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LINKAGES BETWEEN INCOME, EDUCATION AND HEALTH: CASE OF RURAL ORISSA

HIMANSHU SEKHAR ROUT*

ABSTRACT

The study examines the effect of income and education of the household on its health expenditure, based on primary data collected from Jajpur district of Orissa. Multi-stage random sampling method is adopted to select households (HHs), i.e., sampling unit. The descriptive statistics shows that per capita income and per capita health expenditure are Rs.9, 820.02 and Rs.870.10 respectively per annum. The mean education is 0.94. In rural Orissa, an average person spends around nine per cent of his/her income on health expenditure from his own pocket. To find out the impact of income and education on health expenditure, a linear regression model is fitted as $PHE = 70.001 + 0.62PHI + 0.03EDN$ with R^2 value 0.39 which indicates that, a rupee increase income brings about 62 Paise increase health expenditure of a person and an educated person on an average spends three paise more in a rupee than the uneducated person on health expenditure in rural area. This shows that income has greater positive effect on health expenditure than education.

To improve the health status of the people, extreme poverty and hunger should be eradicated which is the first goal of the Millennium Development Goals (MDGs). The health planners and administrators should be involved in the planning process of the government to reduce poverty and adopt policies for more equitable distribution of income. They can also recommend to have a specific health tax (an earmarked or so-called hypothecated tax) devoted to health care. Again spending more on health services does not necessarily buy better health. It needs an efficient management and use of resources. The principle of equality for opportunity for access to services on the basis of need and equal risk, irrespective of ability to pay should be followed.

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I. INTRODUCTION

Macroeconomic Evidence

Since publication of Adam Smith's *The Wealth of Nations* over three centuries ago, economists have sought answers to the unique question of why some countries are wealthy and others poor. Why do economic growth rates differ? The main empirical tool now used to study economic growth is cross-country analysis of the relationship between economic growth and a range of variables believed to account for why growth rates differ (Sachs and Werner, 1997). Among the factors being explored are: levels and pattern of educational attainment (schooling); population growth; density of population and age structure; abundance of natural resources; personal and government saving (investment rate); physical capital stock; economic policy, for example liberalization, globalization and privatization; the quality of public institutions; the geography, for example the location and climate of a country.

Recent research has added several specific "health indicators" to these factors, and looked at the links between them and economic growth and development. There are direct and positive links between economic performance and health indicators. Investing on health is a tool of macroeconomic policy as it enhances the economic growth rate. Interestingly, economic historians have concluded that perhaps thirty per cent of the estimated per capita growth rate in Britain between 1780 and 1979 was a result of improvement in health and nutritional status (Fogel, 1997). A strong partial correlation exists between health (as proxied by life expectancy) and output per worker (and, hence, growth) (Knowles and Owen, 1997).

Microeconomic analysis

Unlike macroeconomic studies that compare the performance of countries over time, microeconomic analysis deals with the link between health and income of the households and the individuals. Little attention has been given to the micro aspects of Health Economics by the researchers, government, policy makers and development planners. Too often decision makers and development planners get so absorbed in the macro issues of health economics that they lose sight of the micro issues. Little research has been done to examine the extent to which the money that poor families spend on health care affects their nutritional status and thereby their health and survival particularly of women and children (Werner, 1995). Major theoretical contributions to Health Economics were made in the sixties and seventies (Padhi and Mishra,

2000). Recent individual and household level studies have, however, paid more attention to health and are reaching increasingly consistent findings (Strauss and Thomas, 1998).

Health is influenced by income of the household, education, food, housing, basic sanitation, social practices, measures to control environmental hazards and communicable diseases. The human development outcomes like health, education depend on household characteristics, such as whether the mother is educated, or the family can afford to send the children to school (Devarajan, Miler and Swanson, 2002). Gupta and Dasgupta (2002) finds, as might be expected, that income and price are strongly correlated with one's choice of health care provider ... education is found to be an important determinant of provider choice.

Indian Scenario

Writing about India has always been a formidable challenge. With its endless diversity – of population, climate, topography, religious beliefs, languages, and socio-economic and cultural settings – generalization becomes difficult. Attempts at aggregations mask the wide differentials between and within different regions. India's rich heritage, its brain power, entrepreneurial genius, vibrant democratic polity, its aspirations for superpower status in the IT sector, present a stark contrast to its abysmal poverty and large illiteracy (Mishra, Chatterjee and Rao, 2003). India experiences with a number of development oriented social services, such as primary health, water and sanitation, primary education as well as such amenities as roads and social protection services. Before looking at India-specific research, it is important to cite a number of overview studies that establish a contextual framework. Devarajan and Reinnikka (2002) start with the premises (accepted by much of the development community) that economic growth and increased public expenditures can't, by themselves, ensure favorable socio-economic outcomes in general, or, in particular, the world will meet the Millennium Development Goals (MDGs) by 2005. In a similar vein, Devarajan, Miler and Swanson (2002) note that, at the existing rate of progress many countries will fail to meet the MDGs' quantitative targets for poverty reduction and improvement in health, education, gender equality, the environment and other aspects of human welfare¹.

Since independence, the government, ostensibly driven by socialistic goals, has expressed its intentions to discharge this responsibility in one five-year plan after the other. Ambitious systems, programmes and schemes have been drawn up to alleviate poverty while promoting the goal of universal health care, although the close linkages between the two have not been fully

appreciated (Mishra, Chatterjee and Rao, 2003). In this connection, the study examines the effect of income and education of the household on its health expenditure based on primary data collected from rural Orissa.

II. REVIEW OF LITERATURE

Impact of Income on Health Expenditure

Earlier analysis of the British experience in the nineteenth century (McKeown, Brown and Record, 1972) and the Latin American experience prior to 1930s (Arriaga and Davis, 1965) showed that mortality decline was closely related to improvement in living standards rather than medical breakthroughs. From the 1930s to the 1960s, however, it was claimed mortality reduction were largely independent of increase in living standards (Arriaga and Davis, 1965). Per capita income is the mostly wide discussed socioeconomic determinants of mortality, primarily because it is considered a summary of the ability of an economy to meet the needs of its citizens (Cochrane, 1980).

From being among the first nations that recognized the centrality of *poverty* for health planning, India today faces a crisis in public health. The first comprehensive document on health planning produced by the government in 1946 recognized that *unemployment and poverty* have profoundly adverse effect on health through the operation of such factors as inadequate nutrition, unsatisfactory housing and clothing and lack of proper medical care during periods of illness (Qadeer, 1995). Over all, the poorest twenty per cent of Indians have more than twice the rates of mortality, malnutrition and fertility of the richest twenty per cent (World Bank, 2001). Despite rapid economic growth, over a billion humans still exist in absolute, degrading poverty. Because ill health traps people in poverty, sustained investment in health of the poor could provide a policy lever for alleviating persistent poverty.

India's social services were used relatively little by the poor. The health and education of the poor has improved but not as much for the population as a whole. Physical access to education and health services has improved but inequalities exist because of biases in locating facilities. The access of the poor to housing, social security, and social welfare services has been limited because these services were inadequate relative to needs and because services leak to the *non-poor*. Social service policies are not comprehensive enough and the quality of service is low. The bureaucracy is inadequate to reach the poor. Existing capacity and resources are inadequate, particularly for education and health (Murthy, Hirway, Panchmukhi, and Satia, 1990).

Poverty is a major cause of low health standard (Abel-Smith and Leiserson, 1978). Health expenditure of the household members of rural India is sensitive to changes in household income levels and the elasticity of health expenditure with respect to income is largest for high-income groups (Mathiyazhagan, 2003). Poverty squatter and disease go together. Health status is a matter of economic power. More the capacity of persons to purchase the health and medical care services, the more likelihood of better health status to emerge. Negatively, the poorer section of the population suffers badly in the maintenance of this health and treatment of disease because of poor financial status (Sharma, 2000). A large gap between rich people and poor people leads to higher mortality through the breakdown of social cohesion (Kawachi and Kennedy, 1997).

The impact of poverty on ill health is well known and extensively documented. Ill health can also be an important cause of poverty because it can lead to loss of income, catastrophic health expenses, and orphanhood. Thus improving health can make a substantial contribution to target 1², which aims to halve between 1990 and 2015 the proportion of people whose income is less than \$1 a day. (Haines Andy and Andrew Cassels, 2004). Overall economic growth – particularly poverty-reducing growth – and education are central to good health (WB, 1993).

Poverty invites malnourishment. Malnutrition has been identified as the “biggest single contributor to child mortality in developing countries” (FAO, 1970). The malnourished mother gives birth to a low weight baby. Malnourishment after birth lowers the child’s resistance to disease. A malnourished child may suffer mental impairment and thus benefit less from any education that is provided. Malnutrition affects human growth and development by adversely affecting the normal shape and size of the body, and early childhood it can result in serious retardation in mental development. In India, where children are expected to help in agriculture (as most of the people depend on it), the rates of school attendance is low, and poor health lowers it further. The child who is hungry while at school may gain little from education. Poverty and ill health waste educational resources. Thus, ill health is the cause of poverty, but poverty is also a cause of ill health. Lack of knowledge can be a direct cause of ill health, or it can cause it indirectly by being one of the causes of poverty.

Impact of Education on Health Expenditure

The positive association between education and health is well established but explanations for this association are not. Well-educated people experience better health than the

poor educated, as indicated by high levels of self reported health and physical functioning and low levels of morbidity, mortality and disability (Ross and Wu, 1995). In contrast, low educational attainment is associated with high rates of infection disease, many chronic noninfectious diseases; self reported poor health, shorter survival when sick, and shorter life expectancy (Feldman, Makuc, Kleinman and Cornoni-Huntley, 1989; Guralnik, Land, Fillenbaum and Branch, 1993; Morris, 1990)³. The positive association between health and socioeconomic status, whether measured by education, occupation or income, is largely due to the effects of socioeconomic status on health, not vice versa, and downward morbidity among persons in poor health cannot explain the association (Doornbos and Kromhout, 1990).

Why is education associated with good health? The theoretical explanations fall in to three categories: (1) work and economic conditions, (2) social-psychological resources, and (3) health life style. According to the first explanation, well educated people are less likely to be unemployed and more likely to have full time jobs, fulfilling work, high incomes, and low economic hardship. According to the second, the well educated have social psychological resources, including a high sense of personal control and social support, in addition to economic resources. According to the third, the well educated have healthier life style; compare to the poorly educated, the well educated are more likely to exercise, to drink moderately, to receive preventive medical care, and less likely to smoke (Ross and Wu, 1995).

Mother's year of education is often positively associated with improved child health and nutritional status (Behrman, 1990). There are a variety of mechanisms through which mother's education could raise child health: (1) direct acquisition of basic health knowledge in school may provide future mothers with information useful for diagnosing and treating child health problems; (2) literacy and numeric skills learnt in school may enhance mother's abilities to treat child illness, conditional on health knowledge, and also should help mothers increases their stock of health knowledge after leaving school; and (3) exposure to modern society in general via schooling may change women's attitudes towards traditional methods of raising children and treating their health problems (Glewwe, 1998).

Schultz (1984) argues that mother's education can influence child health in five ways: (1) education may lead to a more efficient mix of health goods used to produce child health; (2) better educated mother may be more effective at producing child health for a given amount and mix of health goods; (3) schooling can affect parents' preferences in systematic ways – for

example, educated mother tends to opt for fewer but healthier children; (4) more schooling should increase family income, either through higher wages or increased productivity in self employment, which should improve child health status; and (5) education raises the opportunity costs of time, which tends to increase the time mothers spent working outside the home and thus reduce both maternal time for child care and duration of breastfeeding.

Barrera (1990) found that better educated mothers tended to wean their children sooner, but they compensated for this shortened breastfeeding time with better care; overall, their children were healthier as measured by higher height-for-age z-scores⁴.

III. METHODOLOGY AND DATABASE

The study is based on primary data collected from Jajpur districts of Orissa which is selected by random sampling method from the top ten districts of Orissa in terms of rural population. Multi-stage random sampling method is adopted to select households (HHs), i.e., sampling unit. In stage I, Rasulpur Block is selected at random out of ten blocks of Jajpur district. In stage II, Jabara and Singapur Gram Panchayatas (GPs) are selected on random basis out of 26GPs of Rasulpur Block. In stage III, Jabara village, out of five villages of Jabara GP and Singapur village out of seven villages of Singapur GP are selected randomly. In stage IV, 67 HHs, out of 422 HHs of Jabara village and 58 HHs, out of 366 HHs of Singapur village are selected on the basis of random sampling method with proportional allocation. The sample size is 125.

To substantiate the objective, i.e., to find out the effect of income and education on health expenditure regression analysis is used and descriptive statistics are estimated. Mainly, three variables are used for this purpose: household health expenditure, income of the household and education of the head of the household. To represent the household health expenditure, per head health expenditure (PHE) is calculated by dividing total annual health expenditure of the household by the household size. Similarly, for income of the household, per head income of the household (PHI) is calculated by dividing total annual household income by size of the household. Dummy variable is used for education in the regression analysis, those head of the family is educated the value one is assigned and those of uneducated, zero value is assigned.

IV. EMPIRICAL EVIDENCE FROM RURAL ORISSA

The descriptive statistics shows (see Table 1) that PHI is Rs.9, 820.02 per annum with 6625.5507 and 0.67 as standard deviation and coefficient variation respectively where as PHE is Rs.870.10 per annum with 812.9338 and 0.93 as standard deviation and coefficient variation respectively. The mean education is 0.94 with 0.23 and 0.25 as standard deviation and coefficient variation respectively. In rural Orissa, an average person spends around nine per cent of his/her income on health expenditure from his own pocket.

TABLE 1: DESCRIPTIVE STATISTICS

VARIABLES →	PER HEAD INCOME	PER HEAD HEALTH EXPENDITURE	EDUCATION
DESCRIPTIVE STATISTICS ↓			
Mean	9820.02	870.10	0.9440
Standard Deviation	6625.5507	812.9338	0.2308
Coefficient of Variation	0.67	0.93	0.25
Highest Value	52500.00	5500.00	1.00
Lowest Value	1428.57	100.00	0.00
Range	51071.43	5400.00	1.00

Source: **Compiled from Primary Data**

According to Sundar (1995) the households spend five per cent of their income on curative health care where as George (1997) estimated it as 9.78. But in the present study, on an average 7.42 per cent of the income is disposed of for health expenditure by a household. In this connection, government spending on the health sector works out to be less than two per cent of the country's Gross Domestic Product (GDP) (Tulasidhar, 1992). The World Health Organization (WHO) has recommended that governments must spend at least 5 percent of their GDP on health care. As the present government is a welfare government, it should increase its health expenditure for better productivity.

In rural Orissa, to find out the impact of PHI and education of the head of the household (EDN) on PHE, a linear regression model is found (see Table 2 and Figure 4.1) to be fitted as $PHE = 70.001 + 0.62PHI + 0.03EDN$ with R^2 value 0.39, which indicates that, *ceteris paribus*, a rupee increase income brings about 62 Paise increase health expenditure of a person and an educated person on an

average spends three paise more in a rupee than the uneducated person on health expenditure in rural area. We can conclude that income has greater positive effect on health expenditure than education. So the family having more income means better health condition. The autocorrelation problem has taken care of with the D-W statistics test.

FIGURE 4.1
RELATIONSHIP BETWEEN
PHE AND PHI (RURAL AREA)

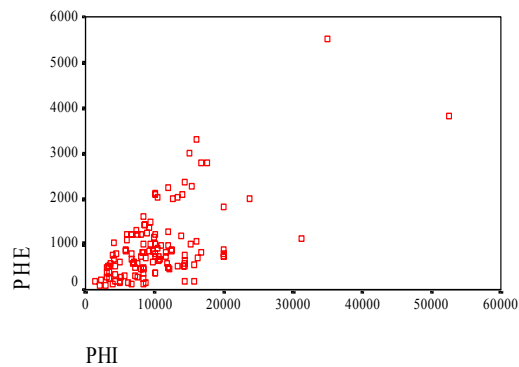


TABLE 2: REGRESSION OUTPUT – ANOVA

	Sum of Squares	df	Mean Square	F	Sig.	R ²	Std error	D-W Stat.
Regression	31481963.160	2	15740981.580	38.054	.000	.39	643.1533	1.657
Residual	50464838.494	122	413646.217					
Total	81946801.654	124						

a Predictors: (Constant), EDN, PHI

b Dependent Variable: PHE

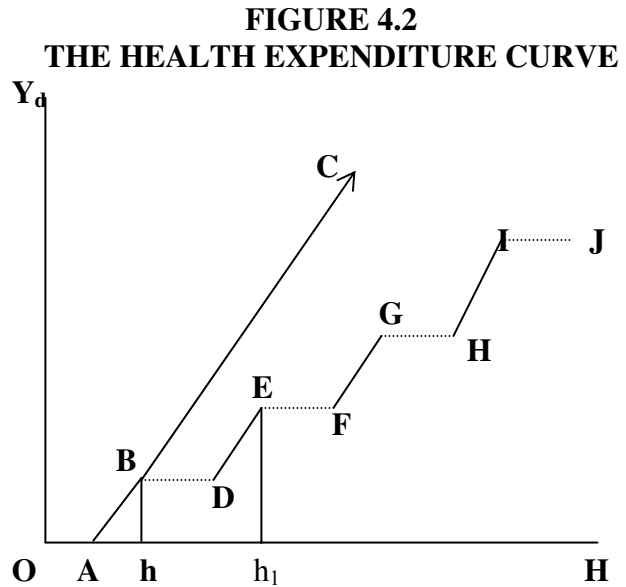
COEFFICIENTS

	Standardized Coefficients B	t	Sig.	95% Confidence Interval for β		Correlations		Collinearity Statistics	
				Lower Bound	Upper Bound	Zero-order	Partial	Tolerance	VIF
Constant	70.001	0.279	.78	-426.538	566.540				
PHI	.616	8.600	.00	.058	.093	.619	.614	.985	1.015
EDN	.029	0.400	.69	-398.172	599.922	.104	.036	.985	1.015

a Dependent Variable: PHE

Source: **Compiled from Primary Data**

From the study, it is found that as disposable income (Y_d) of the household increases, individual takes more care of his life, hence health expenditure (H) increases but at a particular level of income, due to high life risk, health expenditure becomes independent of income and perfectly elastic, which is termed as “*High Life Risk Path (HLRP)*”. The health expenditure during HLRP depends on past saving (S) of household and loanable capacity (L).



In figure 4.2, OA is autonomous health expenditure. In normal life, ABC is the health expenditure curve (with linear relationship assumption between health expenditure and disposable income) without any high life risk. But due to high life risk at Bh level of disposable income, B is the bearable point⁵ and BD is the HLRP. Again normal life starts from point D to point E. At Eh_1 level of disposable income, E is the bearable point and EF is the HLRP and so on. Hence, ABDEFGHIJ is the health expenditure path at high life risk, which is not a normal path.

V. CONCLUSION

Decline in mortality rate (a traditional indicator of health) was closely related to improvement in living standards rather than medical breakthroughs. Per capita income is the mostly wide discussed socioeconomic determinants of mortality, as it is considered a summary of the ability of an economy to meet the needs of its citizens. The impact of poverty (loosely speaking low per capita income) on ill health is well known and extensively documented. Ill health can also be an important cause of poverty because it can lead to loss of income, catastrophic health expenses, and orphanhood. Thus improving health can make a substantial contribution to target 1², which aims to halve between 1990 and 2015 the proportion of people whose income is less than one US Dollar a day.

The positive association between education and health is well established but explanations for this association are not. Well-educated people experience better health than the

poor educated, as indicated by high levels of self reported health and physical functioning and low levels of morbidity, mortality and disability. In contrast, low educational attainment is associated with high rates of infection disease, many chronic noninfectious diseases; self reported poor health, shorter survival when sick, and shorter life expectancy. The positive association between health and socioeconomic status, whether measured by education, occupation or income, is largely due to the effects of socioeconomic status on health. Hence, the impact of income and education on health is empirically tested in rural Orissa.

In an average, a person in rural area spends 46 percent of what a person in urban area spends on health expenditure from his own pocket as his / her income is only around 41 per cent of his / her urban counterparts. But a person in rural area spends around nine per cent of his / her income on health care from his own pocket which is more than a person in urban area who spends only around eight per cent of his / her income. This is because (i) government spending on health care is more in urban than rural area which reduces people's expenditure on it from their own pocket; (ii) in urban area, government and people take more preventive measures than rural area which reduces people's expenditure on their curative care; (iii) urban people take more precautionary measures for health care due to their higher education than rural people; and (iv) a person in rural area spends more on transport cost, which is one of the main component of the health expenditure, to avail the medical facility, than a person in urban area, as it is available far away from his / her residence.

To find out the impact of income and education on health expenditure, a linear regression model is found to be fitted as $PHE = 70.001 + 0.62PHI + 0.03EDN$ which indicates that income of the household influences PHE by 62 percent and an educated person on an average spends three paise more in a rupee than the uneducated person. From the study it is found that as disposable income of the household increases, individual takes more care of his life, hence health expenditure increases but at a particular level of income, due to high life risk, health expenditure becomes independent of income and perfectly elastic, which is termed as "*High Life Risk Path (HLRP)*". The health expenditure during HLRP depends on household's past saving and loanable capacity.

To improve the health status of the people, extreme poverty and hunger should be eradicated which is the first goal of the Millennium Development Goals (MDGs). The health planners and administrators should be involved in the planning process of the government to

reduce poverty and adopt policies for more equitable distribution of income. They can also recommend to have a specific health tax (an earmarked or so-called hypothecated tax) devoted to health care. Again spending more on health services does not necessarily buy better health. It needs an *efficient management and use of resources*. The principle of equality for opportunity for access to services on the basis of need and equal risk, irrespective of ability to pay should be followed.

To tackle poverty, hence, health, it is necessary to consider individual and community. Community development projects that involve people in improving the local environment can provide a useful vehicle within which a wide variety of approaches can be used. The approaches are (i) putting the subject of poverty on the agenda of groups and organizations, (ii) targeting resources and expertise appropriately, (iii) developing educational opportunities, (iv) appropriate tax and benefit measure, (v) ensuring employment opportunities, (vi) changing the environment, and (vii) providing adequate housing. These measures are essential, providing both a better environment and opportunities for all. They all attempt to improve quality of life, and self esteem.

Health is a function, not only of medical care but also of the overall integrated development of socio-cultural, economic, educational and political factors. Therefore to raise the health status and quality of life, a focused approach integrating the development of social, cultural, economical and educational needs to emerge to bring about the overall transformation of a society.

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Notes

1. This debate is fleshed out in **Bhalla, Surjit S. et.al. (Forthcoming) Asian Drama Revisited: Policy Implications for the Poor. Manilla: Asian Development Bank** and in **Bhalla, Surjit S. (2002) Imagine There's No Country: Poverty, Inequality, and Growth in the Era of Globalization. Wasington, D.C.: Institute of International Economics**. Bhalla finds that although the world has already (by end of 2000) exceeded the MDG for poverty reduction, i.e., less than 15 per cent poverty, it is not likely the world will meet the targets of non-monetary human development. As a country gets nearer to the global floor or ceiling values of any particular indicator (e.g., infant mortality or life expectancy), it becomes incrementally more difficult to achieve further progress. Hence the MDGs are not likely to be achieved by the year 2015.
2. Target 1 of Millennium Development Goals (MDGs) declared by United Nations.
3. There are exceptions to this general pattern. For example, well-educated women have higher rates of breast cancer than the poorly educated, largely because they have fewer children, which increase risk. However, among women with breast cancer, well-educated women survive longer than the poorly educated (Lipworth, Abelin and Connelly, 1970).
4. Height-for-age z-score which will be used in the empirical work are based on fitting a standard normal distribution to the growth curves of a healthy population of children. A child with a z-score of zero is exactly at the median in terms of height-for-age, while children with positive (negative) z-scores are taller (shorter) than average. Low height-for-age z-score indicate stunting due to repeated episodes of malnutrition over the life of the child, while low weight for height z-score indicate wasting (weight loss) due to a current episode of malnutrition (Gibson, 1990).
5. The bearable point is the point at which the maximum health expenditure can be financed from a particular level of disposable income.

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