Impact of Female Literacy Rate and Health Facilities on Infant Mortality Rate in Pakistan

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Abstract

The paper assesses the role of education as one of the contributors to economic growth and suggests how various institutions can come as key players to develop methodology equipped to sustain the growth process. The recent economic reforms have handed over the major social sectors such as health and education to the provincial units, thus the future of these sectors seems bleak. The analysis is from a provincial perspective by developing link between the aforementioned sectors as role players in human capital development. The paper analyzes the impact of female literacy on infant mortality in the 35 districts of province of Punjab, Pakistan. The set of variables was selected after a thorough review of empirical studies. These variables are indicators of health, environment, economic status and literacy status of these districts. Inferred from empirical analysis it is evident that in developing and developed economies female literacy generates a significant impact on infant survival rates. The analysis suggests that male literacy and other variables more or less indicate same relationship as expected. Whereas female literacy remains ineffective in reducing infant mortality rates in case of Punjab. The article also mentions the role of institutions by mentioning success stories from the world, where institutional collaboration and effort led to solution of the problem. Therefore, it can also be suggested that the presence of institutions and quality of service delivered are major factors that are important to achieve targets.

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Key words: Education, employment, environment, infant mortality, literacy, post-natal care, poverty, socio-economic status.

1. Introduction

Macro-economic goals such as high Gross Domestic Product, increased exports and reduction in balance of payment deficits alone cannot ensure sustainable growth and poverty reduction. Socio-economic development of a country depends upon many factors. This thinking is embedded in the Human Development Index which incorporates variables addressing socio-economic development of people. In 2000, emphasis of human development was strengthened, when United Nations put forward Millennium Development Goals (MDGs) aiming at eradicating poverty and hunger through increasing literacy among men and women, promoting gender equality, empowerment of women and improving health and other environment related aspects of life. Even though Pakistan is a signatory to MDGs, the budgetary allocations made to social sectors such as health and education are mere 0.54% and 2.1% of GDP respectively[2]. In case of literacy Pakistan is spending even less than smaller economies like Bangladesh and Vietnam, thus, lagging behind these countries in terms of literacy rate of 57%. In health sector, Pakistan has the highest infant mortality rate 65.1 (per 1000 births)[3] among South and East Asian countries such as India, Bangladesh, Sri Lanka, Nepal, China, Indonesia and Malaysia. The situation does not seem very bleak if focus of comparison is shifted from Asia to African region. According to United Nations[4], five countries with highest infant mortality rates are; Afghanistan, Chad, Congo, Guinea Bissau, Angola, Nigeria, expect for the first nation in this list rest of economies belong to African continent.

Moreover the literacy rate for males and females is 69% and 46% respectively[5]. Low level of literacy amongst women in particular creates major problems of poor health care, gender bias and eventually low contribution in economic activities. Female education is very important as it increases the value of women's time in economic activities through higher labor productivity and wages.

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It also results in higher household income and contributes towards reduction in poverty (Subbarao and Raney, 1992). Some empirical studies show that higher female literacy not only results in better health care but also reduces the rate of population growth (Wheeler, 1980). The evidence in the literature also suggests that female education creates social gains by improving women's and child health through the reduction in fertility rates and school education (Subbarao and Raney, 1992).Schultz (1992) shows that the structural relationships between total fertility rates and infant mortality rates depend on certain exogenous variables which include education, better health care, family planning services and household's social and economic conditions that determine fertility and mortality trend in the country.Many other studies similarly point out that female literacy can go a long in reducing infant and child mortality rates[6]. Cochrane (1980, 1982, and 1988) has studied the effects of education on health and social security using cross country data in order to examine the role of female education in determining mortality rates.The findings of the study indicate that countries with low allocations for female literacy. This study attempts to investigate factors that affect infant mortality in 35 districts of province of Punjab. Using district wise data it analyzes the relationship of female education on infant and child mortality rates. It contributes in the literature as most of the previous studies focus on country level data rather than district level data[7].

2. Conceptual Variables and Framework

The variables for the district wise analysis for infant mortality for the province of Punjab have been selected on the basis of empirical studies. Mosley and Chen (1984), developed one of the most comprehensive and systematic framework that is widely used for analyzing factors behind infant mortality. The determinants in Mosley-Chen framework include both social and economic factors. Agha (2000), in his study, highlights similar factors such as poverty, female and male education and other health factors, when improved lead to significant decline in infant mortality rates in Pakistan. Parental education plays a vital role in enhancing the chances of infant survival. Education of females does affect maternal fertility thereby increasing space between children. Having fewer children and getting married at a proper age have an influence upon infant survival (Cleland and Sathar, 1984). Schooling is critical in improving health and hygiene practices. Educated women may get greater opportunities in decision making process in family matters, along with getting permission by household members to develop strategies for improvement of their children and families (D'Souza and Bhuiya, 1982). Father's education may reduce infant mortality through his productivity; on the other hand education results in higher wages and increases the family's financial status thereby improving the family consumption patterns (Streatfield, 1990).

Studies conducted in India indicate that preferential treatment on the basis of gender for males increases in the presence of poverty, termed as economic crises (Gupta, 1987). In case for some parts of South Asia it was witnessed that differentials in male and female nutritional status are more significant for lower socio-economic groups (Levinson, 1974). Households facing tight credit conditions may remain unable in managing their timing of fertility, thus poorer have more children, who are more likely to die in the first year of life. It can be suggested that, the composition of women giving birth may change with economic circumstances, and this is likely to have an effect on mortality (Baird, Friedman and Schady, 2007). Flegg (1982) concludes in his research that a rapid decline in infant mortality levels among under developed economies is only possible when major emphasis is in upon reducing income inequalities.

Child health and possibility of survival can be improved through better health and hygiene, timely delivery of medical care and improved nutrition (Chatterjee and Lambert 1990). Health care and timely delivery of health services also play a vital role in survival of infant, as studies conducted for the developed economies suggest that primary care and presence of primary care practitioners is inversely related to infant mortality levels (Shil et al, 2004). Brazilian data for the years 1990-2002 for 27 stats shows that, family health programmes also bring a decline in infant mortality rates (Macinkol, Guanais and DeSouza, 2006). Mosley and Chen (1984), highlight that variables such as housing, sanitation, environmental contaminations, number of people living in house may also be considered as role players in case of generating impact on infant mortality. Research conducted to identify factors behind infant mortality in Iran, suggests that in addition to reducing income inequalities and improving literacy rates, investment in social sector programmes improving access to clean water, sanitation and hygiene are necessary agents leading to sufficient impact on infant survival rates (Hossienpoor et al 2006).

3. Data and Methodology

The paper develops the methodology on the foundations of secondary data from, Multiple Indicators Cluster (MICS) Survey Punjab (2007-08), by the Planning and Development Bureau of Statistics, Government of the Punjab.

The data set in the aforementioned survey is multidimensional in nature, as it has information of all the 35 districts of Punjab from socio-economic, educational, environmental, households and health perspectives.
The aim of the paper is to identify the factors that might have a positive impact in reducing infant mortality rates in case for Punjab. The dependent variable for the analysis is infant mortality; it is the probability of dying of an infant before his or her first birthday (MICS survey has used the Brass method[8] of calculating this rate). On the basis of the empirical studies mentioned earlier a set of 9 independent variables is identified.The first important variable that remains significant and has an inverse impact on infant mortality is female and male literacy. Poverty and income inequalities are added in the model by including data of number of employed persons, this is done as data for income or poverty was not available for the 35 district in the data set, therefore employment is taken as proxy variable. Better health and hygiene facilities are also major variables in the model leading to reduction in infant deaths. Sanitary means of disposing waste, use of improved sources of drinking water, presence of lady health workers (medical practitioners at the time of birth) and post natal care are selected in the list of health and hygiene variables. Among environmental factors two variables are selected, first is the total number of people living in the house, to address the issue of crowding of people under one roof, on the other hand whether the roof is cemented or not might lead to poor environmental impact.

The model is developed on the regression technique and the equation to be estimated is:

$$\log Y = \alpha - \beta_1 \log X_1 - \beta_2 \log X_2 - \beta_3 \log X_3 - \beta_4 \log X_4 - \beta_5 \log X_5 + \beta_6 \log X_6 - \beta_7 \log X_7 - \beta_8 \log X_8 - \beta_9 \log X_9$$

Where;
Y= infant mortality
X_1= number of lady health workers
X_2= availability of post natal care
X_3= presence of cemented roof
X_4= sanitary means of disposing waste
X_5= tapped source of water
X_6= number of members in a household
X_7= number of employed
X_8= number of female literates
X_9= number of male literates
β_i = elasticity of the respective variables i =1……. 9

The sign mentioned along with the coefficient of each of the nine independent variables, is based on the relationships stated in the empirical studies conducted with references to factors effecting infant mortality.

4. Results

On the basis of various empirical studies mentioned earlier the selected variables are regressed and the estimated equation is;

$$Y=0.6806-0.0695X_1-0.1249X_2+0.3637X_3-0.7063X_4+0.5074X_5+1.9221X_6-0.0266X_7+0.0412X_8-0.0332X_9$$
(-1.709) (-0.59) (0.83) (-2.33) (0.55) (3.08) (-0.048) (0.59) (-0.398)

R-squared= 0.737 d=1.824 F=6.448

The R^2 value of the estimated model is fairly high. Thus confirming that set of selected independent variables are important contributors to modeling the impact on infant mortality in the case of Punjab. The Durbin-Watson value suggests that there is no issue of autocorrelation and the F value also indicates the model is significant. From the general over view of the models significance, the variables are now discussed individually. The first two variables in the equation number of lady health workers(X_1) and post natal care (X_2) are representatives of the health sector. These variables show an inverse relationship with infant mortality levels for the districts of Punjab as suggested in the empirical evidence. A 1% increase in number of lady health workers and provision of proper post-natal care reduces infant mortality by 6.9% and 12% respectively. This indicates that health sector social service programmes where females are delivering care for the mother and the infant are major contributors towards increasing chances of infant survival in the districts of Punjab. Consultancy from a male doctor may not be preferred at times due to social and religious inhibitions on female health issues. Women feel comfortable and at ease while discussing personal health issues with lady health workers and family members adhere to advice given by them in matters pertaining to maternal and child health.

Presence of a trained medical practitioner and care of both mother and child after birth remain necessary factors leading to decline in infant mortality in the case of district wise analysis for Punjab. In the estimated equation, presence of cemented roof (X_3), sanitary means of disposing waste(X_4), tapped source of water (X_5) and number of members in a household (X_6), are variables that representatives of environmental and household factors. Among these four variables two variables; from both sets show similar trend in relationship as indicated in researches conducted in the past. The presence of sanitary means of disposing waste improves hygiene thereby reducing the chances of disease leading to better chances of infant survival as can be seen from the estimated equation for Punjab. Unit increase in adopting sanitary means of disposing waste predicts a reduction of 0.7063 in infant mortality in districts of Punjab. At the same time the larger the number of people in the house may lead to congestion and neglect of infant thereby the positive sign with the coefficient of this independent variable justifies the relationship in the current analysis on the basis of empirical evidence.

As seen from the result a unit change in number of household members leads to a rise of 1.1822 units in infant mortality. The other two variables that do not follow the same relationship in the estimated model are; presence of cemented roof and tapped source of water. Both of these variables should indicate an inverse relationship with infant mortality rates but the coefficients of these have a positive sign in the case of district wise analysis of Punjab. Tapped water may contain certain germs that might be harmful for human health, thus this water should also go through a proper filtration process or must be boiled before use. Further purification of tapped water might lead to reduction in water borne disease leading to improved chances of infant survival. Due to lack of district-wise data on poverty in MICS (2007-08) for Punjab, the proxy variable selected as a representative of economic status in the model is employment (X_7). Greater the number of employed persons, higher will be the income generated leading to more economic prosperity and better standard of living suggesting reduction in poverty. Weak financial status of a family has a positive impact on infant mortality rates as highlighted in aforementioned empirical studies. The coefficient of employment in the estimated equation bears a negative sign indicative of the fact that increase in employment improves the financial status of the family, thereby improving consumption patterns and expenditures on health and hygiene. This later proves as a significant variable that leads in reducing infant mortality rate.

Education is considered as a synonym for enlightenment and awareness both for men and women; it results in adoption of best practices leading to reduced infant mortality levels. In the estimated model, education of males is indication an inverse relationship with infant mortality as the coefficient of this independent variable has a negative sign. In developing and patriarchal societies, men as the head of the families are the major decision makers of the family. Thus, Pakistan being both a male dominated and developing society substantiates the empirical evidence, a 1% change in male literacy leads to 3.32% decline in infant mortality as suggested by the estimated equation for the districts of Punjab. On the contrary the most startling fact that is evident from the model is the lack of inverse relationship between female literacy and infant mortality as suggested in empirical analysis. In my estimated equation the coefficient of female literacy has a positive sign, indicative of the fact that female literacy in the districts of Punjab remains unable in contributing towards increasing chances of infant survival. This direct relationship between female literacy and infant mortality was also observed in a study conducted for 27 Brazilian states for 13 years data (1990-2002)[9].

In this study female literacy was positively related to infant mortality the same way it is in this estimated equation. One of the arguments for female literacy remaining an ineffective tool to reduce infant mortality can be justified on the grounds, that women in our society even if educated lack freedom of expression and decision making authority. Quality of education such as the curriculum taught at various stages of education might not be inclusive of awareness regarding personal and child, health and hygiene. Thus, education remains just a process where a person is promoted from a lower grade to higher grade in an educational institution, but the person remains ineffective in applying this knowledge for bringing about change and improvement in her own self and the people in her everyday life. Lack of these spillovers and externalities makes education of females ineffective in contributing to a critical issue of infant mortality in our case of Punjab.

5. Conclusion

The paper analyses the impact of nine variables indicative of health, literacy, environment and economic status of 35 districts of Punjab on the infant mortality rate. Before suggesting certain recommendations here, it is worth mentioning the international success stories from the world that have reduced the problem of infant mortality through institutional collaboration.

These institutions whether public or private through vigorous efforts have achieved success in their aims.

According to United Nations study[10] of three least developed African countries; Burkina Faso, Mali and Senegal success has been achieved to some extent in promoting equality of gender and empowerment of women. As a result of collaborated project of UNDP with a charity based foundation, setting up of a technologically advanced platform has led to reduction in time consuming activities involving women. This time saved, now is utilized by these women in taking up literacy courses and income generating activities. Small agro- based enterprises are also established by these women. Survey conducted later suggested that these technologically equipped women have shown a manifold time increase in their incomes and revenues. Maternal and neonatal tetanus is referred as the silent killer of many new born babies in poor and remote regions of many developing countries. Viet Nam's [11]Ministry for Health in collaboration with World Health Organization and UNICEF has eliminated these two silent killers. It launched a high coverage expanded programme on immunization against these diseases for pregnant women in 1991. The result of this programme is that, now Viet Nam has completely eliminated this disease, it stands at the ninth country in the world and first East Asian country to achieve this target.

Based on the results of the estimated model certain conclusions and policy recommendations may be suggested in case of Punjab Pakistan.Governmental institutions such as district health offices, community development programs like Punjab Rural Support Programme (PRSP), various Non- Governmental Organizations along with foreign donor agencies are involved in overcoming the key problems regarding female literacy and health that have been highlighted in the paper. Even though the work is taking place through policy formulation and implementation but the results are not up to the mark. The main reason for this is that Development Sector Projects have always been neglected in budgetary allocations both on federal as well as provincial levels. In recent years these allocations have been cut down even when the face of human development in Pakistan is showing a bleak picture.[12]

On the other hand, the programs in which communities were mobilized have shown good results both in the education and health sector[13]. But the projects which are dependent on only government support or donor funding have achieved mixed results[14]. The main reason for this mixed performance is that these projects have a poor coverage rate and barely reach the marginalized sections of the rural society owing to lack of resources or in some cases uncertain availability of funding of various initiatives. Another reason for the lack of success of governmental and non-governmental projects is that most of the projects taken up are foreign funded. When the foreign funding dries up these programmes are winded up or remain poorly executed. The need of the hour is the presence of indigenously funded programmes of education and health. Lack of domestic financial support as mentioned before, leads to hasty management of public sector development projects of health and education, these projects need time and effort toachieve targeted results. The governmental institutions must realize that rolling back projects as soon as the foreign funding is not available leads to poor results in providing access to education and health. It is role of the government to step up in generating resources from domestic resources so that these projects must not be rolled back.

In order to make education more effective in case of females, the curriculum taught at various educational levels needs to be reviewed in the light international standards. The current state of the curriculum is lacking knowledge related to health and hygiene. This means that a female when goes to school is simply being taught basic subjects such as language, science and mathematics, etc, but she is not informed or imparted with the knowledge of improving her and her children's health. There is a need is for proper curriculum designed to ensure that knowledge related to all elements of health, hygiene, and sanitation related problems are incorporated. This activity needs a collaborative effort on part of the Ministry for Health and Ministry for Education of Punjab. The health ministry can identify the information that needs to a part of the curriculum to handle such issues and the education ministry can develop a curriculum for various levels of education on the basis of this information. Health and hygiene related programmes for imparting information to students are a part of almost all the good institutions of the developed world. Future research on panel data for a different set of countries may be helpful in addressing the issue of infant mortality from another perspective.

Notes

2. Economic Survey of Pakistan 2009-10
3. Economic Survey of Pakistan 2009-10

4. United Nations, Department of Economics and Social Affairs, Population Division(2009).
5. Economic Survey of Pakistan 2009-10
6. Preston (1980, 1985), Rosenzweig and Schultz. (1987) and Schultz (1992).
7. King. E.M. and M.A. Hill (1991) and Mensch, B., Lentzner, H. and S. Preston (1986).
8. See any standard text book of Statistics for Brass Method of Calculation
9. MACINKO, J., GUANAIS,F. and DESOUZA,F. (2006). Evaluation of the impact of family health Programme on Infant mortality in Brazil (1990-2002). Journal of Epidemiology and Community Health.60 13-19
10. Fact Sheet, High Level Event on MGDs, United Nations Headquarters, New York, 25 September 2008.
11. Fact Sheet, High Level Event on MGDs, United Nations Headquarters, New York, 25 September 2008.
12. Pakistan is ranked 132 in the Human Development Index of United Nations Human Development Report 2007-08 in which both literacy and infant mortality rates are included for estimating the index.
13. Punjab Rural Support Programme has extended its sphere of work from micro finance to health and education and according to information collected from representatives of the organization and people, it has been found that it is performing better that other government and non-government organizations in terms of service delivery.
14. Chief Minister's Initiative on health and President Initiative's on health, and various programs of NGOs have not produced similar results because of inconsistent policies which change with the change in government and uncertain funding.

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