Infant Healthcare: Striking A Balance Between Public Expenditure, Outcome And Impact: A Case Study Of Barak Valley, India

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Abstract: Healthcare expenditure is quite significant in public healthcare provisioning of any country. This paper discusses the issue of public provisioning of infant healthcare, especially preventive healthcare which forms a very integral part of the child’s initial few years of life. Preventive healthcare in form of immunization goes a long way in protecting the child from many life-threatening and deforming diseases. Also, continuous health expenditure in form of curative healthcare is important to cure from acquired infections and sickness. Healthcare expenditure has always been a question of debate in the developing and less-developed countries faced with the perennial problem of scarce resources and unlimited wants. The area of study is Southern Assam of India. The study explores the trend of the state allocation of healthcare services and its outcomes. Moreover, the paper shall attempt to study their reach-out to the target group, impact on the healthcare parameters of the infants in the area of study and ultimately, probe into the gap between what has been done and what needs to be done.

Index Terms: Barak Valley, Healthcare Expenditure, Immunization, India, Infant Healthcare, NRHM, Southern Assam

1. INTRODUCTION

Child health comprises of the mental, physical and social well-being of a child from conception to adolescence. Nine months prior to the birth of the child, the care for the child gets started through the Ante-natal care of the would-be mother. And post delivery, the matter of concern shifts to the infant and its healthcare along with the new mother. Since health is not only an inherent physical characteristic acquired through birth for a lifetime, but also a characteristic which is vulnerable to the external environment and susceptible to diseases, health needs constant maintenance and up gradation. And this involves a cost, either to be borne by self or by the state. Expenditure on health can be broadly classified into two divisions: the first type being curative and rehabilitative and the second type being preventive and for the maintenance of good health. As far as child health is concerned, the latter forms a very integral part of the child’s initial few years of life as preventive healthcare in form of vaccination and immunization goes a long way in protecting the child from many life-threatening and deforming diseases. Also, continuous health expenditure in form of the former is important to cure from acquired infections and sickness. Public healthcare expenditure has always been a matter of concern in the developing and less-developed countries faced with the perennial problem of scarce resources and unlimited wants. What to allocate, how to allocate and how to channelize the scarce resource to obtain maximum benefits and health for all up by the government in form of public provisioning of healthcare facilities. Maternal and child health has always been viewed as integrally connected to each other and elementally different from other types of health and healthcare issues. It is often said that strong communities begin with maternal and child health. Access to quality maternal, newborn and child healthcare is not equal across or within countries. According to the World Health Organization (WHO), nearly 800 women die every day from preventable causes related to pregnancy and childbirth, with 99% of those deaths occurring in developing countries. According to the UN Inter-agency Group for Child Mortality Estimation 2018 estimates on child mortality among children under age 5 and children aged 5-14, despite progress over the past two decades, in 2017 alone, an estimated 6.3 million children and young adolescents died and most of these deaths were from preventable causes. Also, it was estimated that, globally, the risk of dying is the highest in the first month of life. While the chances of survival have increased for all age groups since 2000, progress was uneven. According to UN Reports, the largest improvements in child survival for children less than 5 years of age occurred for children aged 1–4 years – mortality in this age group dropped by 60% from 2000 to 2017. Post-neonatal mortality or mortality among children aged 1–11 months, declined by 51%, neonatal mortality declined by 41% and mortality among children aged 5–14 declined by 37% over the same period. The largest gains in the survival chances for children aged 1–4 have occurred primarily since 2000. Most children under 5 die due to preventable or treatable causes such as complications during birth, pneumonia, diarrhea, neonatal sepsis, and malaria. According to the WHO, investing in early childhood development is one of the best investments a country can make to boost economic growth, promote peace and sustainable societies, and eliminate extreme poverty and inequality. Equally important, investing in early childhood development is necessary to uphold the right of every child to survive and thrive. Global institutions worldwide have prioritized early childhood development in their programmes of work. In response to this urgent need, WHO, UNICEF and the World Bank, in collaboration with the Partnership for Maternal, Newborn & Child Health, the Early Childhood Development Action Network and many other partners, have developed a Nurturing Care Framework. This framework emphasizes on the efforts that need to be initiated to improve health and wellbeing in the earliest years, from pregnancy to age 3, identification of the major threats to early childhood development, assessing the impact of nutrition and nurturing care in protecting young children from the worst effects of adversity and in promoting physical, emotional and cognitive development and also, the role of family and care givers in

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nurturing infants and young children. What is evident from this international framework is the integral role of the government as well as the society in making regional, cultural and society specific guiding principles and implementing strategic actions. Also, the active role of the government is inevitable in monitoring targets and milestones that are essential to progress. It has been envisaged in the Framework that through mutually accountable partnerships between relevant sectors – health, nutrition, education, social welfare, child protection, and environmental health common action and common results through country leadership may be achieved and the Sustainable Development Goals can be attained to transform goals of the Global Strategy on Women’s, Children’s and Adolescents’ Health. In India, to overcome the poor status of healthcare facilities, particularly in rural India and to meet up with the Millennium Development Goals (MDGs), the government of India launched the National Rural Health Mission (NRHM) in 2005. Since then, there has been a reported betterment of healthcare indicators. The healthcare services involve both curative as well as preventive aspects of healthcare provisioning. Out of the various approaches adopted by NRHM, one is the incentive-based approach for certain target groups. This paper takes up the case of infant health and healthcare in the area of study. Southern Assam, commonly known as Barak Valley constitutes 8.9 percent of the total geographical area of Assam. The region is surrounded by the state of Manipur in the East, Tripura and the country of Bangladesh in the west, Mizoram in the south and North -Cachar Hills and Meghalaya in the North. The Barak Valley mainly comprises of three districts- Cachar, Karimganj and Hailakandi. Of the three districts of the valley, Cachar is the largest district with 3786 sq. km., Hailakandi is the smallest district with total geographical area of 1327 sq. km and the second largest district Karimganj covers 1809 sq. km of the total geographical area. These three districts are further demarcated into development blocks to facilitate developmental activities (Roy, 2018). Barak Valley has witnessed a remarkable increase in the growth of population. As per Indian Census reports, the population of Barak Valley has steadily increased by 20.94 per cent between 1961 and 1971 and by 30.1 per cent till 1991. This increased by 16.66 per cent in 2001 census and then further increased by 31 per cent according to 2011 census. The economy of Barak Valley is basically agrarian with 80 percent of population dependent on agriculture, paddy being the major crop. Agricultural infrastructure and modernization is sadly missing in the area. Based on local resources, the viable industries in the area are those based on cane, bamboo, pineapple and other agro-based industries. Cachar was named one of India’s most backward district amidst a list of the country’s 250 most backward districts out of a total of 640 districts in 2006 by the Indian government. In Human Development Index (HDI), Cachar ranks eighth in the State with an index value of 0.402 which is marginally lower than the state index at 0.407 (Assam Human Development Report 2003). The Human Poverty Index (29.22) shows that almost 30 percent of the population in the district is in poverty. The Gender related Development Index (GDI) for Cachar in 2001 is estimated to be 0.409, which is far less than the state average of 0.537. The human development index for the district of Karimganj stands at 0.301 (ranks 19th in the state) which is much lower than the state average of 0.407 (Human Development Report of Assam, 2004). In terms of income, education and health the district ranks 19th, 14th and 18th respectively in the state out of its present 33 districts.

On the other hand in gender related development index the district is placed at bottom in the state. Hailakandi district shows the poorest performance in terms of development in basic human capabilities in three fundamental dimensions viz., a long and healthy life, knowledge and decent standard of living, as indicated by its HDI value of 0.363 (11th rank) which is lower than the state average of 0.407. The district occupies 9th place in terms of income while 14th place in terms of both education and health in district wise rankings. According to the human poverty index of 1999, 27 per cent of total populations in the district are in poverty. In terms of Gender related Development Index (GDI), Hailakandi ranks 6th in district wise ranking, with GDI value of 0.609 which, is above the state average of 0.537. However, the HDI-GDI rank disparities indicate that women in this district suffers from deprivation of development potential leading to lower achievement than men (Assam Human Development Report, 2003).

2 OBJECTIVE OF THE STUDY

Focusing on the area of study that is Southern Assam, India (commonly known as Barak Valley), this study shall first explore the trend of public investment on infant healthcare in the area of study over the years. It shall then aim to find out if any relationship exists between per capita public healthcare expenditure and infant health or healthcare indicators, and whether an increase in the former can possibly lead to the improvement in the latter. This shall also provide a value judgment on whether government expenditure is absolutely necessary to improve the health status in developing countries where there is a perennial crunch of resources.

3 METHODOLOGY

The area of study comprises of three districts, namely Cachar, Karimganj and Hailakandi districts. Cachar has 895 villages, Karimganj has 177 villages and Hailakandi district has 334 villages. Each district has the grass-root level healthcare service provider as the Primary Health Centres. Primary Health Centre or PHCs are the first contact point between healthcare seekers and healthcare providers. These Primary Health Centres are clubbed together under the umbrella of Block Primary Health Centres (BPHCs). Cachar has eight BPHCs, Karimganj has five BPHCs and Hailakandi has four BPHCs catering healthcare services to the rural population. Each BPHC has a number of villages under it. The BPHC level data regarding infant healthcare and immunization has been accessed through HMIS portal. The year-wise data on those infant healthcare parameters are then studied to find the relationship (if exists) between public healthcare expenditure and infant health outcomes. A regression analysis is done to explore the trend of public investment on infant healthcare in the area of study (commonly known as Barak Valley), this study shall first
4 RESULTS AND DISCUSSIONS

Immunization expenditure is made a part of Universal Immunization Program (UIP), which is separate from Reproductive and Child Health (RCH) through which government makes the maximum expenditure related to maternal and child healthcare that is channelized through NRHM project. Fund allocation and utilization comes under separate head of UIP for immunization of children. Table 1 and Chart 1 shows the pattern of expenditure and utilization of Universal Immunization Programme (UIP) fund, as an integral part of child health and child development

Table 1

<table>
<thead>
<tr>
<th>YEAR</th>
<th>CACHAR</th>
<th>HAILAKANDI</th>
<th>KARIMGANJ</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percentage Utilization of Fund Allotted</td>
<td>Percentage Utilization of Fund Allotted</td>
<td>Percentage Utilization of Fund Allotted</td>
</tr>
<tr>
<td>2005-06</td>
<td>64.22</td>
<td>63.40</td>
<td></td>
</tr>
<tr>
<td>2006-07</td>
<td>88.6</td>
<td>94.11</td>
<td></td>
</tr>
<tr>
<td>2007-08</td>
<td>74.06</td>
<td>96.11</td>
<td></td>
</tr>
<tr>
<td>2008-09</td>
<td>73.82</td>
<td>79.52</td>
<td></td>
</tr>
<tr>
<td>2009-10</td>
<td>43.03</td>
<td>94.94</td>
<td></td>
</tr>
<tr>
<td>2010-11</td>
<td>36.91</td>
<td>85.17</td>
<td></td>
</tr>
<tr>
<td>2011-12</td>
<td>65.99</td>
<td>93.94</td>
<td></td>
</tr>
<tr>
<td>2012-13</td>
<td>89.75</td>
<td>204.1</td>
<td></td>
</tr>
<tr>
<td>2013-14</td>
<td>100.59</td>
<td>36.45</td>
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<tr>
<td>2014-15</td>
<td>64.47</td>
<td>60.18</td>
<td></td>
</tr>
<tr>
<td>2015-16</td>
<td>113.15</td>
<td>178.6</td>
<td></td>
</tr>
</tbody>
</table>

Source: NRHM Cachar, Karimganj, Hailakandi

Chart 1. Universal Immunization Programme (UIP) Expenditure Trend in Barak Valley

Table 1 shows that over the years, not only fund allotted under UIP has increased, but also it has been fairly utilized which is reflected by the percentage utilization column of the table. Even roll-over fund from the previous year (if utilization was less there) was utilized in the subsequent year which is reflected by a higher than cent percent utilization of funds in certain years. The Universal Immunization Programme (UIP) fund utilization presented in Table 1 and Chart 1 shows a much brighter picture of the work being done in the field of child immunization. Though the trend presents a very irregular picture as all the districts follow Polynomial trend for the ten-year time period taken with a low R-square value, still in the recent years, post 2013-14, there has been an upsurge in UIP expenditure in all the three districts. It’s worth mentioning here that, UIP was given the status of one of the five, National Technology Missions’ in 1986. Subsequently in 1992 UIP became a part of Child Survival and Safe Motherhood Program, and then of Reproductive and Child Health (RCH) program in 1997. A specific Immunization Strengthening Program (ISP) was designed to run from 2000-2003 which included three main components, polio eradication, strengthening routine immunization and strategic framework of development. Over the years, various service packages have been developed around the RCH program that have tended to function independently, in order to bring about greater impact of the program and create a synergy between the various packages. Immunization is one of the most cost effective intervention to prevent sickness, disability and death, and its benefit are not only restricted to improvement of health and life expectancy but also have social and economic impact both at community and national level.

In order to examine the relationship between public healthcare expenditure and infant health, the relation between Public expenditure and percentage of live birth has been examined by using the following regression model:

\[ Lb = \alpha + \beta_1 P \text{ex}_{i} + \gamma M + u \]

Where Lb indicates percentage of live births of children in \( i \)th block in the Barak Valley region of Assam and t stands for time period. Pex\(_{i,t}\) stands for the per capita public expenditure for \( i \)th block in the last period and \( M \) indicates vector of other variables supposed to influence maternal safe delivery of child. A positive and significant value of \( \beta_1 \) (coefficient of Pex\(_{i,t}\)) would provide evidence for encouraging impact of public expenditure on health. On the basis of the review of literature in Chapter-2 some other control variables affecting live births of children’s have been identified.

The final specification of the models is,

\[ Lb = \alpha + \beta_1 P \text{ex}_{i} + \gamma_1 Bp + \gamma_2 Idl + \gamma_3 Mmr + \gamma_4 Lpd + u \]

Where,

- Bp=> Blood pressure level is a major cause of maternal and child death. It is the Eclampsia caused in mother due to high Bp. A positive and significant value of the coefficient indicates impact on number of live birth.
- Idl=>Percentage of Institutional Delivery reduces the risk of maternal death. A positive and significant value of the coefficient of Idl indicates impact on number of live birth.
- Mmr => Maternal mortality rate i.e. annual number of deaths of expected mother per 100,000 live births. The relation with dependent variable is expected to be negative as higher deaths of mother will lower number of live births. A positive and significant value of the coefficient indicates impact on number of live birth.
- Lpd=> Indoor Patient Department indicates headcount percentage to outdoor patient attendance. Higher indoor patients lower the chances of risk of delivery of child and the relation with dependent variable is expected to be positive.

The data used for the variables covers the period 2011-12 to 2015-16 on the basis of the availability of time series data for all the variables. \( u \) is disturbance term and assumed to be independently and identically distributed. The most important issue in estimation is the choice between pooled OLS method.
and a method that allows for state-specific effects. Therefore, the Redundant Fixed Effect (RFE) test has been chosen between the pooled OLS and fixed-effect methods. Rejection of pooled OLS method indicates that marginal effect of maternal health delivery system is not uniform across all the block in the Barak Valley region of Assam.

**Table 2. Results of Fixed Effect GLS Regression**

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Value of Coefficients</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>98.52</td>
<td>216.1***</td>
</tr>
<tr>
<td>Pcox</td>
<td>0.011</td>
<td>3.42***</td>
</tr>
<tr>
<td>Bp</td>
<td>-0.02</td>
<td>-5.02***</td>
</tr>
<tr>
<td>Idl</td>
<td>0.001</td>
<td>3.82***</td>
</tr>
<tr>
<td>Mmr</td>
<td>-0.024</td>
<td>-4.66***</td>
</tr>
<tr>
<td>lpd</td>
<td>0.076</td>
<td>4.13****</td>
</tr>
</tbody>
</table>

Note: (*) (** and (***) indicate significant at 10%, 5% and 1% level.
*Cross-section SUR (PCSE) standard errors & covariance (d.f. corrected)
*Greater than lower and upper Durbin-Watson theoretical values at 5% level of significance

All the cross-section fixed effects are non-zero; as such presence of fixed effect is confirmed. However to confirm suitability of Fixed effect model, Redundant Fixed Effects Tests are performed. The superiority of fixed effects model over the constant coefficients (pooled OLS) model is reinforced by the highly significant F-statistic. Also the computed value of Durbin-Watson test statistic in constant coefficient model indicates presence of positive autocorrelation when compared with theoretical value. The redundant fixed effects test shows whether fixed effects are necessary or not. Here, the null hypothesis is that the constant term is the same for all BPHC in the districts of Barak Valley, and the alternative hypothesis is that constant term for each BPHC is different (presence of fixed effects). As the estimated test statistics 13.24 is significant at the 1% level we reject the null hypothesis. Hausman test has also been performed to confirm the suitability of fixed effect model. The estimated coefficients of all the explanatory variables are found to be as per expectation. Thus number of live birth has been influenced by per capita public sector health expenditure, level of Blood pressure, number of institutional deliveries, maternal mortality and percentage of indoor patients (that is, health infrastructure indicator).

**5 CONCLUSION AND SUGGESTIONS**

The study has proved that there exists a positive relation between public health expenditure and child health, in terms of the number of live births. When maternal and child health expenditure as a percentage of total public health expenditure falls, there is high possibility of a negative impact on maternal and child health and healthcare. Certain suggestions are thus made as concluding remarks to improve the healthcare scenario, specifically mother’s and child’s healthcare. Public health infrastructure should be revamped and strengthened since a huge majority of the population is dependent on it. The existing facilities should be expanded and advanced while modern techniques of treatment and diagnostics should be included under the public healthcare purview so that they become affordable and accessible to the economically backward section of the society. The spread of education and awareness among rural people and specifically mothers shall go a long way in creating consciousness among them regarding the need and benefit of ante natal care and child immunisation which will help to reduce the morbidity and mortality of the child and mother. Government should initiate steps and formulate policies to make the public healthcare system self-sustaining in the future. One of the ways is through spreading awareness and knowledge. If such governmental policies are designed and implemented which makes the healthcare system self-sustaining and maintains high standards of healthcare indicators even without the support of financial schemes and incentives, this will release an immense financial burden on the state exchequer.

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