EXPENDITURE AND HEALTH HUMAN CAPITAL FORMATION IN JAMMU AND KASHMIR: ESTIMATION AND ANALYSIS

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ABSTRACT

In this paper an attempt has been made to estimate the growth rate of health human capital in Jammu and Kashmir over the time period 1994-95 to 2012-13, by employing both econometrics and non- econometrics methods. The proxy variables for health human capital taken for the study included total expenditure on health, share of health expenditure in total expenditure, health expenditure as percentage share of gross state domestic product, analysis of medical attention, life expectance, infant mortality, crude birth and death rates. The study concludes that the compound annual growth of expenditure on health stood significantly at 11.62. It has been observed from the estimation that both expenditure on health as share of total and share of GSDP is showing negative trend. The medical attention was 48% in 2006 and it reaches to 64% in 2009 and 74.1% in 2011 but is more urban oriented than rural. The average life span has increased over the years in the State which reveals decrease in death rate and improvement in the quality health services. Following the findings Substantial amount of government budgetary allocation should be directed towards the health sector is strongly recommended. The rural urban gap in receiving the medical attention must be minimized. The main suggestions in the area is to increase the rural   infrastructure in order to increase the attention. Increase in the transportation and institutional services are important and strongly recommended.

KEYWORDS: Human capital, Econometrics, components of human capital.

Section I
INTRODUCTION

Human capital is widely accepted as an important determinant of economic growth and the importance of human capital accumulation is unconditionally acknowledged in the existing exogenous and endogenous growth theories (Mankiw et al. 1992). However what is still debatable is what factors should be considered as components of human capital. The exclusion and inclusion of different components of the human capital to relate it empirically with other variables such as growth makes it more complex and changing concept. Health being an important component of the human capital remains the priority of every nation. Health indicators of any economy are important determinants of the socioeconomic development as well as of the human capital. Better health of the economy means the better human resources which later in turn effects the growth of the economy. Better health also leads to the personal economic gain by working (Qadri 2011). The

goal of every economy remains to keep the human resource in healthy conditions. Health is the fundamental human right and necessary for individual well-being at micro level, and indispensable prerequisite for economic growth and development in a country or state at the macro level. Given the role of health human capital in the development of the economy both developed and an underdeveloped country tries to increase the health component of human capital. Different strategies are taken by different countries to increase it. India after independence is also struggling to provide a better health care. In this phase of struggle some states of India succeeded but others failed. With a view to meet the growing healthcare needs of the people especially those living in rural areas, the State Government of Jammu and Kashmir is trying to improve the health care system.

In this study an effort is made to estimate the growth rate of health human capital in Jammu and Kashmir. Different variables like expenditure on health, life expectancy, infant mortality, death rates, birth rates, medical care as the proxy variables to estimate the growth of health human capital in Jammu and Kashmir. The paper is divided into four sections. Section first provides the introduction and review of literature, section II provides research methodology and section III provides results and discussion and section IV provides summary and conclusion.

1.1.1 REVIEW OF LITERATURE

Mankiw et al. (1992) empirically examined the Solow growth model with and without human capital as a factor of production and find that the human capital augmented Solow model fits in explaining cross-country income variations.

Taniguchi; Wang (2003), suggested in his analysis that Nutrition has a strong link with productivity, output and economic growth. A person who intakes nutritious food is likely to be n more productive due to high vigor and strength. In this way providing good nutrition is considered as an investment in human capital. Especially in the case of economic growth, education and health\ reinforce each other; being healthy is as important for economic growth as being educated.

Tamura (2004) in his study develops a general equilibrium model of fertility and human capital investment with young adult mortality. Parents maximize expected utility producing a precautionary demand for children. Because young adult mortality is negatively related to average young adult human capital, human capital accumulation lowers mortality, inducing a demographic transition and an industrial revolution. Data confirm the model prediction that young adult mortality affects human capital investments. The model prediction of a positive relationship between infant mortality and young adult mortality is confirmed.

Bratti et al (2004) posit that human capital accumulation rates are affected by demographic variables. For example, they established that an increase in life expectancy at birth brings about an increase in secondary and tertiary education while a decrease in the juvenile dependence rate negatively affects secondary education..

Abbas and Foreman-Peck (2007) use the co-integration technique for estimating the effect of human capital on economic growth of Pakistan in the period 1961 to 2003. The proxy for human capital used in the study was health expenditures as a percentage of GDP. They found an increasing return to physical and human capital specially in case of investing in health sector.

Qadri and Waheed (2011) regarded that Human capital is generally considered as a positive contributor in the economic growth. In the study, they estimate this relationship using time series data of Pakistan for the period 1978 to 2007. The health adjusted education indicator was found to be a highly significant determinant of economic growth, which indicates that both the health and education sectors should be given special attention in order to ensure long run economic growth.

Ojo Johnson (2011) in their study shows the relevance of human capital development to the growth of the economy. The study evaluates human capital development and economic growth in Nigeria. The analysis confirms that there is strong positive relationship between human capital development and economic growth.

Section II
1.2 RESEARCH METHODOLOGY

In this paper an effort is made to estimate and analysis the growth rate of health human capital in Jammu and Kashmir. Different methods can be used for the study of growth rate but in this paper both econometrics and non-econometrics methods were used for estimation. Besides graphs, charts and tables both percentage and compound growth rate methods were used in this paper the test like t test was used for different variables to test the significance. The secondary data was collected from various reports of economic survey, various reports of planning government of Jammu and Kashmir and various reports of census.

1.2.1 Percentage growth rates:

$$Y_{n-y_0}/y_o * 100$$

Where:

Y_n is new value

y_0 is old value in the series and resulting values are multiple by 100

1.2.2 Compound Annual Growth:

Compound annual growth rates (CAGRs) for the overall period were estimated by fitting an exponential function of the following form:

$$Y_t = \beta_0 \, \beta_{1\,t} \, e^{ut} \qquad (1)$$

Where Yt is the dependent variable, B_0 and B_1 are the unknown parameters, and Ut is the disturbance term. Equation (1) could be written in the logarithmic form as follows:

$$Log\ Yt = logB_0 + t\ log\ B_1 + Ut \qquad (2)$$

Above equation was estimated by applying Ordinary Least Square method and Compound rate of growth (CAGR) was obtained by taking antilog of the estimated regression Coefficient, subtracting from it one and multiplying the difference by 100, as follows:

$$CAGR = (anti\ log\ b_1 -1)\ 100 \qquad (3)$$

Where b1 is an estimate for B_1. The significance of growth rates was tested by applying t-test, given as follows.

$$t = b_1 / s(b_1) - t\ (n\text{-}2)\ df \qquad (4)$$

Where b_1 is the regression estimate and $s(b_1)$ is the respective standard error.

Models Used:

Model *1 ln(*TEH*)t = β1 + β2t + µt*

Model *2 ln(EHTE)t = β1 + β2t + µt*

Where

TEH, total expenditure on health

EHTE, percentage share of health expenditure in total expenditure

Section III
1.3 RESULTS AND DISCUSSION

This section presents the results and discussion of the study. Measurement of growth has been one of the most extensively researched areas. The growth rate analysis provides the whole vision of growth performance. The results have been discussed in brief under the following headings.

1.3.1 Estimation of Population & Average Annual Exponential Growth Rate (AAEGR):-

As per Census 2011, the State's population stood at 1.25 Crore comprising of 66 lakh (53%) males and 59 lakh (47%) females. Of the 1.25 Crore population, 91.35 lakh (72.79%) live in rural areas while 34.14 lakh (27.21%) live in urban areas. Decadal growth during 2001-2011 declined to 23.71% from 29.43% during 1991- 2001. One of the important features of the present decade is that 2001-2011 is the first decade since 1961 which has actually added lesser population in the State compared to the previous decades. In absolute terms, the population of State has increased by about 24 lakh during the decade 2001-2011. The Average Annual Exponential Growth Rate (AAEGR) declined to 2.15% per annum during 2001-2011 from 2.61% per annum during 1991-2001 (census 2011). The density of the State is 124 per sq km which is lower than the national average 382 per sq km. The population of the J&K

State accounts for 1.04 percent of the country in 2011 as against 0.99 percent in 2001 and ranks 19th among the States/UTs.

1.3.2 Expenditure on health: Total, percentage share of total and percentage of GSDP:-

Increasing expenditure on the health means different things. It means the variable is getting quite attention to increase the output. The estimation of the health expenditure shows that the amount for the health is increasing but the growth rates over preceding years are quite fluctuating the growth rate of the variable were highest in 2009-10 accounted for 58%. As for as the CAGR is concerned estimation valued it significantly at 11.62. Its observed from the analysis that both expenditure as share of total and share of GSDP is showing negative trend and is minimum -0.5 and -0.9 respectively. In comparing the share how much state bears burden a comparison of 2006 and 2009 is taken of per-capita expenditure on health it was found that share of Centre increases in 2009 and compared to 20006.

1.3.3 Medical attention:-

As for as the medical attention received by mothers at delivery is concerned it is increasing from 2006. The attention was 48% in 2006 and it reachs to 64% in 2009 and 74.1% in 2011. However the attention is received more in urban areas than in the rural areas. The attention is touching 100% in urban areas where as its one third in rural areas the tablic and graphical analysis of the variable is given in appendix.

1.3.4 Life Expectancy at Birth estimations:-

At the national level, the life expectancy which was 49.7 years during 1970- 75 increased to the level of 63.0 years in 2000-04, which further improved and stood at 63.5 years during 2002-06. The Ministry of Health and Family Welfare, GOI has projected the life expectancy at birth for the period 2011-15 at the national level at 67.3 (males) and 69.6 (females). However, with specific reference to the J&K State, the projected figures stood at 66.5 (males) and 69.3 (females) which is almost at par with the national average (cencus 2011) .The average life span has increased over the years in the in the State which reveals decrease in death rate and improvement in the quality health services

1.3.5 Estimation of Crude Birth Rate (CBR):-

As per the estimation made by the Registrar General on the basis of Sample Registration System (SRS- 2011), the CBR of the state is 17.8 and the same is well below the national average of 21.8. Himachal Pradesh and Punjab has better CBR than the state and the figures in respect of these states stood at 16.5 and 16.2 respectively. However, jammu and kashmir State is well ahead of Haryana which has CBR at 21.8. While the CBR dipped by 0.3 points at all India level during

2011 compared to 2010, it recorded decrease of 0.5 points in the state during the reference period(Economic survey 2013).

1.3.6 Estimation of Crude Death Rate (CDR):-

The CDR of the State is quite good as compared to national average and the neighboring states. It stood at 5.5 as against the national average of 7.1 in 2011. While studying the pattern of CDR from 2006-2011, it reveals that the performance of the state is in line with the national level scenario which has dipped by 0.4 points during the period (Economic survey 2013)

1.3.7 Estimation of Total Fertility Rate (TFR):-

Due to focused attention of the State Government on addressing the unmet needs for contraception, reduction in the child mortality, greater male involvement in family planning measures and delaying age at marriage, the TFR has come down below replacement level for the first in the State and stood at 2.0 in 2010 as compared to 2.3 in 2006. The TRF level is also better in the State when compared with the national average which stood at 2.5.

1.3.8 Estimation of Maternal Mortality Ratio (MMR):-

MMR measures number of women aged 15-49 years dying due to maternal causes per 1, 00,000 live births. The Registrar General of India (RGI) in its publication "Maternal Mortality in India 2007-2009" published in June 2011 indicates MMR at all India level at 212 as compared to 254 during 2004-2006. Under the category of "Other States", the said publication depicts MMR of Gujarat at 148, Haryana (153), Maharashtra (104), Punjab (172), West Bengal (145) and others (160). The MMR of the J&K State is well below the All India level and the results corroborate with another similar such study conducted by the Directorate of Economics & Statistics (Digest of statistics and Economics 2013).

1.3.9 Estimation of Infant Mortality Rate (IMR):-

Infant Mortality Rate is better in the state as compared to the all India average. As per SRS 2011, the State's IMR was registered at 41 as against the national level figure of 44. The Infant Mortality Rate (IMR) of the State is showing a consistent downward trend and is indicative of fruition of host of child health programmes and activities undertaken by the Department especially under NRHM since 2006. While the State IMR decreased by 11 points during 2006-2011, it registered faster decrease of 13 points at All India level during the corresponding period. HP, Haryana and Punjab performed well and registered decrease in IMR by 12, 13 and 14 points from 2006 to 2011. No doubt, the IMR of the State has improved over the years, but the rate improvements need to faster to achieve the IMR goal of <30.

1.3.10 Neo-natal Mortality Rate (NNMR):-

Neo-natal Mortality Rate (NMR) is concerned with the condition of the newborn from birth to 4 weeks (28 days) of age. Neo-natal survival is a very sensitive indicator of population growth and socio-economic development. At national level, the neo-natal mortality rate was 37 per 1000 live births during 2006 which came down to 33 in 2010. The NMR of the State remained stagnant at 39 during 2006 to 2008, and decreased to 37 in 2009 and further declined to 35 in 2010. Efforts are being made to reduce it further by laying stress on facility/ home based newborn care. However, at national level, NMR constitutes 69.3% of the total infant deaths while as for the State the figure is as high as 82.1% which is suggestive of the requirement for a more focused effort to target the Neonatal Mortality.

Section IV
SUMMARY AND CONCLUSION

In this paper the different proxy variables were taken to estimate and analysis the human capital in the state. Different tools where used for the estimation and analysis varying from econometrics to non-econometrics. The study concludes that the expenditure on health was 11.62 and is statistically significant at 5% level of significance. However as for as the share in total expenditure is concerned it is decreasing indicating government's least priority approach towards sector. As for as the medical attention received by mothers at delivery is concerned it is increasing from 2006. The attention was 48% in 2006 and it reached to 64% in 2009 and 74.1% in 2011 showing a positive sign.

From the analysis it was found that the average life span has increased over the years in the in the State which reveals decrease in death rate and improvement in the quality health services that leads to increase in the health human capital. The crude birth rates of the state is 17.8 and the same is well below the national average of 21.8.

While studying the pattern of crude death rates from 2006-2011, it reveals that the performance of the state is in line with the national level scenario which has dipped by 0.4 points during the period. The TRF level is also better in the State when compared with the national average which stood at 2.5. The NMR of the State remained stagnant at 39 during 2006 to 2008, and decreased to 37 in 2009 and further declined to 35 in 2010.

Following the findings of the study increase in the spending of the government for the health sector must be increased.

Another policy implication of the study revealed that the rural urban gap in receiving the medical attention must be minimized. The main suggestions in   the area is to increase the rural

infrastructure in order to increase the attention. Increase in the transportation and institutional services are important and strongly recommended. The implementation of basic awareness programs must be increased.

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APENDIX

Table 2 Expenditure on health, share of expenditure on health of total expenditure and expenditure on health as share of GSDP

year	GREH	% of total expenditure	% share of GSDP
1991-92			
1992-93	0.79	5.6	-47.01
1993-94	-1.54	-7.00	35.21
1994-95	26.34	-1.42	-35.41
1995-96	14.06	-5.99	-24.19
1996-97	10.94	-10.32	-10.68
1997-98	28.63	8.57	14.28
1998-99	19.76	42.21	14.58
1999-00	4.25	-2.22	-3.63
2000-01	12.08	-1.62	7.54
2001-02	17.10	2.80	15.78
2002-03	18.41	0	12.12
2003-04	6.93	-6.09	1.35
2004-05	29.05	6.83	-13.33
2005-06	23.69	-1.23	16.92
2006-07	3.26	7.77	-2.63
2007-08	3.13	-20.15	-4.05
2008-09	-27.97	-33.14	-32.37
2009-10	58.45	42.25	52.08
2010-11	5.22	-3.56	0
2011-12	0.54	-12.11	-5.47
2012-13	-17.58	-25.77	-23.18
2013-14	4.56	10.06	9.43

Source: various economic survey by planning department Jammu and Kashmir Where GREH means percentage growth rate of total expenditure on health,

Table 3 Estimation Of Growth Of Total Expenditure On Health(Greh), Growth Of Share In Total(Gr She Total) And Growth Of Share GSDP(Gr Shr Of Gsdp)

variable	CAGR	R SQUARE	T STAT.	
TOTAL EX. ON HEALTH	11.62	.934	17.309	SIGNIFICANT AT 5
SHARE OF TOTAL EXP.	-0.9	.085	-1.397	SIG. AT FIVE
SHARE OF GSDP	-0.5	.20	-.646	NOT SIG.

Source: Based on the data collected from various reports of economic and statistics digests.

Table 4 Percent of Live births where the mothers received medical attention at delivery either at Government hospitals or at Private hospitals

year	TOTAL	URBAN	RURAL
2006	48.6	85.5	41.1
2007	52	87.2	45.1
2008	61.5	87.9	56.4
2009	64.2	89.9	59.4
2010	67.7	93	65.3
2011	74.1	95.6	70.1

Source: cencus reports and reports of Ministry of health, GOI

Table 5: Estimation of Brith rate and death rates of rural and urban

|	BRITH RATE	RBR	UBR	DEATHRATE TOTAL	UDR	RDR
2006	18.7	20	14.2	5.9	5.2	6.4
2007	19	20.4	14.1	5.8	5.3	6.2
2008	18.8	20.2	14	5.8	5.1	6.4
2009	18.6	19.9	13.7	5.7	5.2	6.3
2010	18.3	19.5	13.5	5.7	5.7	5.6
2011	17.8	19.1	13.1	5.5	5	6

Source: Census 2011

Table 6 Estimation of Fertility Total Rural and Urban. Infant Mortality Rural and Urban

| YEAR	TOTAL FERTILITY RATE	RURAL	RURAL	IMR TOTAL	URBAN	RURAL
2006	2.3	2.5	1.6	52	53	51
2007	2.3	2.5	1.5	51	52	49
2008	2.2	2.4	1.5	49	51	48
2009	2.2	2.4	1.4	45	51	41
2010	2	2.2	1.4	43	45	41
2011	1.9	2.1	1.3	41	41	40

Sources: Census 2011

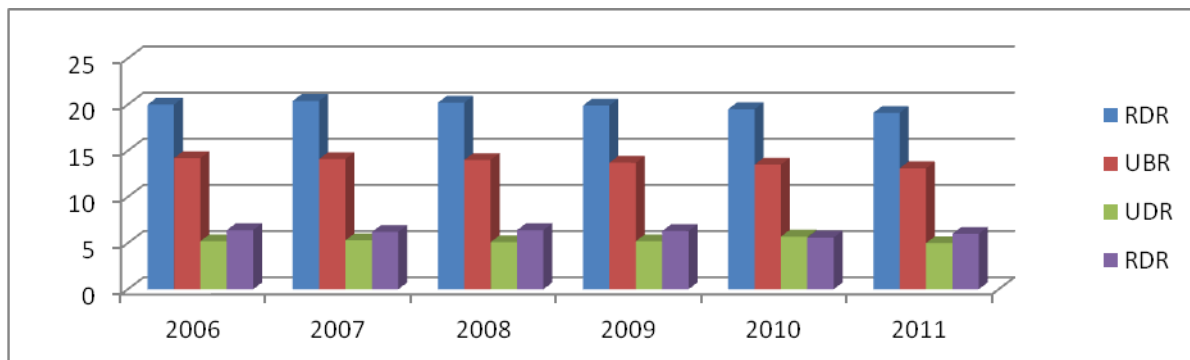### Figure 1 Trends in growth rate of expenditure
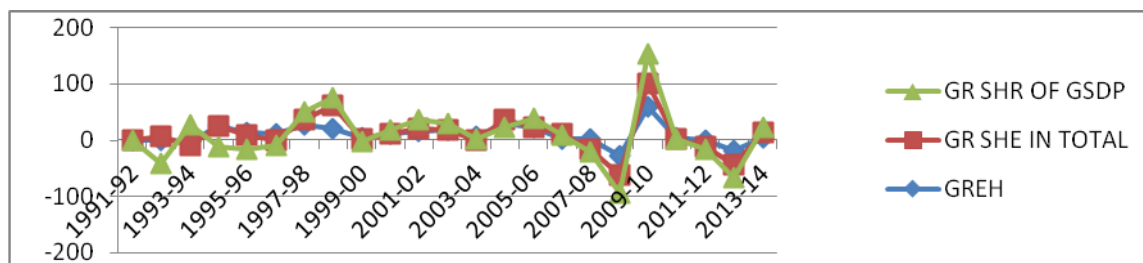
Source: Based on table 2

Figure 2 : Graphical analysis of Percent of Live births where the mothers received medical attention at delivery either at Government hospitals or at Private hospitals
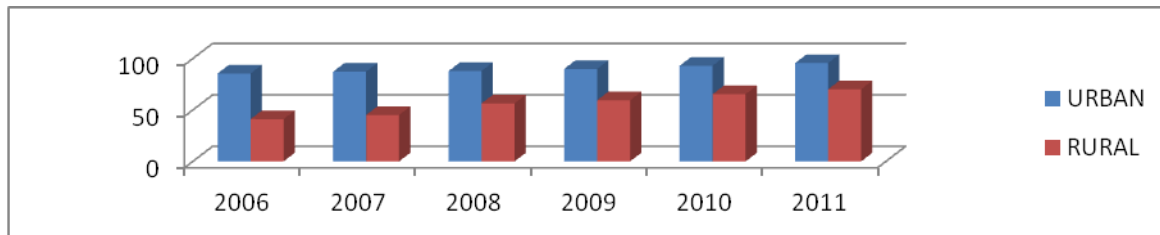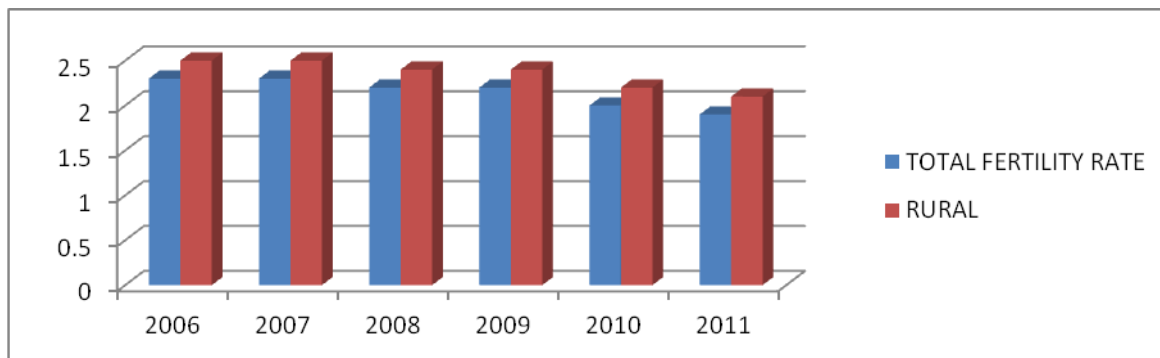

Source: Based on Table 4
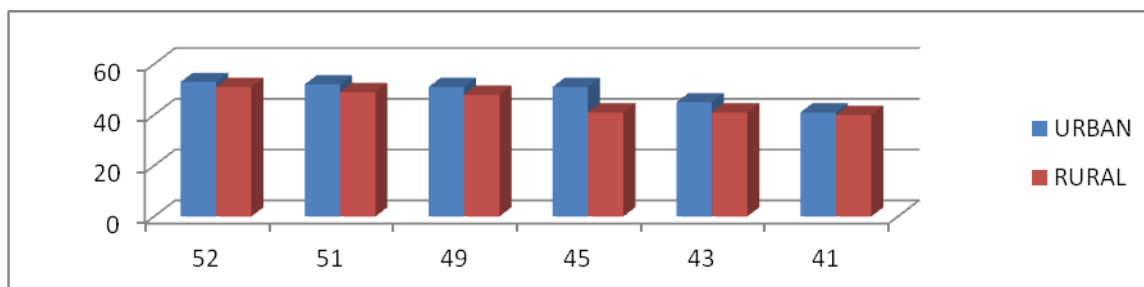
Figure 3 Analysis of rural urban birth and death rates

Sources : Based on table 5

Figure 4 Analysis of Fertitlity rural and urban

Source: Based on Table 6 Figure 5 Analysis of IMR rurala and urban

Source: Based on Table 7