **Others** |
| **Govt** | 0.853 | 0.083 | 0.000 | 0.000 | 0.064 |
| **Private** | 0.004 | 0.988 | 0.000 | 0.000 | 0.007 |
| **NGO** | 0.000 | 0.300 | 0.700 | 0.000 | 0.000 |
| **Traditional** | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 |
| **Others** | 0.000 | 0.042 | 0.000 | 0.000 | 0.958 |
|  |  |  |  |  |  |
| **Probability for first visit** | **0.227** | **0.677** | **0.010** | **0.036** | **0.050** |
| **Probability for last visit** | **0.853** | **0.083** | **0.000** | **0.000** | **0.064** |

**Table-5.2.3: Transition probabilities showing pattern of movement from one type of health facility to others for the treatment of Diarrhea for Children belonging to High SLI**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Second visit**  **First visit** | **Govt** | **Private** | **NGO** | **Traditional** | **Others** |
| **Govt** | 0.822 | 0.150 | 0.000 | 0.000 | 0.028 |
| **Private** | 0.010 | 0.987 | 0.000 | 0.001 | 0.002 |
| **NGO** | 0.000 | 0.333 | 0.667 | 0.000 | 0.000 |
| **Traditional** | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 |
| **Others** | 0.043 | 0.149 | 0.000 | 0.043 | 0.766 |
|  |  |  |  |  |  |
| **Probability for first visit** | **0.175** | **0.749** | **0.002** | **0.028** | **0.046** |
| **Probability for last visit** | **0.154** | **0.771** | **0.002** | **0.031** | **0.042** |

While estimating the probabilities of for traditional the probabilities of transition are 0 which is uniform for all the categories irrespective of the slandered of living. However, in low SLI for the “others” categories, the probabilities of transition are .059, .098 corresponding to government and private whereas for Ngo and traditional health care providers there is no transition. While, in medium SLI the transition probabilities for “others” category is .042 to private facility and 0 for rest. Lastly, high SLI pertain large variation then low and medium SLI. While observing the probabilities for “others” category, the transition probabilities are found to be .043 for government .149 for private and .043 for traditional health care providers.

However, the probabilities given in last two rows show a considerable increase in traditional and “others” for low SLI it shows slight decrease for government (0.253 to 0.243) and private (0.666 to 0.664). marginal figure of probability from place of first visit to next in case of medium SLI shows decrease in government (0.227 to 0.196) and Ngo (0.010 to 0.007) but increases for private (0.667 to 0.693) and others (0.050 to 0.067). Whereas the probabilities remain approximately same for traditional category in medium SLI. Similarly in case of high SLI the value slightly decreases for government (0.175 to 0.154) and others (0.046 to 0.042). While, the probabilities of transition for private and traditional or AYUSH provider’s shows considerable increment.

**Table-6.1: Transition probabilities showing pattern of movement from one type of health facility to others for the treatment of Diarrhea for Male Children**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Second visit**  **First visit** | **Govt** | **Private** | **NGO** | **Traditional** | **Others** |
| **Govt** | 0.703 | 0.071 | 0.000 | 0.002 | 0.033 |
| **Private** | 0.007 | 0.988 | 0.000 | 0.000 | 0.005 |
| **NGO** | 0.000 | 0.500 | 0.500 | 0.000 | 0.000 |
| **Traditional** | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 |
| **Others** | 0.044 | 0.110 | 0.000 | 0.000 | 0.846 |
|  |  |  |  |  |  |
| **Probability for first visit** | **0.286** | **0.724** | **0.006** | **0.029** | **0.050** |
| **Probability for last visit** | **0.200** | **0.715** | **0.003** | **0.029** | **0.053** |

**Table-6.2: Transition probabilities showing pattern of movement from one type of health facility to others for the treatment of Diarrhea for female Children**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Second visit**  **First visit** | **Govt** | **Private** | **NGO** | **Traditional** | **Others** |
| **Govt** | 0.868 | 0.078 | 0.000 | 0.000 | 0.053 |
| **Private** | 0.011 | 0.982 | 0.000 | 0.001 | 0.006 |
| **NGO** | 0.000 | 0.000 | 1.000 | 0.000 | 0.000 |
| **Traditional** | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 |
| **Others** | 0.030 | 0.121 | 0.000 | 0.045 | 0.803 |
|  |  |  |  |  |  |
| **Probability for first visit** | **0.260** | **0.765** | **0.003** | **0.028** | **0.047** |
| **Probability for last visit** | **0.183** | **0.773** | **0.003** | **0.030** | **0.052** |

**Tables 6.1** and **6.2** represent the estimates of transition probabilities for treatment sought for diarrhea in case of Male and Female child. Table 6.1 is for male child where probability to retain at same place for treatment are 0.703, 0.988, 0.5, 1 and 0.846 for government, private, Ngo, traditional and “others” respectively. Whereas for female child probability to retain at same place for treatment are 0.868, 0.982, 1, 1 and 0.803 for government, private, Ngo, traditional and “others” respectively .It is observed in table 6.2 that the probabilities of transition from one place for treatment to the other in case of male child is 0.078 from government to private but in case of female child it is 0.868. Among male child probability of transition from government facility to traditional and others are 0.002 and 0.033. Whereas for female child transition from “government” to “others” is 0.053. While in case of male child probability of transition from private health care facility to government, NGO, traditional and other facility are 0.007, 0, 0, 0.005 respectively it is 0.011, 0, 0.001 and 0.006. For NGO the transition probabilities to different health care facility among male child are 0, 0.5, 0.5, 0 and 0. But for female child it is 0 for all other categories. In case of traditional it is 0 for both male and female which is uniform for all categories. Whereas for “others” it is 0.044 for government, 0.11 for private, and 0 for both NGO and traditional among male child. However in case of female child probabilities of transition from others facility to government, private, NGO and traditional are 0.03, 0.121, 0 and 0.045 respectively.

Having close look at the probabilities of transition in each treatment group, it reveals that where for male child the marginal probabilities decreases in private (.724 to .714), government (0.286 to 0.220) and Ngo (0.006 to 0.003) remains same for traditional but increases in others category (0.050 to 0.053) .Similarly for female child it decreases for government (0.260 to 0.183). But increases for private (0.765 to 0.773), traditional (0.028 to 0.030) and others (0.047 to 0.052). For Ngo the values remain same.

**Table-7.1 Transition probabilities showing pattern of movement from one type of health facility to others for the treatment of Diarrhea for Children in Urban Areas**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Second visit**  **First visit** | **Govt** | **Private** | **NGO** | **Traditional** | **Others** |
| **Govt** | 0.881 | 0.107 | 0.000 | 0.000 | 0.011 |
| **Private** | 0.010 | 0.987 | 0.000 | 0.000 | 0.003 |
| **NGO** | 0.000 | 0.333 | 0.667 | 0.000 | 0.000 |
| **Traditional** | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 |
| **Others** | 0.000 | 0.238 | 0.000 | 0.000 | 0.762 |
|  |  |  |  |  |  |
| **Probability for first visit** | **0.199** | **0.725** | **0.003** | **0.026** | **0.047** |
| **Probability for last visit** | **0.183** | **0.748** | **0.002** | **0.026** | **0.040** |

**Table-7.2: Transition probabilities showing pattern of movement from one type of health facility to others for the treatment of Diarrhea for Children in Rural Areas**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Second visit**  **First visit** | **Govt** | **Private** | **NGO** | **Traditional** | **Others** |
| **Govt** | 0.865 | 0.076 | 0.000 | 0.002 | 0.057 |
| **Private** | 0.008 | 0.985 | 0.000 | 0.001 | 0.006 |
| **NGO** | 0.000 | 0.300 | 0.700 | 0.000 | 0.000 |
| **Traditional** | 0.000 | 0.000 | 0.000 | 1.000 | 0.000 |
| **Others** | 0.045 | 0.072 | 0.000 | 0.000 | 0.883 |
|  |  |  |  |  |  |
| **Probability for first visit** | **0.224** | **0.694** | **0.004** | **0.031** | **0.047** |
| **Probability for last visit** | **0.202** | **0.705** | **0.003** | **0.032** | **0.059** |

**Tables 7.1** and **7.2** represent the estimates of transition probabilities for treatment sought for diarrhea by place of residence. Table 7.1 is for urban area where probability to retain at same place for treatment are 0.881, 0.987, 0.667, 1 and 0.762 for government, private, Ngo, traditional and “others” respectively. Whereas for female child probability to retain at same place for treatment are 0.865, 0.985, 0.7, 1 and 0.883 for government, private, Ngo, traditional and “others” respectively .It is observed in table 7.2 that the probabilities of transition from one place for treatment to the other in case of urban is 0.107 from government to private but in case of rural (table 5.15.2) it is 0.076. Among urban area probability of transition from government facility to traditional and others are 0and 0.011. Whereas for rural area transition from “government” to traditional “others” are 0.002 and 0.057. While in case of urban probability of transition from private health care facility to government, NGO, traditional and other facility are 0.010, 0, 0, 0.003 respectively it is 0.008, 0, 0.001 and 0.006. For NGO the transition probabilities to different health care facility at urban area are 0, 0.333, 0 and 0. But for rural it is 0.7 for private and 0 for all other categories. In case of traditional it is 0 for both urban and rural which is uniform for all categories. Whereas for “others” category it is 0 for government, 0.238 for private, and 0 for both NGO and traditional for urban. However in case of rural area probabilities of transition from “others” facility to government, private, NGO and traditional are 0.045, 0.072, 0 and 0 respectively.

The last two rows of table shows maximum decrease in the probability of transition for government facility followed by others and Ngo slightly increases for private, but no transition is observed for traditional category in urban area. Estimates for rural area shows there is considerable decrease from place of first visit to next in case of government remains approximately same for Ngo and traditional. But shows some increment in case of private (0.694 to 0.705) and others (0.047 to 0.057).

**Table-8: Distribution of the sick who did not received medical treatment by age, sex and place of residence**

|  |  |  |
| --- | --- | --- |
| **Characteristics** | **Diarrhea** | **N** |
| **SEX** (male) | 44.0 | 1153 |
| **Sex**(female) | 42.9 | 910 |
| **Urban** | 36.9 | 447 |
| **Rural** | 45.8 | 1661 |
| **Age**  **<1** | 54.8 | 686 |
| **1-5** | 42.4 | 1377 |
| **Total** | **43.5** | **2063** |

The **table 8:** shows distributions of the sick children who did not received medical treatment by age, sex and place of residence. Sex of the child is an important factor to describe distributions of the sick children who did not received medical treatment. more number of (44 percent) male children did not receive any medical treatment for diarrhea than their counterparts. Residence is more prominent factor to describe that where less number of children are taken treatment for diarrhea. More number of rural children were not given any medical treatment (45.8 percent) than the urban areas (36.9 percent). But the picture depicted for diarrhea that 54.8 percent children below one year age group are not received any medical treatment than the age group 1-5 years.

**SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMENDATIONS**

Overall the data show a strong and consistent association between child age and disease prevalence, the age related susceptibility is clearly demonstrated though this study, the average prevalence of diarrhea peaks amongst children below one year than there older counterparts. This data support an association between relatively low SLI households and an increased probability of recent diarrheal episode or both urban and rural children. The study clearly brings out the importance feeding practices during diarrhea episodes, while observing the amount of fluid provided during diarrhea revels that, about half of the children received same amount of fluid during diarrhea, while 10 only percent received more amount and 37 percent received less amount of fluid then what they were provided prior to the episode of diarrhea. In terms of its differentials it is generally expected that women with higher socio-economic status (In terms of education, exposure to mass-media, SLI) would like to give more fluid to there children during diarrhea, compared to those with lower socio-economic status. While observing amount of food provided during diarrhea, a distinct picture appears as only 2 percent of all children were provided more amount of food while, more than 42 percent were provided less amount of food during diarrheal episode where as it is mentioned that normal food intake should be promoted as soon as the child, whatever be its age, is able to eat. A higher proportion of children whose mothers were Hindu, working, exposed to mass-media and belongs to rural area have received same amount of food where as children whose mother are literate, are of higher SLI families , exposed to mass-media and belongs to urban area are provided more amount of food during Diarrhea.

By and large similar differentials are evident even in case of administering ORS to the children suffering with diarrhea. In terms of its differentials, a higher proportion of children of young mothers were given ORS then the children of older mothers. Children whose mother had exposed to mass-media, educated, urban, general caste and belong to high socio-economic status are more likely to receive ORS during diarrhea. A higher proportion of children who belong to first birth order received ORS than those from lower birth order, it may be because first child are given more care and attention. Children of older age are more likely to get ORS than infants, which could be partly attributed to the prevailing belief that medication may produce side-effects if given to infants. Discriminating a particular sex in all aspect during the childhood has been well established. The result shows that male children are more likely to be given ORS than female children. Thus there is an urgent need to prioritize strategies to minimized gap in knowledge by enhancing the maternal awareness thro suitably develop programs and interventions.

Considering treatment seeking behavior among the children, it was observed that diarrheal cases were much neglected by the parents as children with diarrhea two weeks prior to survey are one and half times more likely to miss the opportunity to get medical treatment. However, the analysis of the extent of medical treatment to children suffering with the disease shows that relatively larger proportion of children suffering with diarrhea could not get medical treatment. Cases of not seeking any treatment during recent diarrheal episodes were more found in rural areas. Also child less than one years of age were given less attention for medical care in case of diarrhea. The probability of seeking treatment among children during diarrhea is significantly higher among educated, urban and higher socio-economic status women. Women belonging to schedule cast/ tribe are less likely to seek treatment for their children. Only 63 percent of child suffering with diarrheal disease were sought any treatment. Estimates of treatment seeking for diarrhea suggest that mothers of suffering children relay mostly on private health care provider (52 percent) which is considered to be appropriate source for treatment. About 13.3 percept of the child were treated in government facility where as 0.2 at Ngo, 2.2 percent at traditional health care providers and 4.2 at “others” which mostly includes home treatment, pharmacy shops, friends/ relative’s etc. Children of older age are more likely to taken for treatment than infants, which could be partly attributed to the prevailing belief that drug may produce side-effects if given to infants. children whose mothers belong to urban area are more likely to seek treatment for diarrhea which probably reflects the easy availability of medical facilities. Probabilities of seeking treatment are more among educated mothers then mothers having no education, this may reflect a greater awareness of health problems among educated mothers. More attention is needed for the proper utilization of mass-media for the prevention of these diseases. Where the mother had exposure to mass-media there greater percentage of children were brought to health care facilities for treatment during diarrheal episodes than the mothers who had no exposure to mass-media. In the case of occupation of mother, housewife are more likely to seek treatment than working mothers, this may be due to time available to the housewives. Stander of living has shown a positive effect on health seeking behavior. To be clear women belonging to medium and high level of economic status are more likely to seek treatment than women from low economic status, this could be due to cost element of using health care or accessing the services.

While examining the application of **Morkov-chain model** to study the transition probabilities from one health facility to other by condensing the reported place of treatment. The estimates of transition probabilities from place of first treatment to the place of further treatment during diarrhea revels that, the change pattern is not uniform during the treatment in case of the disease. While, probability to retain in the same group of health facilities for treatment is highest in private followed by government but varies largely across traditional, others and NGO for the disease. Variation in the probability of transition from government to private health facilities for treatment of diarrhea reveal that children living in urban areas and those coming from high SLI households are in better position than their counterparts. However, it is encouraging to note that there are no sex differentials in transition probabilities for movement from government to private health facilities in diarrhea.

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