Research Article

Budgetary Expenditure on Health and Human Development in India

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This study aims at analyzing the differentials across rich and poor states and across rich and poorer strata and rural urban segments of 19 major Indian states. The study indicates that besides individual health financing policies of the respective state governments, there are significant disparities even between rural and urban strata and rich and poorer sections of the society. These are indicated by high inequality coefficients and an emerging pattern of lifestyle second generation health problems as well as levels of utilization of both preventive and curative care both in public and private sectors. Our results emphasise that there is a need to increase public expenditure on health, improve efficiency in utilization of existing public facilities, and popularize government run health insurance schemes meant primarily for the poor. These steps may help to mitigate partly the inequitable outcomes.

1. Introduction

There has been a general concern for disparity across rural and urban areas particularly pertaining to human development. This is despite the persistent policies of investing more in rural health infrastructure and an orientation of health policies which remain rural focused in India. It is pertinent to explore the issue that why this outcome of adverse indicators of human development for rural areas has emerged as a prominent outcome of planned effort and to suggest remedy for this disparity. The objective of this paper is to analyse this disparity in terms of different indicators of mortality and diseases which include infant mortality rate (IMR), child mortality (CMR), and under five mortality (UFMR). The model concentrates on the role of price factors, time prices, earned and nonearned income, and health insurance. A number of socioeconomic variables including religion, caste, education, and assets are also used in empirical estimation. For simplicity, the formal model is developed in terms of only one provider of health, but the implications for several providers can easily be drawn.

2. Methodology

In this paper we compare human development and health outcomes across major Indian states. First we explain here the basic framework for our analysis and data base.

Our focus in this paper is more on health and human development perspective1.

To develop empirically testable hypotheses, a model of the demand for health defined in terms of different indicators of mortality and diseases is specified. Since life expectancy at birth is an important component of human development and it depends crucially on mortality rates in the initial years of life, we have used therefore three indicators of mortality which include infant mortality rate (IMR), child mortality (CMR), and under five mortality (UFMR). The model concentrates on the role of price factors, time prices, earned and nonearned income, and health insurance. A number of socioeconomic variables including religion, caste, education, and assets are also used in empirical estimation. For simplicity, the formal model is developed in terms of only one provider of health, but the implications for several providers can easily be drawn.
Let the intertemporal utility function of a typical consumer be

\[ U = U(\Delta t H_t, Z_t), \quad t = 0, 1, \ldots, n, \]  

(1)

where \( H_t \) is the stock of health at age \( t \) or in time period \( t \), \( \Delta t \) is the service flow per unit stock, \( h_t = \Delta t H_t \) is total consumption of “health services,” and \( Z_t \) is consumption of another commodity.

The stock of health in the initial period (\( H_0 \)) is given, but the stock of health at any other age is endogenous. The length of life as of the planning date \( n \) also is endogenous. In particular, death takes place when \( H_t \Delta t H_{\text{min}} \). Therefore, length of life is determined by the quantities of health capital that maximize utility subject to production and resource constraints.

If we write \( h_t = \Delta t H_t = m \) denoting medical services or any other commodity or characteristic leading to health and assume that two goods enter the individual’s utility function: medical services \( m \), and a composite \( X \), for all other goods and services and also presume a fixed proportions of money and time to consume \( m \) and \( X \), these combined with the full wealth assumption, the model can be represented as follows:

Maximize \( U = U(m, X) \)

subject to \( (p + wt)m + (q + ws)X \leq y + wT = Y, \)

(2)

where \( U \): utility, \( m \): medical services, \( X \): all other goods and services, \( p \): out-of-pocket money price per unit of medical services, \( t \): own-time input per unit of medical services consumed, \( q \): money price per unit of \( X \), \( s \): own-time input per unit of \( X \), \( w \): earnings per hour. \( Y \): total (full) income, \( y \): non-earned income, and \( T \): total amount of time available for market and own production of goods and services.

Here the consumption of medical services, \( m \), does not affect the amount of time available for production, \( T \).

Using the above basic consumption model formulation, the effect of various parameters on health could be tested in a regression framework. The literature broadly from the health economics field on the determinants of health outcomes in populations mainly indicates five sets of factors that could be considered important to explore. These include socioeconomic status, access to health services, environment and others including nutrition and personal attributes [1].

Generally, rural and urban populations tend to differ with respect to many health indicators. It is typically presumed that the urban population is better off. The reality is depicted more vividly when a disaggregate scenario is analyzed using an acceptable measure of income categories. Empirically and rather paradoxically to presumption of better urban health, in some countries like Colombia and Peru, indicators suggest that the urban poor are worse off than their rural counterparts, and the health status of the urban population varies widely across countries, provinces, and city sizes [2, 3]. In addition, urban populations are more susceptible due to degradation of physical environment. For instance, a study on São Paolo, Brazil, finds that an increase in airborne contamination (which is higher in cities) results in increased hospitalization due to respiratory illness and pneumonia [4]. Thus it is another set of presumption that higher income is positively correlated with better health, with the direction of causality clearly established from wealthier to healthier [5], urban poor can experience problems with their physical environment that are distinct from and have greater negative health impacts than those faced by their rural counterparts and personal hygiene, nutrition, choice of physical activities, and employment can have an extremely important effect on health in terms of incidence of obesity, heart disease, cancer, sexually transmitted diseases and similar kind of chronic lifestyle diseases. A notable trend across the globe is a steady increase in urban populace with nearly one-third of these urban dwellers having a living in urban slums. It is estimated that nearly 30% of India’s population or about 300 million people live in towns and cities and nearly 100 million of them live in slums which are characterized by overcrowding, poor hygiene and sanitation and the absence of proper civic services. Thus, in definite ways, it is not an exaggeration to presume that health of the urban poor is as bad as the rural population.

By systematic planning since independence, health system in India is more focused towards the rural areas having an organizational structure right from grass root to tertiary care managed by dedicated staff. In contrast however there is a huge deficiency of any such health care structure in the urban areas. Majority of health care in urban area is served by the private sector but its costing, distance, and many other factors make private sector facilities out of reach of most urban poor residents. Health care system in India in the last 45 years has focused on increasing coverage in rural areas. It has been assumed that with high concentration of health facilities and services in the cities compared with rural areas, urban health problems are less. But in fact, for the urban poor, the level of access to health facilities falls below the minimum equitable level, where primary health care facilities, their location, resources, quality, and performance are often poor, their links to deprived communities are inadequate, and their utilization is low [6]. Thus, there exist wide gap in the utilization pattern of health services and health improvement in urban area.

Thus, a priori, based on the formal model of demand for health services one can expect that time will function as a normal price, and demand for free care will be more sensitive to changes in time prices than will demand for nonfree care. The elasticity of demand for medical services with respect to nonearned income should be positive and the elasticity of demand with respect to earned income is indeterminate, but the price effect may dominate for free care (and thus reduce demand) and the income effect may dominate for non-free care (and thus increase demand). Further in the absence of differences in taste for particular types of providers, more education may reduce the demand for care. If there are taste differentials (with the more educated preferring private care), there may be a negative elasticity with respect to education for public care and an elasticity biased upward (possibly positive) for private care.
2.1. Data. In order to carry out regression exercise we have made use of NFHS state level reports of National Family Health Survey 2005-06 (NFHS-3). These reports are published by the Ministry of Health and Family Welfare, Government of India (MOHF, GOI) which are downloaded from the Ministry’s website. The states included in our analysis comprise 19 states. These include Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Himachal Pradesh, Harayana, Jharkhand, Karanataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, Uttarakhand, and West Bengal.

Both for rural and urban areas we have used a set of 12 dependent variables. These include three mortality indicators namely infant mortality rates (IMR), child mortality rate (CMR) and under five mortality rates (UFMR). The other dependent variables represent nutritional deficiency or diseases for men, and women separately. Thus nutritional disorders are represented by Underweight children, anemia of children and women separately and three environment related or life style diseases for males and females namely, diabetes, asthma and goitre. Among the set of independent variables we used some 48 variables representing various socioeconomic aspects. These were used based on their statistical significance individually prior to selecting final equation which combined them after taking into account any multicollinearity.

3. Findings and Discussion

In this section we first explain situation in regard to human development and budgetary financing in Indian states, which is followed by an explanation of the variations in health indicators across rural and urban areas and their potential causes, including inadequate access to infrastructure, health services, and education. This section concludes with our findings and suggestions.

3.1. Human Development and Budgetary Financing: Poor versus Rich States. A broad view of the human development indices (HDI) across major Indian states is presented in Figure 1. This is indicated by HDI bars. These generally depict a lower index value for low income states like Orissa, Bihar, Chhattisgarh and Madhya Pradesh (MP) as the states which rank lowest and with the sequence moving to better off states ranking higher in HDI with Kerala, Punjab, Himachal Pradesh (HP), and Maharashtra among the top five states. However, there has been a concern about rising inequalities and uneven distribution of the benefits of growth and explicitly capturing quantification of the potential loss due to inequality with respect to access to education and, health and recently a study by United Nations Development Programme (UNDP) provides another index, called Inequality-adjusted Human Development Index (IHDI) which is based on methodology proposed in the 2010 Human Development Report. To facilitate a comparison between usual HDI indices and newly presented IHDI we have also presented both of these in Figure 1 and Table 1 for major Indian states. With this new index the lowest ranking first four states become MP, Chattisgarh, Orissa, and Bihar whereas the highest moves from Kerala to Punjab, HP, and Maharashtra. In both the set of indices we find that poorer states continue to remain low in their HDI or IHDI and better off states remain higher in these indices.

Thus in view of the distinct differential across rich and poor states in terms of their human development indices we have compared the financing situation with respect to these groups of states. Figures 2 and 3 thus present an overview of social sector expenditure in these categories of
Table 1: HDI and IHDI estimates across Indian states.

| State             | HDI  | IHDI | Rank HDI | Rank IHDI | Difference |
|-------------------|------|------|----------|-----------|------------|
| Andhra Pradesh    | 0.485| 0.332| 11       | 12        | −1         |
| Assam             | 0.474| 0.341| 12       | 11        | 1          |
| Bihar             | 0.447| 0.303| 18       | 16        | 2          |
| Chhattisgarh      | 0.449| 0.291| 17       | 18        | −1         |
| Gujarat           | 0.514| 0.363| 8        | 7         | 1          |
| Haryana           | 0.545| 0.375| 5        | 6         | −1         |
| Himachal Pradesh  | 0.558| 0.403| 3        | 3         | 0          |
| Jharkhand         | 0.464| 0.308| 15       | 14        | 1          |
| Karnataka         | 0.508| 0.353| 10       | 9         | 1          |
| Kerala            | 0.625| 0.520| 1        | 1         | 0          |
| Madhya Pradesh    | 0.451| 0.290| 16       | 19        | −3         |
| Maharashtra       | 0.549| 0.397| 4        | 4         | 0          |
| Orissa            | 0.442| 0.296| 19       | 17        | 2          |
| Punjab            | 0.569| 0.410| 2        | 2         | 0          |
| Rajasthan         | 0.468| 0.308| 14       | 13        | 1          |
| Tamil Nadu        | 0.544| 0.396| 6        | 5         | 1          |
| Uttar Pradesh     | 0.468| 0.307| 13       | 15        | −2         |
| Uttar Pradesh     | 0.515| 0.345| 7        | 10        | −3         |
| West Bengal       | 0.509| 0.360| 9        | 8         | 1          |
| India             | 0.504| 0.343|          |           |            |

Source: same as Figure 1.

Figure 3: Poor States (Social Sector Exp/GSDP) (%) (2005–11). Source: RBI, 2011; GSDP in the above figures stands for Gross State Domestic Product.

Figure 2: Average income and rich states (social sector exp./GSDP) (%) (2005–11).

3.2. Rural versus Urban Areas. A comparative profile of rural and urban sectors across 19 states is presented in Figures below. It could be observed that all the three types of mortality indicators namely infant mortality (IMR), child mortality (CMR), and under five mortality (UFMR) except for Kerala are higher for rural areas relative to their counterparts in urban areas (Figures 9, 10, and 11). Except Rajasthan (for IMR), this differential is very glaring for other states.

As depicted in Table 2, the rank of MP is highest in terms of all the three mortality indicators whereas UP and Tamil Nadu seem to be at the bottom leaving the exception of Kerala which has in fact the lowest mortality in the country. Most of the poorer states like Chhattisgarh, Jharkhand, Orissa, and Assam comprise the top five mortality states as ranked by IMR. The better-off states (relative to all India average in per capita income) are also having a better situation in terms of mortality indicators (Figures 9–11 and Table 2). A similar observation could be made in terms of urban mortality differentials where poorer states like Rajasthan (top IMR in urban areas), Assam, Bihar, Chhattisgarh, and Jharkhand are the first top five mortality states in IMR (Table 3).

By contrast, generally richer states like Gujarat, Maharashtra, and Punjab are lower in the IMR ranks for urban areas. There is an improved position and mixed trend for middle income states like AP, and rich ones like Karnataka and Tamil Nadu.
Figure 4: Budgetary exp. on health and education for major Indian states (2009–10). Source: RBI, 2011 [16].

Figure 5: Average income and rich states: growth rate of budgetary exp on Health (% of aggregate Exp.) (2000–11). Source: estimated from RBI, 2011 [16].

Figure 6: Poor states: growth rate budgetary exp on Health (2000–11) (% of Agg. Exp.) Source: estimated from RBI, 2011 [16].

Figure 7: Average and rich states: education budgetary exp (% of Agg. Exp) (growth rate 2001–11). Source: estimated from RBI, 2011 [16].

Figure 8: Poor states: education budgetary Exp(% of aggregate exp) (growth Rate 2000–11). Source: estimated from RBI, 2011 [16].

Figure 9: Infant mortality (rural versus urban). Source: IIPS and Macro International, 2008 [14].

Figure 10: Child mortality (rural and urban). Source: IIPS and Macro International. 2008 [14].
A further noteworthy feature in this regard is that despite NRHM inputs meant particularly for poorer rural areas, a system geared towards rural orientation and in recent years a direct intervention is being made through primary health schemes. It is thus imperative that poorer sanitation and housing in states like Assam, Bihar, UP, MP, and Orissa (Figure 16). Most of the rural areas are having a much lower proportion of proper housing facility as depicted by the results of underweight children and anemia of children and women which fall mostly under lower ranking IMR states with some variations in relative rankings pertaining to other mortality indicators of CMR and UFMR (Table 3).

Thus it is pointed out that even among the poorer or richer states there is a considerable disparity between rural and urban areas. Generally rural areas also have higher inequitable distributions as depicted by the composition of the respective populations in terms of lowest and highest wealth index provided by NFHS. A uniform scenario depicted in Figure 12 indicates that a major proportion among lower wealth index people is residing in rural areas. For instance, this proportion of lower wealth index people is nearly 70 in Jharkhand and 50 percent in Chhattisgarh, Madhya Pradesh (MP), and Orissa. In other states like Rajasthan, UP and West Bengal it is nearly 30 percent (Figure 12). By contrast urban areas have a majority of highest wealth index people in all the states with an exception of Kerala (Figure 13). In the states of Gujarat, Himachal Pradesh, Haryana, Rajasthan, Punjab, and Uttarakhhand more than 50 percent urban residents seem to be in the highest wealth index. Further as depicted in Figure 13, states like Assam, Bihar, Chhattisgarh, Kerala, UP, and West Bengal have nearly 30 percent (or more) urbanites with highest wealth index.

It should be noted that even the planning of basic resources like improved water supply and sanitation also goes in line with these distributions. As depicted in Figures 14 and 15, the improved sources of water supply are much below in rural areas relative to their urban counterparts in most of the states with some exceptions like Punjab and Tamil Nadu (in water supply) and Kerala (in sanitation). These differentials are low in water supply but in sanitation there is a glaring gap between rural and urban areas both in richer and poorer states (Figures 14 and 15). A similar observation holds true in regard to pucca housing where except Kerala (with lower gap) most of the rural areas are having a much lower proportion of the pucca housing facility with a worse situation in poorer states like Assam, Bihar, UP, MP, and Orissa (Figure 16). It is thus imperative that poorer sanitation and housing may have a definite adverse impact on mortality indicators which thus happen to be more in rural areas. Even though a direct intervention is being made through primary health system geared towards rural orientation and in recent years NRHM inputs meant particularly for poorer rural areas. A further noteworthy feature in this regard is that despite a liberalisation of insurance sector since 2001 and a plethora of individual health schemes/health insurance schemes initiated in recent years the coverage in rural areas of these schemes is abysmally low and much lower than urban areas (Figure 17).

Results of our regression analysis using logit and OLS are presented in Tables 4 and 5. Since mortality and other indicators like underweight children, anemia of women and children are given as per thousand or in proportions, we have used logit models for these dependent variables and the results are presented in Tables 4 and 5. Both for rural and urban areas we have used a set of 12 dependent variables. These include three mortality indicators, namely IMR, CMR, and UFMR. The other dependent variables represent nutritional deficiency or diseases for men and women separately. Thus nutritional disorders are represented by Underweight children, anemia of children and women separately and three environment-related or lifestyle diseases for males and females namely, diabetes, asthma and goitre. Among the set of independent variables we used some 48 variables representing various socioeconomic aspects. These were used based on their statistical significance individually prior to selecting final equation which combined them after taking into account any multicollinearity. Thus in the set of rural sector results, 18 explanatory variables in different equations emerged as statistically significant. In urban sector results such variables were 21. Generally explanatory power has been satisfactory for our results which are depicted through R bar squared values in the tables.

In the regressions particularly among the set of explanatory variables representing economic status of people we expect that a variable representing income should be influential in determining mortality rates or nutritional deficiency related diseases like underweight children or anemia. Since NFHS data used in this study give wealth index (rather than income) we have used wealth index as proxy for income variable. Also since below poverty level people are provided with a card to identify them for concessional rates in rationing and other provisions, we have also used this variable separately as another proxy for income or economic status. Among others we expect that a lower (or higher) wealth index and BPL card holding should be influential in both rural and urban areas to determine mortality and nutrition-related diseases. Thus, results of our rural sector depict that mortality is highly positively influenced by lack of basic education of women with its coefficient ranging from .131 (for IMR) to .232 (for UFMR). An important aspect is positive impact of ST belonging for all these mortality indicators (Table 4). This indicates a lack of positive impact of various promotive and curative care for tribal areas. Lack of sanitation and proper housing facility seemed to have its positive impact on mortality either for IMR or other two mortality indicators (Table 4). It is further observed that nutritional deficiency as depicted by the results of underweight children and anemia of children and women are positively impacted by lack of basic education for females. Likewise belonging to a poor family (coefficient of lowest wealth index = .095) and poor housing condition (coeff = .035) are other important
determinants of underweight of children and women anemia (Table 4). These results of mortality indicators thus reinforce the fact that rural poor are at a disadvantage in receiving fully the benefits of our health system. Lifestyle diseases like diabetes and asthma had an impact from religion and household size indicating that sometimes certain food habits owing to some community influence and overall bigger size of family leading to less careful trend towards individual health might have had an impact in the incidence of such diseases (Table 4).

The results of urban sector indicate lack of female education, proper housing, and insurance as important determining factors in influencing mortality (Table 5). The coefficient of lack of female education varies between .196 (for IMR) to .241 (for UFMR). The coefficients of insurance and lack of proper housing vary between .242 (for IMR) and .127—.205 (for CMR and IMR), respectively (Table 5). These results of urban mortality in fact depict a disadvantageous situation caused by proper availability of adequate financial resources (lack of insurance) and prevalent condition of poor housing in poorer localities of urban areas. A further impact of poverty driven diseases particularly women anemia is also noted through these results for urban sector with an impact of belonging to a lowest wealth index family (coeff. .692),
shared sanitation facility (.164) and no transport vehicle ownership (coeff. .091) (Table 5). An important determinant of diabetes and asthma is seen with the impact of household size (-.565 for diabetes of women), BPL status (both for men and women coeff. Between .235–.404, women and men resp.) and ownership of farm animals (for diabetes women coeff. -.378).

Thus our results are in line with other studies which indicate toward much better health in urban areas. For instance, in Colombia child malnutrition and infant mortality are much more prevalent in rural areas [2]. In Peru health indicators are two to four times better in urban areas than in rural areas. Generally higher income is found positively correlated with better health, with the direction of causality clearly established from wealthier to healthier [5]. It has also been pointed out that sickness and poverty generally send households into poverty as debts are incurred for treatment or breadwinners are no longer able to work [1, 3]10. In line with our findings, other studies also provide evidence that physical environment, including access to water and sanitation, exposure to environmental contamination and the level of cleanliness, is a key determinant of health outcomes [3]. The social environment, like the level of community integration, membership in social groups has been found to be inversely related with health [7].

While poverty has a uniform impact on both the rural and urban people, it is emphasized that urban poor particularly in their health outcomes are influenced by a number of other factors since partly the urban population has better access to infrastructure, medical services and more money than the rural population yet their physical environment is distinct from and has greater negative health impacts than those faced by their rural counterparts. A number of studies indicate that environmental pollution has a significant effect on the health of urban populations. It may be for instance an increase in airborne contamination (which is higher in cities) resulting in increased hospitalization due to respiratory illness and pneumonia [4]. In fact it is suggested that pollution has a disproportionately large impact on lower income populations in urban areas, but little research has been conducted on the issue [8, 9]. Evidence from UHRC indeed indicate that in India one in every ten children in slums do not live to see their fifth birthday. Only 42% of slum children receive all the recommended vaccinations. Over half (56%) of child births take place at home in slums putting the life of both the mother and newborn to serious risk. Poor sanitation conditions in slums contribute to the high burden of disease in slums. Two-thirds of urban poor households do not have access to toilets and nearly 40% do not have piped water supply at home.

4. Conclusions

Our regression results thus indicate that both the factors namely, poverty and rural-urban belonging influence health demand and education also modifies the pattern of such demand as well as pattern of diseases. Combined with the health and education financing depicted in the earlier
Table 4: Regression results for impact of socioeconomic variables (rural).

(a)

| Explanatory variable/statistic | RM3† | RM4† | RM5† | UWRURAL† | RUANMCHL† | RUANMWMN† |
|--------------------------------|------|------|------|----------|-----------|-----------|
| ED1F                           | .131 (2.70∗) | .218 (3.25∗) | .232 (3.56∗) | .096 (2.13∗) | .200 (3.65∗) | .073 (1.93∗∗) |
| ST                             | .237 (3.51∗) | .124 (2.66∗) | .282 (3.91∗) | —         | —         | —         |
| Facility shared                | —     | .412 (2.36∗) | .569 (2.68∗) | —         | —         | —         |
| Kachha                         | —     | —     | —     | —         | —         | —         |
| Lowest                         | —     | —     | .095 (2.84∗) | —         | —         | —         |
| Nuclear                        | —     | —     | —     | —         | —         | —         |
| Semkacha                       | —     | —     | —     | —         | —         | .035 (1.35) |
| Hindu                          | —     | —     | —     | —         | —         | —         |
| Muslim                         | —     | —     | —     | —         | —         | —         |
| HHSize                         | —     | —     | —     | —         | —         | —         |
| Diabtwmn                      | —     | —     | —     | —         | —         | —         |
| BPL Card                       | —     | —     | —     | —         | —         | —         |
| Diabtmen                       | —     | —     | —     | —         | —         | —         |
| Frmanimal                      | —     | —     | —     | —         | —         | —         |
| ED2Man                         | —     | —     | —     | —         | —         | —         |
| Pseudo $R^2$                   | .280  | .239 | .351 | .205      | .178      | .067      |
| Chi square                     | 30.62∗ | 25.44∗ | 38.29∗ | 23.01∗    | 19.44∗    | 7.47∗∗    |

† indicates logit model results of the respective dependent variable.

(b)

| Explanatory variable/statistic | Diabwmn | ASTHWMN | Goitrwmn | Diabtmen | Asthmwmn | Goitrmen |
|--------------------------------|---------|---------|----------|----------|----------|----------|
| Intercept                      | 4176.57 (3.62∗) | 727.86 (2.41∗∗) | 138.02 (1.07) | 2485.32 (3.84∗) | −1421.32 (−1.30) | −1123.00 (−2.05∗∗) |
| ED1F                           | —       | —       | —        | —        | —        | —        |
| ST                             | —       | —       | —        | —        | —        | —        |
| Facility shared                | —       | —       | —        | —        | —        | —        |
| Kachha                         | —       | —       | —        | —        | —        | —        |
| Lowest                         | —       | —       | —        | —        | —        | —        |
| Nuclear                        | —       | —       | —        | —        | —        | —        |
| Hindu                          | −.457 (−2.20∗) | —       | —        | —        | —        | —        |
| Muslim                         | —       | .429 (2.09∗∗∗) | .632 (3.41∗) | .537 (3.91∗) | —        | .680 (4.16∗) |
| Pucca                          | —       | —       | —        | —        | —        | .510 (2.70∗∗) |
| Goitrmen                       | —       | —       | .324 (2.16∗∗) | —        | —        | —        |
| HHSize                         | −.514 (−2.47∗∗) | —       | —        | −.442 (−3.45∗) | —        | —        |
| Diabtwmn                      | —       | .359 (1.75∗∗∗) | —        | —        | —        | —        |
| BPL card                       | —       | —       | .482 (2.60∗∗) | —        | —        | —        |
| Goitrmen                       | —       | —       | —        | —        | —        | —        |
| Diabtmen                       | —       | —       | —        | —        | .934 (5.76∗) | —        |
| Frmanimal                      | —       | —       | —        | —        | .275 (1.699) | —        |
| ED2Man                         | —       | —       | —        | —        | —        | .341 (1.82∗∗) |
| $R^2$                          | .294    | .364    | .465     | .810     | .649     | .526     |

F statistic and DF: 4.547∗∗, 17 | 6.14∗, 18 | 7.95∗, 16 | 25.11∗, 17 | 17.62∗, 18 | 7.67∗, 18

Source: estimated; *1%, **5%, ***10%, †: slightly below 10%.
Table 5: Regression results for impact of socioeconomic variables (urban).

(a)

| Explanatory variable/statistic | Dependent variable | Um3† | Um4† | Um5‡ | Uwturbn§ | Uanchld¶ | Uanwmn traversal |
|-------------------------------|---------------------|------|------|-------|----------|-----------|-----------------|
| ED1F                          |                     | .196 (2.72∗) | .241 (2.99∗∗∗) | .213 (3.04∗) | .208 (3.01∗) | .169 (2.48∗∗) |
| Insurance                     |                     | .242 (1.91∗∗) |       |       |           |           | .692 (3.41∗) |
| Lowest                        |                     |       |       |       |           |           | .164 (2.54∗) |
| ST                            |                     |       |       |       |           |           | .091 (1.99∗∗) |
| No transport                  |                     |       |       |       |           |           | .164 (2.54∗) |
| Kachha                        |                     |       |       |       |           |           | .091 (1.99∗∗) |
| Lowest                        |                     |       |       |       |           |           | .164 (2.54∗) |
| Nuclear                       |                     |       |       |       |           |           | .091 (1.99∗∗) |
| Semkacha                      |                     | .205 (3.10∗) | .127 (2.43∗) | .149 (2.58∗) |           |           | .151 |
| Puca                          |                     |       |       |       |           |           | .151 |
| Goitrmen                      |                     |       |       |       |           |           | .151 |
| HHSize                        |                     |       |       |       |           |           | .151 |
| Diabtwmn                      |                     |       |       |       |           |           | .151 |
| BPL card                      |                     |       |       |       |           |           | .151 |
| Goitrmen                      |                     |       |       |       |           |           | .151 |
| Diabtmn                       |                     |       |       |       |           |           | .151 |
| Frmanimal                     |                     |       |       |       |           |           | .151 |
| ED2Man                        |                     |       |       |       |           |           | .151 |
| Pseudo R²                     |                     | .178  | .162  | .176  | .091  | .007  | .151 |
| Chi sq.                       |                     | 19.38∗ | 17.28∗ | 18.74∗ | 9.93∗ | 7.22∗ | 16.94∗ |

† indicates logit model results of the respective dependent variable and values in the parentheses are Z values.

(b)

| Explanatory variable/statistic | Udbtwmn | Uathwmn | Ugtrwmn | Udbtmen | Uathmen | Ugtrmen |
|-------------------------------|---------|---------|---------|---------|---------|---------|
| Intercept                     | 4130.38 (4.01∗) | −700.82 (−2.32∗∗) | 10767.55 (2.35∗∗) | 6225.29 (2.16∗∗) | −3217.47 (−4.53∗) |
| ED1F                          |         |         |         |         |         |         |
| Improv                        |         |         |         |         |         |         |
| Insurance                     |         |         |         |         |         |         |
| Lowest                        |         |         |         |         |         |         |
| ST                            |         |         |         |         |         |         |
| Facility shared               |         |         |         |         |         |         |
| No transport                  |         | .249 (3.03∗) |         |         |         | .568 (4.25∗) |
| Ownhouse                      |         |         |         |         |         | .571 (4.28∗) |
| Mqtnet                        |         |         |         |         |         | −.268 (−2.15∗∗) |
| Puca                          |         |         |         |         | .568 (3.34∗) |         |
| Goitrmen                      |         |         |         |         |         |         |
| HHSize                        | −.565 (−3.48∗) |         |         |         |         |         |
| Ugtrwmn                       | .493 (3.24∗) | .751 (8.85∗) |         |         |         |         |
| Diabtwmn                      |         |         |         |         |         |         |
| BPL card                      |         | .235 (2.71∗∗) |         |         |         |         |
| goitrmen                      |         |         |         |         |         |         |
| Diabtmn                       |         |         |         |         |         | .402 (1.93∗∗∗) |

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sections, overall human development pattern seems to have been influenced by poverty, inequality across rural and urban areas and inadequate financing efforts by the states for health and education. Thus it is important that health care spending by the state governments should be increased to meet the requirement of additional resources at the state level. Between 1996-97 and 2005-06, total government spending on health was stagnant at about 1 percent of GDP, and the public expenditure elasticity with respect to GDP was at 0.94, lower than the average for low-income countries (1.16) for the same period [10]. However, in the health policy document an increase in health expenditure by Government as a percent of GDP from the existing 0.9% to 2.0% by 2010 was envisaged [11]. Despite efforts to increase public spending after 2005-06 including the adoption of NRHM, the expenditure increased only marginally to 1.2 percent of GDP in 2009-2010. In fact, the High Level Expert Group on Universal Health Coverage for India has further recommended that public spending on health should increase to 2.5 to 3 percent in the medium term [12].

Secondly, within the states, a further analysis by us earlier at the district level in MP and West Bengal (poorer states) and Karnataka, Maharashtra and Punjab (richer States), for instance, further indicate that outcomes in health sector are being influenced by an inefficient utilization of limited budgetary resources due to various factors comprising of misallocation of funds across inputs, low productivity and local political bureaucratic hurdles [9]. Thus any financing strategy to human development aiming at reducing disparities should also take into account not only overcoming inadequacy but also inefficiency in allocation and utilization of health care inputs [9].

Thirdly, in recent years there has been a trend to involve more and more private sector to mobilize resources and pass on some responsibility partly or jointly with the government to run health care establishments. As the official reports also indicate that such type of reliance on private sector has not brought out desirable outcome [13] and there is a need thus to improve state run health facilities through better management and popularize state run health insurance which primarily targets the poor populace. It is revealed by studies that most of these state run insurance schemes have had very poor uptake and the fund meant for these schemes has been utilized to an abysmally low levels (2008). In fact the Central Government subsidizes the premium costs for the BPL community by reimbursing the insurance companies after a policy has been sold to a BPL. However, there has been little uptake of the universal health insurance (UHI) and very low levels of subsidy reimbursement (less than half or one-fourth in many years as compared to planned in the budget) to the implementing insurance companies (2008).

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Endnotes

1. In the literature, basic approach to the demand for health as developed initially by Grossman [17] has been labeled as the human capital model because it draws heavily on human capital theory [18–21]. According to human capital theory, increases in a person’s stock of knowledge or human capital raise his productivity in the market sector of the economy, where he produces money earnings, and in the non market or household sector, where he produces commodities that enter his utility function. Grossman approach uses the household production function model of consumer behavior [22–24] to account for the gap between health as an output and medical care as one of many inputs into its production. This model draws a sharp distinction between fundamental objects of choice—called commodities—that enter the utility function and market goods and services. Consumers produce commodities with inputs of market goods and services and their own time. Since goods and services are inputs into the production of commodities, the demand for these goods and services is a derived demand for a factor of production. That is, the demand for medical care and other health inputs is derived from the basic demand for health. It is stressed that the shadow price of health depends on many other variables besides the price of medical care. Shifts in these variables alter the optimal amount of health and also alter the derived demand for gross investment and
for health inputs. Grossman emphasizes that, under certain conditions, an increase in the shadow price may simultaneously reduce the quantity of health demanded and increase the quantities of health inputs demanded.

2. This formulation is largely based on [15].

3. See for instance, Kantharia SL National Journal of Community Medicine 2010, Vol. 1, Issue 1.

4. The states here are considered poor, middle income and rich depending upon their per capita state income being much below, nearer or much above all India average per capita income of Rs. 27123 in 2005-06 (the year of NFHS survey). Thus among poor states we include Assam, Bihar, Chattisgarh, Jharkhand, MP, Orissa, Rajasthan, UP and WB. Middle income states include AP and Uttarakhand. Rich states include Gujarat, Harayana, HP, Karnataka, Kerala, Maharashtra, Punjab and Tamil Nadu.

5. Age-to-weight criteria using two standard deviation as given in NFHS 3 data.

6. The states here are considered poor, middle income (or average), and rich depending upon their per capita state income being much below, nearer or much above all India average per capita income of Rs. 27123 in 2005-06 (the year of NFHS survey which we also use later in the paper). Thus among poor states we include Assam, Bihar, Chhattisgarh, Jharkhand, MP, Orissa, Rajasthan, UP and WB. Middle income states include AP and Uttarakhand. Rich states include Gujarat, Harayana, HP, Karnataka, Kerala, Maharashtra, Punjab and Tamil Nadu.

7. The wealth index is constructed by NFHS by combining information on 33 household assets and housing characteristics, such as ownership of consumer assets, type of dwelling, source of water, and availability of electricity, into a single wealth index. The household population is divided into five equal groups of 20 percent each (quintiles) at the national level from 1 (lowest, poorest) through 5 (highest, wealthiest). Since the quintiles of the wealth index are defined at the national level, the proportion of the population of a particular state that falls in any specific quintile will vary across states.

8. OLS estimates may be biased and inefficient in case of discrete dependent variable and thus logit regressions are presented for such dependent variables.

9. Age-to-weight criteria using 2 standard deviation as given in NFHS 3 data.

10. However, there is a very little consensus on the impact of these factors on health outcomes [3]. There is no consensus in the literature on the extent to which consumption of health services improves health outcomes [3]. Studies have shown public expenditure on health services to have a limited impact, possibly due to variations in the quality of expenditure and the importance of individuals’ health-seeking behavior [25].

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