An Analysis of Human Capital Formation in Jammu and Kashmir

Section I

4.1 Introduction

Human capital is defined to include all the skills, health status and knowledge embodied in an individual. The empirical results indicated that investment in human capital, especially through improved education had accelerated the economic growth (Schultz (1961, 1988), Mankiw et.al (1992), Barro, (1997), Tilak, (1988,) Abass. (2001). In the present chapter the analysis of human capital is done under headings of educational and health as the two main components of human capital. The proxy variables for education as component of human capital are divided into inputs and outputs. The Proxy variables as inputs and outputs for the education component of human capital includes total expenditure on education, expenditure on education as the percentage share of total expenditure and percentage share of GSDP, institutional availability, pupil teacher ratio, gross enrollment ratios at primary, secondary and at higher level, literacy rate and dropout rates. The proxy variables for health as component of human capital as inputs and outputs includes total expenditure on health, expenditure on health as the percentage share of the total expenditure and percentage share of GSDP, manpower availability, institutional availability, death rates, birth rates, natural growth rates, life expectancy, infant mortality rates and total fertility rates. This chapter is divided into

four sections. Section first provides introduction and methodology for estimation. Section second provides estimation and analysis of education component of human capital. Section third gives detailed account of estimation and analysis of health component of human capital. Section fourth provides summary and conclusions.

4.1.2 Estimation techniques

Different methods are used in this chapter for the estimation and analysis. Data represented in the table form, graphical and percentage methods are used for analysis. For the estimation of the growth rates both percentage and compound annual growth methods are used. The test like t test is used for different variables to test the significance.

4.1.3 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 multiplied by 100.

4.1.4 Compound Annual Growth

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

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

Where Yt is the dependent variable, β_0 and β_1 are the unknown parameters, and Ut is the disturbance term. Equation (1) could be written in the logarithmic form as follows:

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

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

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

Where b1 is an estimate for β_1. The significance of growth rates was tested by applying t-test, given as follows.

$$t = b1/\ s\ (b_{1)} \sim t\ (n\text{-}2)\ df$$

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

4.1.5 Models Used Education component of Human capital

Model *1* ln(**TEDEX**)t = *β1 + β2t + μt*

Model *2* ln(EDEXST)t = *β1 + β2t + μt*

Model *3* ln(**EDEXSDP**)t = *β1 + β2t + μt*

Where *ln* represents log and TEDEX as a dependent variable represents total government expenditure on education in model one. EDEXST as

dependent variable represents expenditure on education as percentage share of total expenditure in model two and EDEXSDP as a dependent variable represents as expenditure on education as percentage share of GSDP in model three. These proxy variable included for education human capital represents the importance attached by the government to build the education human capital in the state. These proxy variables for education human capital represent the input factors for education human capital. Else Government budget policy affects the long-term growth rate through decisions on priority based public spending on different sectors and these variables will helps us to understand the role of government in education sector as well. The relevance of estimating becomes important because return on educational investment yields a higher rate of return than investment in physical capital (Tilak, 1988 and Psacharopoulos, 1993). All the expenditure represents the budgetary allocation to increase the education human capital.

Model *4 ln(GERP)t = β1 + β2t + μt*

Model 5   *ln(GERS)t = β1 + β2t + μt*

Model 6   *ln(GERH)t = β1 + β2t + μt*

Where (GERP) represents the Gross enrollment ratio at primary, (GERS) represents Gross enrollment ratios at secondary and (GERH) represents gross enrollment ratios at higher level are all dependent variables in model first, second and third. The gross enrollment ratios has been calculated by taking the total students on roll and divided by the population in that particular age group. All these enrolment ratios are used as proxy variable

for the education human capital. Empirically the enrolment ratio as a proxy variable for education human capital has gained more importance. These variables will help to know the growth of educational attainment in the state. The growth rate of these variables helps us to know the access to education in the state as well. These three variables are output variables and are used by many scholars as a determinant of growth (Howitt, 2005).

Model *7*   *ln*(PTRP*)t = β1 + β2t + μt*

Model *8*   *ln(PTRUP)t = β1 + β2t + μt*

Model *9*   *ln(PTRS)t = β1 + β2t + μt*

Model *10*   *ln(PTRAS)t = β1 + β2t + μt*

Where (PTRP) represent pupil teacher ratio at primary level, (PTRUP) represents Pupil teacher ratios at upper primary level, (PTRS) represents Pupil teacher ratio at secondary level and (PTRAS) represents Pupil teacher ratio at all schools. All these dependent variables as a proxy variable for education human capital help us to know about the quality of education. More concentration of the teachers to the given density of the students represents the quality of education. In all these models all variable represents the inputs to education as well. Else the efficiency of expenditure is defined as the technical efficiency of the inputs – the number of schools and the number of teachers – in generating educational output, such as enrolments (Pradan, 2004).

Model *11*   *ln(IAP*)t = β1 + β2t + μt*

Model *12*   *ln(*IAUP*)t = β1 + β2t + µt*

Model *13*   *ln(IAS)t = β1 + β2t + µt*

Where IAP represents the institutional availability at primary school level, IAUP represents institutional availability at upper primary school level and (IAS) represents institutional availability at secondary school level. All these variables are dependent variables. These particular variables are institutional inputs for education. The more availability of institutions represents easy access to education.

It is assumed that all these inputs in the education human capital in the state helps to generate an efficient and quality output in the form of educated skilled labour force in the state. Besides these basic inputs the literacy rate as the output is also estimate and analyzed.

4.1.6 Models used Health component of Human capital

Model *14*   *ln(HEXT)t = β1 + β2t + µt*

Model *15*   *ln(HEXST)t = β1 + β2t + µt*

Model *16*   *ln(*HEXSDP*)t = β1 + β2t + µt*

Where HEXT represents the total government expenditure on health, HEXST is expenditure on health as percentage share of total expenditure and HEXSDP is expenditure on health as percentage share of GSDP. All these are taken as dependent variables. The public spending on health sector represents the basic input to maintain the quality of health in any economy. The growth rate estimation of these variables will help us to

know the exact importance attached to the sector by the government. This basic input also helps us to know the proportion of the expenditure spend on the sector out of the total expenditure. This variable has been empirically used as the basic input to know the health human capital (Abass, 2001).

Model *17   ln(MPA)t = β1 + β2t + μt*

Where (MPA) represent the availability of man power in the health sector. The availability of people like doctors, nurses and all such people who directly or indirectly involved in the health sector are presented as dependent variable in the model.

Model *18   ln(AIT)t = β1 + β2t + μt*

Model *19   ln(*AIP*)t = β1 + β2t + μt*

Model *20   ln(AIA)t = β1 + β2t + μt*

Model *21 ln(AIDS)t = β1 + β2t + μt*

Where AIT is Availability of total hospitals, AIP represented availability of primary units, AIA are availability of ayurvedic institutions and AIDS represented availability of hospitals at district and sub-district level. All these variables are used as the dependent variables. The estimation of all these proxy variables will help us to know the availability of hospitals in the state. Simple rule of thumb is that more availability of health care units provides easy access of people to the health care.

Besides these models the survival factors like life expectancy by sex, infant mortality by sex and residence, death rates, birth rates, total fertility and natural growth rates are also estimated and analyzed. These survival factors represent the basic output in the health human capital of the state.

Section II

4.2 Education as component of Human capital: Estimation and Analysis

Education is the most important component of human capital and acts as the most important lever for social, economic and political transformation. A well-educated and skilled population not only drives economic and social development but also ensures personal growth. The spread of education in society is at the foundation of success in today's globalized world, where the real wealth of a country or state is not in its tangible natural resources but in knowledge (Abass, 2001). The importance of education as the foundation and building block for achieving national objectives and for building a more inclusive, equitable and sustainable

society is well recognized. The different variables analyzed and estimated are presented in the table 1 below.

Table 4.1 Inputs and Output of Education

Inputs	Outputs
1. Total expenditure on education 2. Expenditure on education as percentage of total expenditure 3. Expenditure on Education as percentage of GSDP 4. Teachers pupil ratio 5. Institutional availability	1. Literacy 2. Enrolments ratios

Source: Measuring human capital (2014).

4.3 Expenditure on Education

Under this heading three proxy variables are estimated and analyzed which represent the inputs of education. The three inputs include total expenditure on education, expenditure on education as a percentage share of total expenditure and expenditure on education as a percentage share of GSDP.

Based on the estimation of year to year growth rates of expenditure on education from the time period 1995-96 to 2015-16 it exhibits a fluctuating trend in the growth rate. Starting from 16.74 % in 1996-1997 it increased to 20.80 % in 2000-01 and started decreasing and declined to 13.0 % in 2007-08. The growth was highest in 2009-10 accounting for 34.80 %. After 2009-10 the growth rate started decreasing again and reached 0.32 % in 2012-13. The growth reached to 2.09 % in 2015-16 as shown in table 4.2. The growth rate of the expenditure on education in total did not register any negative value in the entire sample period of the data. The compound average growth rate of the expenditure on education as estimated from the model first of the methodology stood at 12.46 % and remained the significant at one and five percent level of the significance as presented in table 4.11.

As far as the expenditure on education as a percentage share of total or aggregate expenditure of the state is concerned it shows negative trend in most of the years. Starting from the 3.74 % in 1996-97 it reached -5.41% during 1997-98. The growth touched -12.61% in 2004-05. However it started increasing in 2008-09 accounted for 8.69 % and reached around

12.39% in 2010-11. The year wise growth rate stood at 7.43% in 2013-14, growth rate increased to 13.77% in 2014-15 the highest during the entire time period as shown in table 4.2.

The fluctuating trend of the expenditure on education as a percentage share of the total indicates that expenditure share of total on education gained less priority in the state of the Jammu and Kashmir. The increasing aggregate expenditure of the state had less contributed towards the sector and if the contribution was increased it doesn't increased up to the increase in the aggregate expenditure of the state and relatively is more fluctuating. The compound annual growth rate of the expenditure on the education as a percentage share of the total expenditure was 1.01 % and was significant at one and five percent level of the significance as shown in table 4.11.

As far as the expenditure on education as percentage share of gross state domestic product of the state is concerned it represented the negative growth rate in 1999-2000 accounting for -38.55 %, -2.83 % in 2002-03, -2.37 % in 2003-04, -4.04 % in 2011-12 and reached to -9.87 % in 2012-13. The growth rate was positive during rest of the years in the given time period. The growth was highest in 2009-10 accounting for 29.25 % followed by second highest in 2000-01 accounted for 16.78 % and 11.33% in 1996-97 represented in table 4. 2. It can be revealed that total expenditure on the education in absolute terms has increased but the expenditure share of total expenditure and percentage share of GSDP was relatively low as represented in table 4.2. The importance of the sector is

such that growth rate of the share devoted to education is less. The possibility of less expenditure has further added to the inefficiency of the education sector and fall short of the demand of the state budget to the education sector.

Table 4. 2 Year Wise Growth Rate of Expenditure on Education

| Year	Total expenditure on education (percentage)	Expenditure on education as percentage share of total expenditure	Expenditure on education as percentage share of GSDP
1995-96	-	-	-
1996-97	16.74	3.74	11.33
1997-98	15.10	-5.41	8.86
1998-99	18.39	-0.96	12.66
1999-00	18.25	-2.69	-38.55
2000-01	20.80	9.68	16.78
2001-02	7.45	4.50	5.22
2002-03	1.99	-6.03	-2.83
2003-04	2.75	1.83	-2.37
2004-05	10.28	-12.61	-26.16
2005-06	16.03	-4.12	9.87
2006-07	10.80	7.52	4.37
2007-08	13.00	-8	6.40
2008-09	19.56	8.69	12.03
2009-10	34.86	13	29.25
2010-11	19.89	12.39	13.46
2011-12	3.28	-0.78	-4.04
2012-13	0.32	-3.97	-9.87
2013-14	8.96	7.43	10.66
2014-15	7.42	13.77	3.69
2015-16	2.09	-2.23	9.28

Source: Calculated from handbook of statistics on Indian states (2014-15), RBI.

Fig4.1 Year Wise Growth Rate of Expenditure on Education.
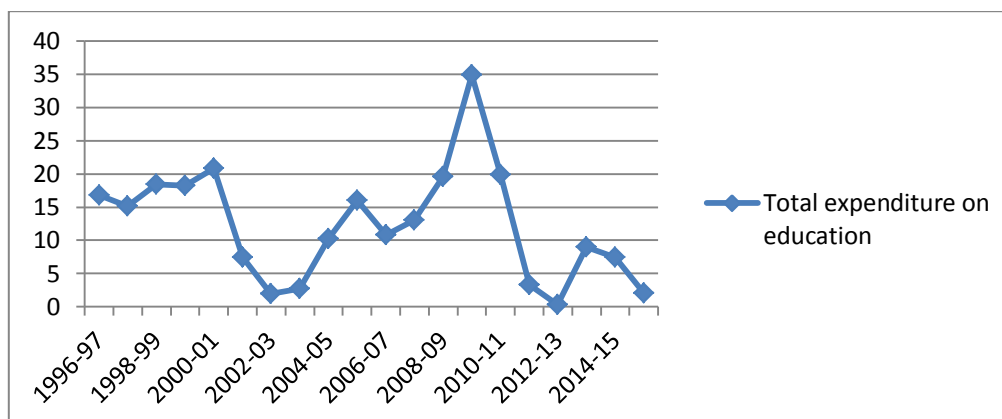
Source: Based on the data in table 4.2

Fig4. 2 Year wise growth rate of expenditure on education
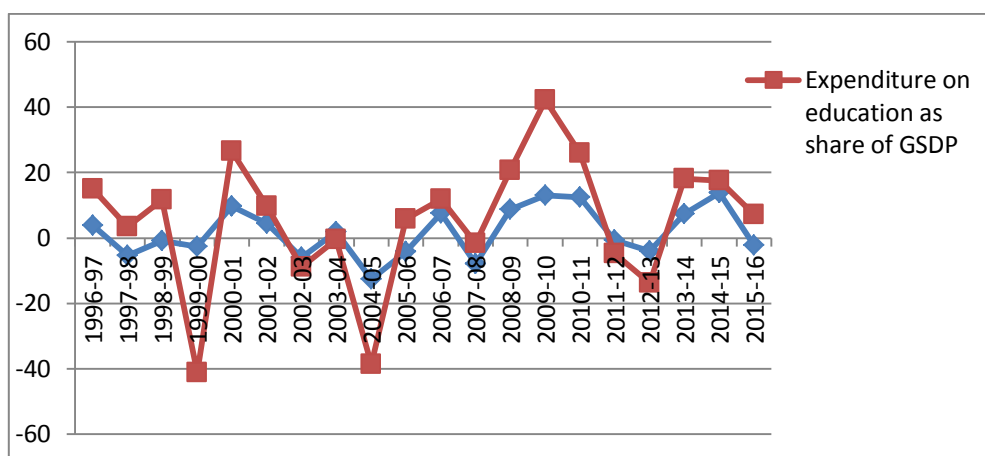
Source: Based on the data in table 4.2

4.4 Estimation and analysis of pupil teacher ratios

Under this heading the quality of education is estimated by two important proxy variables. They are pupil teacher ratio and the availability of the institutions. Both these variables are important for the quality of the education. Increase in the institutional availability will provide the easy access to education and more availability of teachers to given density of students represented the quality of education parameter as well.

The pupil teacher ratio in primary was highest in 2001-02 accounting for 34 and lowest being 13 in 2004-05. In upper primary it goes never beyond 20 and in secondary the ratio was 16 being the highest during most of the years. In all schools the highest ratio was in 2007-08 accounted for 23 as represented in table 4.3. The year wise growth rates are presented in table 4.4.

The year wise percentage growth rate of pupil teacher ratio in primary was -14.70 % in the year 2002-03. The highest growth rates as revealed by table 4.3 was in 2005-06 accounted for 130.77 % after that it started decreasing and reached negative -17.86 % in the year 2009-10. The growth rate of pupil teacher ratio in primary was zero in 2012-13 as shown in table 4.4.

The compound annual growth rate in the given time period from 2001-02 to 2013-14 stood at -0.689 % in primary schools and is insignificant presented in table 4.11. As far as the upper primary and

secondary is concerned both represented the negative annual compound growth rates.

The estimated compound annual growth rates stood at -1.30, -3.69 and -2.51 % for secondary, upper primary and all schools pupil teacher ratio presented in table 4.11. In this scenario the quality of education is bound to be restricted to low level in the state measured through the proxy variable of pupil teacher's ratio.

Table 4.3 Pupil Teacher Ratio

Year	Primary	Upper primary	Secondary	All schools
2001-02	34	17	16	22
2002-02	29	18	16	22
2003-04	26	14	10	17
2004-05	13	16	15	21
2005-06	30	15	12	20
2006-07	32	15	15	18
2007-08	31	20	16	23
2008-09	28	14	16	20
2009-10	23	15	14	18
2010-11	20	15	13	16
2011-12	27	11	13	17
2012-13	27	11	12	16
2013-14	26	10	11	15

Sources: Digest of statistics and economics (2014-15) J&K

Table 4. 4 Year wise growth rates of pupil teacher ratios at all levels

Year	Percentage (primary)	Percentage (upper pr.)	Percentage (secondary)	Percentage (all schools)
2002-03	-14.70	5.89	0	0
2003-04	-10.34	-22.22	-37.5	-22.72
2004-05	-50	14.28	50	23.52
2005-06	130.77	-6.25	-20	-4.76
2006-07	6.67	0	25	-10
2007-08	-3.12	33.33	6.67	27.78
2008-09	-9.68	-30	0	-13.04
2009-10	-17.86	7.14	-12.5	-10
2010-11	-13.04	0	-7.14	-11.11
2011-12	35	-26.67	0	6.25
2012-13	0	0	-7.69	-5.89
2013-14	-3.70	-9.09	-8.33	-6.25

Source: computed on the Basis of Table 4.3

4.5 Estimation and analysis of Growth rates of Institutional availability

Institutional availability is another parameter to evaluate the access to education and determine the quality and efficiency of the education. The institutions in the category of the primary schools in the state have increased from the number 11237 units in 2006-07 to 15245 units in 2011-12. Similarly the upper primary has increased roughly from 5313 units in 2006-07 to 10995 units in the year 2013-14. The establishments of the secondary schools also increased from 1511 from 2006-07 units to 4757 units in 2013-14 and are presented in table 4. 5.

The primary institutions are more as compared to upper primary and secondary institutes in the state. The availability of the institutions is

pertaining to the rural areas where more than 60% population is the inhabitant by residence. However in the absolute terms the increasing number of the schools in the category of the primary, upper primary and secondary represented a good move towards increasing the access to education. However the increasing number of the institutions must be matched with the growing demand of the population.

The increase in the absolute number of the institutions in the state doesn't mean that the growth rates are also growing with full pace and zeal. The percentage growth rate was 1.40 % in 2007-08 at primary level that increased to 24.94% in 2008-09 and reached to only negative growth in entire time period -1.34% in 2010-11. The growth rate was 0.28% and 0.59% in 2011-12 and 2012-13 at primary level. The growth rate reached to 5.89% in 2013-14 as shown in table 4.6.

As far as the upper primary is concerned the growth rate stood at 2.84 % in 2007-08, reached to highest 33.38% in 2009-10. The growth rate started decreased till it reached 0.69 % in 2012-13. The growth rate was 8.72% of upper primary in 2013-14 as shown in table 4. 6.

The growth rate of the secondary institutions however has decreased continuously in the state from 44.54% in 2007-08 to 31.82% in 2009-10. The secondary institutions growth rate was 1.47% in 2010-11 and stood at 26.21% in 2013-14 as presented in table 4.6. The growing institutions in the state in absolute terms indicate the efforts of the government to provide the easy access to educational availability.

The compound growth rates of the institutional availability of primary; upper primary and secondary in the state stood at 5.19 %, 15.34 % and 11.94 % respectively and were significant as presented in table 4.11. The estimations revealed that in the state the educational institutions in the form of primary, secondary and upper primary has been increased

Table 4. 5Institutional availability

Year	primary	upper primary	Secondary
2006-07	11237	5313	1511
2007-08	11395	5464	2184
2008-09	14237	6621	2369
2009-10	15409	8831	3123
2010-11	15203	9320	3169
2011-12	15245	10008	3519
2012-13	15335	10077	3769
2013-14	16239	10956	4757

Source: Digests of statistics 2013-14 J&K.

Table 4.6 Year wise growth rates of institutional availability

Year	Percentage (Primary)	Percentage upper primary	Percentage secondary
2007-08	1.40	2.84	44.54
2008-09	24.94	21.17	8.47
2009-10	8.23	33.38	31.82
2010-11	-1.34	5.53	1.47
2011-12	0.28	7.38	11.04
2012-13	0.59	0.69	7.10
2013-14	5.89	8.72	26.21

Source: Based on the data in table 4.5

4.6 Gross enrollment ratio: Estimation and Analysis

The gross enrollment ratios has been calculated by taking the total students on roll and divided by the population in that particular age group. The gross enrollments were calculated for primary, secondary and higher by same methodology. The gross enrollment ratios as the proxy variable for education human capital fulfills many criteria to get better picture of the education human capital conditions of the state because these variables also represent the result of efforts for education.

The Gross enrollments ratio at the primary level was 86.32 in 1995-96 in Jammu and Kashmir. It increased to 100.49 in 2005-06 and stood at 103.09 in 2006-07. The gross enrollment ratio at primary level stood at 117.25 in 2009-10 as shown in table 4.7. The year with highest gross enrollment ratio was 2010-11 accounted for 119 and the year witnessed with lowest gross enrollment ratio at primary was 2002-03 accounted for 71.52 presented in table 4. 7.

As far as the year wise estimated growth rates of primary enrollments are concerned it was -8.07% in the starting period of 1996-97 and reached to 8.49% in 1998-99. The growth rate again decreased and stood at -15.25% in 2003-04. From 2004-05 the growth rate of the gross enrollment ratios started increasing from 17.66% and reached to 20.23 % in 2005-06 but decreased again to -2.46% in 2007-08. In 2009-10 the growth of gross enrollment ratio at primary level stood at 13.61% but in the time period of four years decreased to -22.43% in 2012-13.

The growth rates of the gross enrollment ratios at the primary level shows a quite fluctuating trend in the state which is represented in table 4. 8. The growth rate was highest in the year 2005-06 stood at 20.03% as presented in table 4.8.

The estimated annual compound growth rate of the gross enrollment at the primary level stood at low of 0.46 % and was significant as shown in table 4.11.

Table 4.7 Enrollment Ratios

Year	GER primary	GER secondary	GER higher
1995-95	86.32	16.3	1.89
1996-97	79.33	18.9	2.01
1997-98	80.3	17.29	2.1
1998-99	87.12	24.9	2.54
1999-00	93.11	29.52	3.89
2000-01	92.5	34.35	3.27
2001-02	89.85	42.24	3.17
2002-03	84.39	33.38	4.95
2003-04	71.52	32.6	5.3
2004-05	83.72	35.38	6.2
2005-06	100.49	35.74	7.2
2006-07	103.01	27.47	7.9
2007-08	100.46	41.14	8.4
2008-09	103.2	45.1	10.36
2009-10	117.25	44.11	18.2
2010-11	119	53.2	16.8
2011-12	115	52.8	23.7
2012-13	89.2	51.9	24.1
2013-14	84.3	47.11	25.2
2014-15	85.3	51.12	26.2
2015-16	88.3	49.21	26.39

Source: Computed from various Reports of MHRD

The gross enrollment ratios at the secondary level estimated takes under consideration the class from secondary to higher secondary. The continuous increase in the students on roll increased gross enrollment ratios at secondary level from 16.3 in 1995-96 to 42.24 in 2001-02 but started decreased to 33.38 in 2002-03. The gross enrollment at secondary level stood at 41.14 in 2007-08 and reached 52.8 in 2011-12. The gross enrollment ratio was highest in the year 2010-11 stood at 53 but reached to 49.21 in 2015-16 shown in table 4. 7.

The year to year wise growth rate of the secondary gross enrollment ratio estimated depicts that it was 15.95% in 1996-97 and decreased to -8.51 % in 1997-98 as shown in table 4. 8. The highest growth rate of the gross enrolment ratio at secondary level was reported 44.01% in the year 1998-99 presented in table4. 8. The growth was 16.36% in 2000-01 and increased to 8.52% in 2004-05. The growth rate was highest in the year 2007-08 accounted for 49.77%. The growth rate reached to -9.22 % in 2013-14 and stood at -3.74% in 2015-16 as shown in table 4. 8. The estimated compound annual growth rate of the gross enrolment ratio at secondary level stood at 0.69 % and was significant as presented in table 4. 11.

Higher education represented the backbone of the human capital to be utilized in the near time than the primary and secondary. The mere possibilities arise after higher education to get back the gains or returns on investment incurred in the form of gaining primary or secondary education.

It is higher education after that the utilization for achieved skills gained during time came into being. As far as the higher education gross enrollment in the state are concerned they are quite low in fact the gross enrollment ratios have never gone beyond 27 as presented in table 4.7.

The gross enrollment ratio at higher level was 1.89 in the year 1995-96 and reached to 3.27 in 2000-01. From the 2001 the gross enrolment ratios started increasing and reached to 10.36 in 2008-09 and absolutely 18.2 in 2009-10. Gross enrollment ratio at higher level reached to 23.7 in 2011-12 and stood at 26.39 in 2015-16 as presented in table 4.7.

The year to year growth rates estimated for the gross enrollment ratio of the higher education in the state of the Jammu and Kashmir revealed that it was 6.34 % in the year of 1996-97and increased to 20.95 in 1998-99. The highest growth rate recorded was 53.15% in 1999-2000 and decreased dramatically to -3.058% in 2001-02 as can be revealed from table 4. 8. The growth rate stood at 0.73% in the year 2015-16. The estimated compound annual growth rate stood at 0.46 % in the higher education and is significant shown in table 4.11.

Table 4.8 Annual Growth Rates of Gross Enrollment Ratios (%)

Year	primary	secondary	higher
1996-97	-8.09	15.95	6.34
1997-98	1.22	-8.51	4.48
1998-99	8.49	44.01	20.95
1999-00	6.88	18.55	53.15
2000-01	-0.65	16.36	-15.94
2001-02	-2.86	22.97	-3.058
2002-03	-6.07	-20.97	56.15

2003-04	-15.25	-2.33	7.07
2004-05	17.06	8.52	16.98
2005-06	20.03	1.02	16.13
2006-07	2.50	-23.13	9.72
2007-08	-2.46	49.77	6.33
2008-09	2.73	9.63	23.33
2009-10	13.61	-2.19	75.68
2010-11	1.49	20.60	-7.69
2011-12	-3.36	-0.75	41.07
2012-13	-22.43	-1.70	1.68
2013-14	-5.49	-9.22	4.56
2014-15	1.18	8.51	3.97
2015-16	3.52	-3.74	0.73

Source: Based on the data in table 4.7

4.7 Literacy Estimations and Analysis

Another variable for the analysis in the category taken is literacy. From the literature it is suggested that more literate people can increase the efficiency of work and hence in return leads to increase the production. Literacy is at the heart of basic education for all, and of all human capabilities. Literacy can be taken as the output of education human capital variables. Basic literacy is essential for eradicating poverty, reducing child mortality, curbing population growth, achieving gender equality and ensuring sustainable development, peace and democracy. Universal literacy also has special significance for those who have been historically deprived of access to education. In fact, education is a lifelong learning perspective not only to enhancing reading and writing capabilities, but also imparting a comprehensive set of life skills that enable people to access all

development resources. With the planned interventions and sustained efforts, considerable progress has been made in the State in the field of literacy (Economic Survey, 2014).

At the time of Independence the literacy rate of the state was only five per cent. Census 1961 put the literacy rate of the State at 11.03 % which increased to 18.58 % during 1971 census. In 1981, the literacy rate was recorded at 26.67 % and the projection for 1991 was made at 45 % as no census was carried out during latter period. During the decade 2001-2011, literacy rate increased from 55.50 % to 68.74 % in the State as against 64.84 % to 74.04 % at the national level as shown in table 4. 9 (Economic survey, 2014).

Although, the literacy rate of the state is well short of the rate recorded at the national level, yet figures reveal that the rate of increase in the literacy in the state is faster than at the national level. During 1961-2011, while the literacy rate in the State increased by 58 points, it recorded increase of 46 points at the national level. Category-wise also, the rate of increase in literacy percentage both among males and females is better in the State than the country.

Despite number of limiting factors like less infrastructure availability, rural urban gaps and low density of population the (LGR) literacy growth rate at state level remained above the (LGR) literacy growth rate at national level, the State has been able to make a remarkable progress in the field of education as is evident from the above figures.

Table4. 9 Growth rate of Literacy Rate

Year	Jammu and Kashmir			All India			Percentage increase (J&K)	
	Male	Female	Total	Male	Female	Total		
1961	16.97	4.26	11.3	40.39	15.33	28.30	-	-
1971	26.75	9.28	18.58	45.95	21.97	34.45	07.55	6.15
1981	36.29	15.28	26.67	56.38	29.76	43.57	8.09	9.12
2001	66.60	43.00	55.50	75.26	53.67	64.84	28.83	21.27
2011	78.26	58.01	68.70	82.14	65.46	74.04	13.24	9.20

Source: Estimated From census (2011)

Fig 4.3 Growth of Literacy
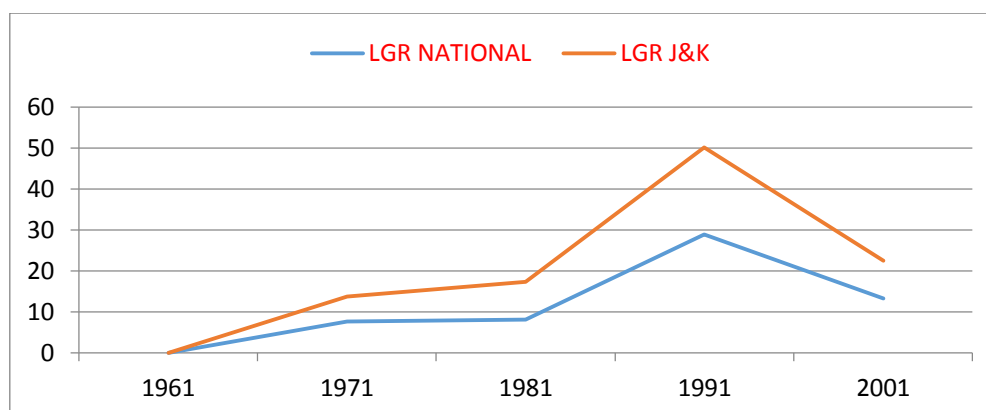
Source: Based on figures in table 4. 9

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.8 Gender Gap in Literacy Estimation and Analysis

Gender differential exists both in rural and urban areas, but it is high in rural areas. This can be attributed to a number of factors like Social dogmas, engagement of girl child in agricultural and other domestic activities etc.

The State has been able to break this impasse and put a halt to the ever increasing trajectory of gender gap for the first time during the decade 2001-2011 when the gender gap got reduced to 20.25%. This was possible only due to higher rate of increase in the female literacy viz; by 15.01 % as against 11.66 % recorded for males during 2001-11 (Economic survey, 2014).

Table 4 .10 Estimation of Gender Gap in literacy rate

Year	1961	1971	1981	2001	2011
Gender gap in Literacy	12.17	17.47	20. 41	23.60	20.25

Sources: Census (2011)

4.9 Dropout rates: an analysis

Ever since the launch of Sarva Shiksha Abhiyan (SSA), Mid-Day Meal Scheme (MDMS) and initiation of host of steps like provision of free text-books, scholarships, various educational facilities at an easy reach, the State has been able to reduce the drop-out rate. The dropout rate in the State has declined to 11% in 2012-13.

Table 4.11 Estimated ACGRs of Education Human Capital

Variables	CAGR
Total expenditure on education	12.46**
Education expenditure as percentage share of total	1.01**
Education expenditure as share of GSDP	0.7**
Gross enrollments at primary	0.46*
Gross enrollments at secondary level	0.69*
Gross enrollment ratios at higher	0.46*
Pupils teacher ratios at primary level	-0.689***
Pupil teacher ratio at upper primary level	-3.69***
Pupils teacher ratios at secondary level	-1.30***
Pupils teacher ratios at all levels	-2.51*
Institutional availability primary level	5.19*
Institutional availability at upper primary level	15.34*
Institutional availability at secondary level	11.94*

Source: (*,,*** significant at five, 10 and not significant)**

Section III

4.3 Health as component of human capital: estimation and analysis

Health indicators of any State are important determinants of the socioeconomic development as well as of the human capital, better health means the efficiency of productivity of work increments. 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.

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/state at the macro level. Better health improves the efficiency and productivity of the labor force, which ultimately contributes the economic growth and leads to human welfare (Abass, 2001).

In this section of the chapter health is estimated and analyzed in the context of Jammu and Kashmir economy. Under the health component of the human capital both the inputs and outputs are taken under consideration. The health inputs analyzed are total expenditure on health, expenditure on health as a percentage share of total and Gross State Domestic Products of the state. Other inputs to check the efficiency, quality and accessibility of health care are availability of institutions and availability of manpower in the health sector. The outputs of health human capital taken for analysis are life expectancy, Infant mortality, both death rates and birth rates.

Table 4.12 inputs and outputs of health

Inputs	Outputs
1. Total expenditure on health 2. Expenditure on health as percentage share of total expenditure 3. Expenditure on Health as percentage share of GSDP 4. Institutional availability 5. Total manpower in Health Sector. Medical attention	1. Infant mortality rate 2. Life expectancy 3. Death Rates 4. Birth Rates

4.11 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 as presented in table 4.13 (Census 2011).

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. 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 Jammu and Kashmir 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.

Table 4.13 Population of State during Census Years

Census year	Population
1951	32.54
1961	35.61
1971	46.17
1981	59.87
1991	78.37
2001	1.0144
2011	1.2549

Source; Census (2011)

4.12 Sex Ratio

This variable helps to understand the condition of the human capital in terms of the gender. The child sex ratio [0 to 6 years] has shown a sharp decline from 941 in 2001 to 859 as per census 2011. The overall sex ratio has also declined from 892 in 2001 to 883 as per census 2011 as shown in table 4.14. This shows a continuing preference for male children over females in the last decade and is a matter of serious concern.

Table 4.14 Sex Ratio

| census year	sex ratio
1901	882
1911	876
1921	870
1931	865
1941	869
1951	873
1961	878
1971	878
1981	892
1991	896
2001	900
2011	883

Source: census (2011)

As per figures of Census 2011, the child sex ratio of the State was 859 as compared to 914 at the national level (Census 2011). In order to improve the declining Sex Ratio, various measures have been taken. State Supervisory Board, Division / District Advisory Committees have been reconstituted and are regularly meeting.

Sensitization workshops / rallies / debates in the school are being organized under Jammu & Kashmir Pre-Conception and Prenatal Sex Selection/Determination (PC&PNDT) Act, 2002 to curb the menace of

declining sex ratio in the State. Reward amount of ` 50,000 has been introduced for the person who informs about Sex determination / Selection by any of the ultra sound clinics and amount of ` 25,000 for the whistle blower who informs about unregistered ultrasound machine.

Fig. 4.4 Sex ratio in Jammu and Kashmir
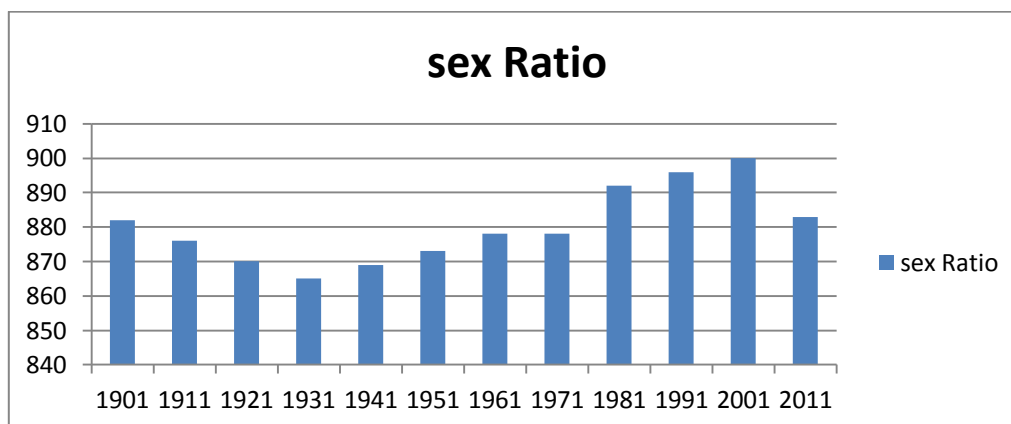
Source: Based on the figures in table 4.14

4.13 Expenditure on Health: Estimation and analysis

Under this heading total expenditure on health sector, percentage share of aggregate expenditure and percentage share of GSDP are estimated and analyzed. The expenditure on health is an important input to get the best output. As far as the absolute values are concerned the total expenditure on the health stood at 146.493 in the year 1995-96 and went to 383 in 2000-01 as shown in table 4.15. The total expenditure on the health increased further to 454.376 in the year 2002-03 in absolute terms and stood at 749.358 in the year 2006-07 as shown in table 4.15. The maximum expenditure on the sector was in the year 2015-16 accounted for 1505.854 as shown in table 4.15.

The estimated year wise growth rate was -6.68 % in 1995-96 and reached to 25.27 % in the year 1997-98. The growth rate was 44.87 % in the year 1998-99. The growth rate in 2002-03 accounted for 6.72% and 23.65% in 2007-08 as represented in table 4.16. The growth rate was negative in the year 2008-09 and 2014-15 accounted for -0.38 % and -5.6 % respectively. The highest growth rate was 46.87 % in the year 1998-99 As far as the CAGR are concerned it accounted for 12.97 % and was significant at five percent level of significance.

As far as the total expenditure on health as the percentage share of total aggregate expenditure is concerned it accounted for 4.1 percent in 1995-96 and reached 5.2 and 5.4 percent in absolute terms in the year 2002-03 and 2014-15 respectively presented in table 4.16. The percentage value ranges in between two to six and the fact of the budget of state remains that percentage expenditure to health sector out of total budget remained at 5.8 percent in the year 2015-16 and is shown in table 4.16.

The estimate year to year wise growth rates of the expenditure on the health as a percentage of the total was -17.07 % in the year 1996-97. The year wise growth rate accounted for 22.80 % in 1998-99 and stood at -5.45 % in 2002-03.The growth rate was negative -1.92 % in the year 2012-13. The highest growth rate was in the year 1998-99 accounted for 22 % followed with 20% in 2006-07 which is clearly seen from table 4.16. The estimated CAGR of the expenditure on the health as a percentage of the total was 1.62 and was significant at five percent level of significance as shown in table 4.29.

Expenditure on the health as the percentage share of the size of the economy measured in terms of the gross state domestic product in absolute terms shows increase. However the range of the value was extremely low and never touched four percent in the entire sample time period. The expenditure as the share of the gross state domestic product of the health sector in absolute terms was 2.09 in 1995-96 and decreased to 1.86 percent in the year 1996-97, 3.08 percent in 1998-99 and reached to 2.65 percent 2003-04 as can be seen from table 4.15. The share was highest in the year of 2015-16 accounted for 3.88 percent and lowest was 1.86 percent in the year of 1996-97 represented in table 4.15.

As far as the estimated year wise growth rate of the expenditure on the health as the percentage of the state domestic product is concerned it stood at -11.07 % in 1996-97 and 18.56 % in the year 1997-98 (table 4.16). The year wise growth rate was 39.61 % in the year 1998-99 the highest in the entire time period. The growth was -32.39%, 13.32%, 13.19% and -2.38% in the year 1999-2000, 2000-01, 2001-02 and 2002-03 respectively as shown in table 4. 16. However the growth shows increment from negative to 16.70% in 2006-07 and 23.72 % in 2009-10. The growth rate of the expenditure on the health as a percentage of the gross domestic product was negative in the last five years except in the year of 2013-14 and 2015-16 accounted for 9.10 % and 20.1% respectively which is presented in table 4.16. The estimated CAGR of the expenditure on the health as percentage of the gross state domestic product was 2.09 % and was statistically significant (table 4.29).

Table 4.15 Expenditure on Health

| Year	Total expenditure	As Percentage share of total expenditure	As Percentage Share of GSDP
1995-96	146.493	4.1	2.09
1996-97	136.714	3.4	1.86
1997-98	171.255	3.5	2.21
1998-99	251.507	4.3	3.08
1999-00	326.968	4.6	2.08
2000-01	383.621	4.9	2.36
2001-02	442.75	5.5	2.67
2002-03	454.376	5.2	2.61
2003-04	484.935	5.5	2.65
2004-05	545.223	4.9	1.99
2005-06	606.015	4.5	2.09
2006-07	749.358	5.4	2.44
2007-08	903.438	5.3	2.77
2008-09	900	4.8	2.59
2009-10	1163.656	5.2	3.21
2010-11	1217.472	5.1	3.18
2011-12	1292.356	5.2	3.13
2012-13	1324.113	5.1	2.88
2013-14	1421.928	5.4	3.15
2014-15	1342.062	5.4	2.87
2015-16	1505.854	5.8	3.44

Source: Handbook of statistics on state finance (2014-15), RBI

Table 4.16 Annual growth rates of expenditure on health

| Year	Total expenditure	Percentage share of total	Percentage share of GSDP
1996-97	-6.68	-17.07	-11.07
1997-98	25.27	2.94	18.56
1998-99	46.87	22.86	39.61
1999-00	30.00	6.98	-32.39
2000-01	17.33	6.52	13.32
2001-02	15.41	12.24	13.19
2002-03	2.62	-5.45	-2.38
2003-04	6.72	5.78	1.48
2004-05	12.43	-10.90	-24.73
2005-06	11.14	-8.16	5.07
2006-07	23.65	20	16.70
2007-08	20.56	-1.86	13.30
2008-09	-0.38	-9.43	-6.42
2009-10	29.29	8.33	23.72
2010-11	4.62	-1.92	-0.96
2011-12	6.15	1.96	-1.40
2012-13	2.45	-1.92	-7.92
2013-14	7.38	5.88	9.10
2014-15	-5.61	0	-8.89
2015-16	12.20	7.40	20.10

Source: Authors own calculations based on the figures in table 4.1

Fig 4. 5   Year wise growth rate of expenditure on Health
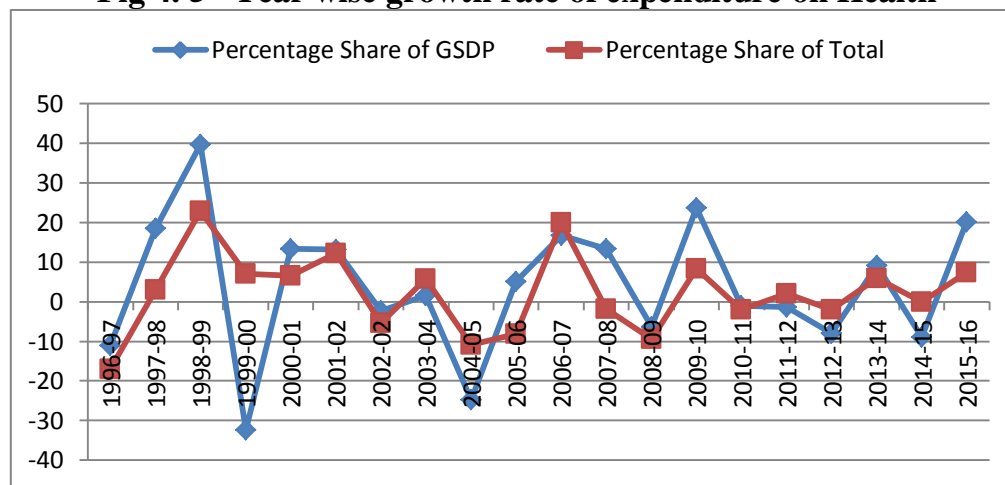
Source: Based on the figures in table 4.16

Fig 4.6 Year wise growth rate of expenditure on Health (Total)

Source: Based on the figures in table 4.16

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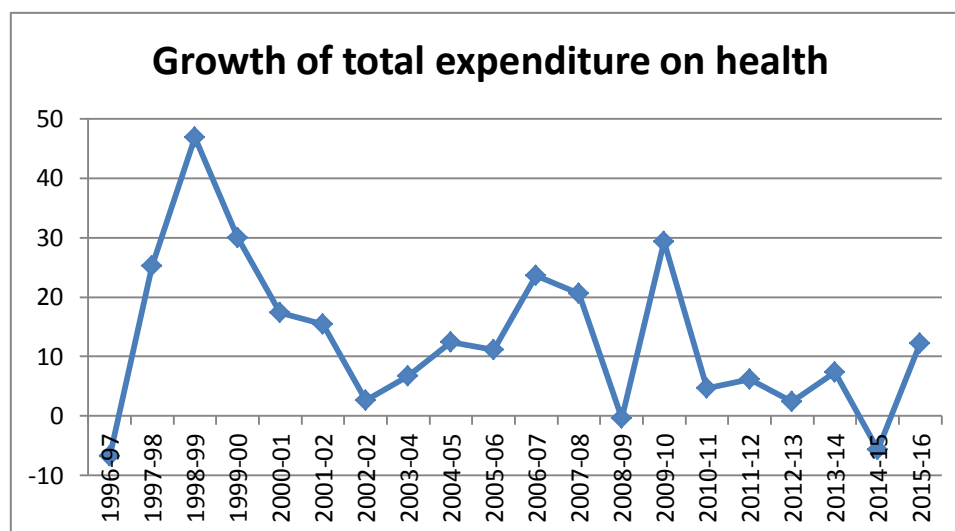
4.14 Quality and access to health care Estimation and Analysis

The quality and access to the health care in the state is measured with the two proxy variables one is the availability of the institutions and second is the availability of the man power in the health sector. As far as the availability of the man power in the state is concerned it includes doctors working, nurses and all those who are virtually employed or engaged in the health department of the state.

Let's look to absolute figures of the availability of the manpower in the state. The total number of persons involved in the health sector was 25231 in the year 2001- 02. The availability was 27454 in the year 2005-06 and decreased to 24205 in the year 2008-09 and increased further to 31533 in the year of 2013-14 (Table 4.17). The increasing number of the population in the state demands much more of the manpower to be available in the health sector because in per-capita terms the ratio is decreasing absolutely in the state of the Jammu and Kashmir.

As far as the year wise growth rate of the availability of the man power in the health sector is concerned as represented from table 4.17 it was 4.32 % in 2002-03 and reached to 3.13 % in the year 2003-04.The growth rate was -0.46% in the year 2004-05 and -3.56% in the year 2006-07. The growth rate was zero in the year 2010-11 and highest growth rate of availability of man power in the state was seen in the year of 2011-12 accounted for 16.81%. The CAGR of the availability of the man power in the state was estimated 0.925 % and was insignificant (table 4.29).

The availability of the health institutions has never crossed the 4000 number. The total availability was 3704 units in the year 2001-02 and

reached to 3806 units in the year 2004-05. The availability of the total institutions stood at 3858 units in 2013-14. The availability of institutions was 3972 highest in 2010-11 and is shown in table 4.18.

The availability of the district and sub district hospitals out of the total was increased to 120 in 2013-14 which were 111 in 2001-02. The sub district hospitals were 105 units lowest in 2005-06 and 120 units highest in 2013-14 as shown in table 4.18.

Table 4.17 Man power availability in the health sector

year	Medical persons in health sector	Growth rates (%)
2001-02	25231	
2002-03	26321	4.32
2003-04	27147	3.13
2004-05	27022	-0.46
2005-06	27454	1.59
2006-07	26474	-3.56
2007-08	27286	3.06
2008-09	24205	-11.29
2009-10	24877	2.77
2010-11	24877	0
2011-12	29059	16.81
2012-13	29524	1.60
2013-14	31533	6.80

Source: Digests of statistics and economics (2014-15), J&K

The total availability of the primary health centers were 361 in 2001-02 and increased to 388 and 394 units in 2003-04 and 2004-05. The primary health centers were 408 units highest in the year of 2012-14 as is shown in table 4.18.

The availability of the ayervedic institutions in the state were 433 units in the year of 2001-02 and decreased to 423 units in 2014-15. The availability of the ayervedic dispensaries were highest in the year of 2009-10 accounted for 457 units in the state and is shown in table 4.18. The idea from the rough data of the availability of the health centers in the state indicates that the state needs to set infrastructure to increase the availability of the institution in the state.

The estimated growth rates of the total institutional availability remains below 2% and maximum occurrence were negative. The highest growth rate was in the year of 2010-11 accounted for 7.64% in the state. The growth of total institutional availability was 1.90 % in the year 2004-05 and 1.49 % in 2008-09 as presented in table 4.19. The estimated CAGR was 0.46 and was significant (Table 4.29). The estimated growth rate at district and sub-district hospitals were never beyond five percent. The growth rate was 2.70% in 2002-03 and reached to 3.50% in 2003-04 as shown in table 4.19.

Table 4.18 Institutional availability

Year	Total	Distt/sub distt/pvt hospitals	Primary health centers	Ayurvedic dispensaries
2001-02	3704	111	361	433
2002-02	3735	114	372	438
2003-04	3735	118	388	434
2004-05	3806	117	394	437
2005-06	3698	105	391	424
2006-07	3705	110	386	424
2007-08	3603	113	380	423
2008-09	3657	106	401	423
2009-10	3690	110	391	457
2010-11	3972	115	412	457
2011-12	3850	112	418	417
2012-13	3856	117	406	423
2013-14	3858	120	408	423

Source: Digests of economics and statistics (2014-115)

Table 4.19 Growth rates of institutional availability

Year	Total hospitals	District level	Primary	Ayervedic hospitals
2002-03	0.83	2.70	3.04	1.15
2003-04	0	3.50	4.30	-0.91
2004-05	1.90	-0.87	1.54	0.69
2005-06	-2.83	-10.24	-0.76	-2.94
2006-07	0.18	4.76	-1.27	0
2007-08	-2.75	2.72	-1.55	-0.29
2008-09	1.49	-6.19	5.56	0

2009-10	0.90	3.77	-2.49	8.03
2010-11	7.64	4.54	5.37	0
2011-12	-3.07	-2.60	1.45	-8.75
2012-13	0.15	4.46	-2.87	1.43
2013-14	0.051	2.56	0.49	0

Source: Authors calculations based on table4.17

The growth of district hospitals was highest 4.76% in the year 2006-07. The CAGR was estimated as 0.23% but insignificant.

The year wise growth rate of the primary health centers in state were estimated highest in the year of 2008-09 accounted for 5.52% followed with 5.37% in 2010-11 as shown in table 18. The growth rate decreased to -0.76% in 2005-06 from 4.30% in 2003-04 and 3.047% in 2001-02. The growth rate was negative -2.49% in 2009-10. The estimated CAGR were estimated 0.925% and was significant (table 4. 29).

The year to year wise growth rates in the ayervedic dispensaries estimated were negative except for the year 2009-10 which accounted for 8.03%. The growth rate was -0.91%, -2.91%, -0.23% and -8.1% in 2003-04, 2005-06, 2007-08 and 2011-12 and is presented in table 4.18. The CAGR estimated was 8.6% but insignificant.

4.15 Medical attention

As far as the medical attention received by mothers at delivery is concerned it is increasing from 2006. The attention was 48% in 2006 and it reaches 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 presented in table 4.20.

Table 4.20 Percent of Live births where the mothers received medical attention

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: Development report (2014-15), planning commission, Jammu and Kashmir

Figure 4.7 Percent of Live births where the mothers received medical attention
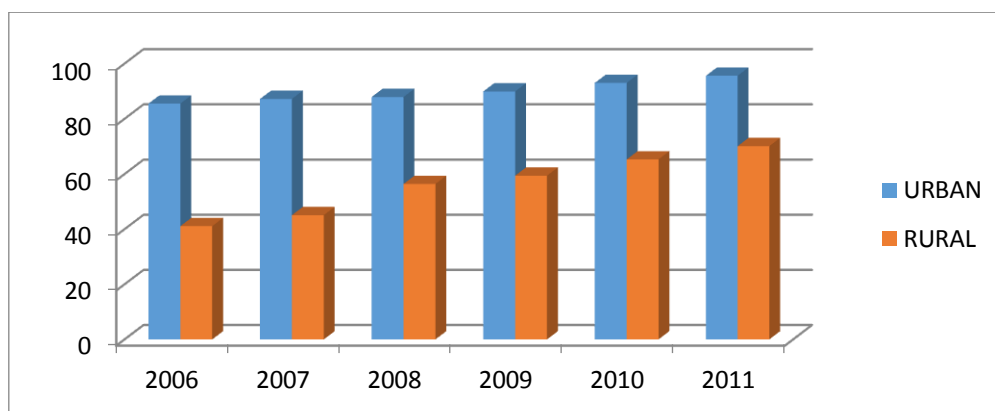
Source: Based on Table 4.20

As far as the growth rates are concerned the growth rate of medical attention received of total was highest in the year 2008 accounted for 18.27 % and lowest was 4.39 % in 2009. However the growth rate was positive in the time period from 2006 to 2011. The growth of medical attention by residence shows that it was positive for urban as well as rural.

The growth rate was 1.98 % in 2007 and 0.80 % in 2008. The growth increased to 2.27% in 2009 and 3.44 % in 2010 and decreased to 2.79 % in 2011. The growth rate in the rural area was 9.73% in 2007 and increased to25.05 % in 2008. The growth rate decreased to 5.31% in 2009 and increased again 9.93% in 2010 and decreased to 7.35% in 2011 (table 4. 21).

Table 4.21 Year wise growth rates of medical attention

year	percentage total	Percentage Urban	percentage Rural
2007	6.10	1.98	9.73
2008	18.27	0.80	25.05
2009	4.39	2.27	5.31
2010	5.45	3.44	9.93
2011	9.45	2.79	7.35

Source: computed on the basis of table 4.20.

4.16 Death Rates and Birth Rates

The balance between the death rates and birth rates are important to stabiles the natural growth rates. Increasing death rates represents the worst situation in the economy and increasing birth rates without available

resources or their utilization to feed them can lead to worst health human capital.

The birth rates in the state were 19.9 percent per thousands in 1998-99. The birth rates in the state were highest in the year 1999-00 accounted for 20.9 and lowest in the year 17.5 in 2013-14. The birth rates in the state have not gone beyond 20.9 in Jammu and Kashmir (Table 4.22).

As far as the death rates of the state are concerned it accounted for 5.4 in the year 1998-99 and increased to 6.3 and 6.2 in the year 1999-00 and 2000-01. The death rate has decreased to 5.3 in 2013-14. The death rates were highest in the year1999-00 accounted for 6.3 and lowest were 5.3 in the year 2013-14..

Table 4.22 Year wise birth and death rates per thousand in State

year	Birth Rate	Death Rates
1998-99	19.9	5.4
1999-00	20.9	6.3
2000-01	19.6	6.2
2001-02	20.1	6.1
2002-02	19.2	5.7
2003-04	18.6	5.7
2004-05	18.7	5.6
2005-06	18.9	5.5
2006-07	18.7	5.9
2007-08	19	5.8
2008-09	18	5.8
2009-10	18.6	5.7
2010-11	18.3	5.7
2011-12	17.8	5.5
2012-13	17.6	5.4
2013-14	17.5	5.3

Sources: Handbook on Indian states (2014-15), RBI

Table 4.23 Year wise Growth rates of death and birth rates

YEAR	Percentage BR	Percentage DR
1999-00	5.02	16.66
2000-01	-6.22	-1.58
2001-02	2.55	-1.61
2002-02	-4.4	-6.55
2003-04	-3.1	0
2004-05	0.53	-1.75
2005-06	1.06	-1.78
2006-07	-1.08	7.27
2007-08	1.60	-1.69
2008-09	-5.25	0
2009-10	3.33	-1.72
2010-11	-1.61	0
2011-12	-2.73	-3.50
2012-13	-1.12	-1.81
2013-14	-0.56	-1.85

Source: Authors own calculations based on table 4.22

As far as the estimated year wise growth rates are concerned it was highest for birth rates in 1999-00 accounted for 5.02%. The growth rate was highest for death rates in 1999-00 accounted for 16.66% (Table 4.22) in the state of Jammu and Kashmir. The decreasing growth rates represented the best results for both death and birth rate as they are negative indicator

4.17 Natural growth rates

The natural growth rates represent the difference between the birth rates and death rates the balance between the birth rates and death rates represented the balance in the natural growth rate. A balance in the natural

growth rates is important to maintain the demographic balance of the society.

The natural growth rates of the state were 14% in 2001-02. The growth rate accounted for 13.5% in 2002-03 and 12.8% in 2006-07 (Table 4.24). The estimated growth rate was 12.2% in 2013-14. The growth rate was highest in the year 2001-02 and accounted for the 14 % and lowest was 12.2% in the year 2012-13 (table 4.24).

By residence the estimated growth rate was 15% in 2001-02 in rural area and decreased to 13.2 in 2013-14 (table 4.24). The growth rate of the urban area was 10.3% in 2001-02 and reached to 8.1% in 2013-14 (Table 4.24). The estimated natural growth rates were higher in the rural areas and lower in the urban areas as compared to the urban areas.

Table 4.24 Estimation of natural growth rates

Year	Total	Rural	Urban
2001-02	14	15	10.3
2002-03	13.5	14.2	10.3
2003-04	12.9	13.3	10.6
2004-05	13.1	14.4	8.3
2005-06	13.4	14.5	9.3
2006-07	12.8	13.9	9.3
2007-08	13.2	14.4	9.2
2008-09	12.2	14.2	9.1
2009-10	12.9	13.9	9
2010-11	12.6	13.6	8.8
2011-12	12.3	13.4	8.4
2012-13	12.2	13.2	8.2
2013-14	12.2	13.2	8.1

Sources: Authors calculations from above table 4. 22

Figure 4.8 Natural growth rates
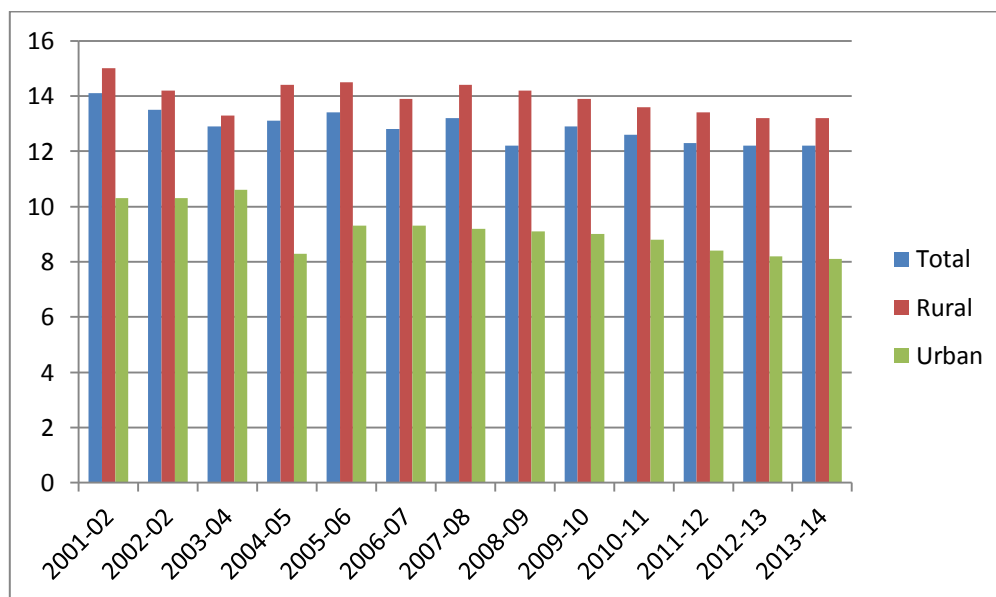
Source: based on above table 4.24

4.18 Life expectancy

The life expectancy in the state was estimated on averages years.

The life expectancy in the state on average shows the increased trend in the state. Life expectancy is taken as the measure of the quality of the life. The increasing life expectancy in the state indicates that the quality of life is increasing. Life expectancy in the state was 65.9 in 1998-2002. The male expectancy in the same year was 64.7 and life expectancy of the female in the state stood at 67.3. The total life expectancy increased from 66 in 1999-03 to 70 in 2002-06. In the same time period the male expectancy increased from 64.4 to 69.2 and life expectancy of the female increased from 68 to 71 as shown in table 4.25.

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Total life expectancy increased from 69.8 in 2004-08 to 72 in 2009-13. Life expectancy for male in the respective time period increased from 69 to 72.4 and for female life expectancy increased from 70.6 to 74 (table 4.25). On average the total life expectancy increased followed by increase in the male as well as female life expectancy.

Life expectancy total was higher on average in the time period 2009-13 accounted for 72. The life expectancy on average was low in the time period of 1998-02 accounted for 65.9 in the entire time period of the sample (table 4.25).

Life expectancy for male was higher in the time period of 2009-13 accounted for 72 and low in the time period of 1999-03 accounted for 64.4. Life expectancy for female was low in the time period of 1998-02 accounted for 67.3 and 74 highest in the time period of 2009-13 (table 4.25).

One important analysis is that the life expectancy is more for females in the state of Jammu and Kashmir than the males of Jammu and Kashmir. In the recent data of India the state of Jammu and Kashmir has left behind the Kerala in the life expectancy. The state is doing well as far as the life expectancy is concerned.

Table 4.25 Life expectancy total in State (average three years)

Year	Total	Male	Female
1998-02	65.9	64.7	67.3
1999-03	66	64.4	68
2000-04	67.3	65.9	68.9
2001-05	68.4	67.1	69.9
2002-06	70	69.2	71
2003-07	69.6	68.6	70.8
2004-08	69.8	69	70.6
2005-09	70	68.9	71.2
2006-10	70.1	69.2	71.1
2007-11	70.5	69.4	71.9
2008-12	71	69.9	72.4
2009-13	72	72.4	74

Source: Handbook on Indian states (2014-15), RBI

Fig. 4.9   Life expectancy in Jammu and Kashmir (average)
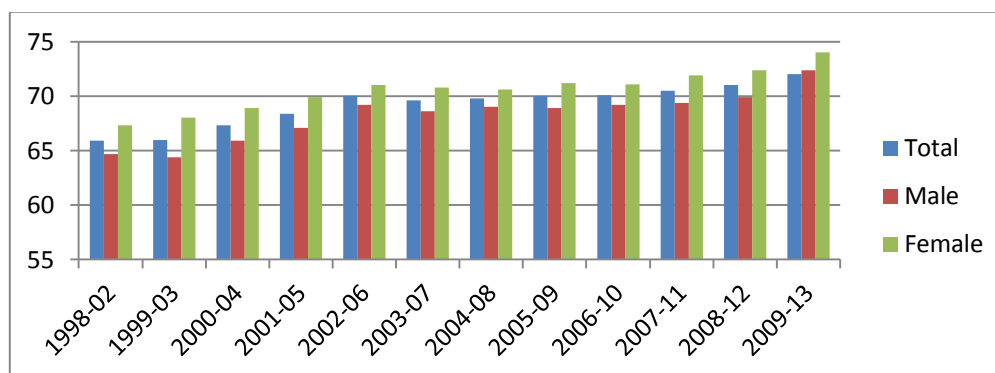
Source: Based on the figures in table 4.25

4.19 Infant Mortality in Jammu and Kashmir

Infant mortality rate is actually taken as the indicator of quality index in the modern economy; low mortality is policy goal of the economy a low mortality accompanied with trained skills represented the human

capital in good condition. Infant mortality is also taken as the indicator of health output in any economy.

As far as the infant mortality total rural is concerned it was 41.8 in 2001-02 and increased to 45.3 in 2002-03. Infant mortality in rural total stood at 51.1 in 2004-05 and 53.1 in 2007-08. The total rural infant mortality was highest in the year 2006-07 accounted for 54.4 and lowest was 38 in 39 in 2013-14 (table 4. 26).

As far as the infant mortality by sex is concerned in the rural areas it was 45.2 for male in the year 2001-02 and reached to 40 in 2013. The male infant mortality was higher in the year 2006-07 accounted for 54.3 and lowest was in the year 2013-14 accounted for 38 (table 4. 26).

Infant mortality was 38 in 2001-02 of rural females and reached to 40 in 2013. The infant mortality in the rural family was highest in the year 2004-05 accounted for 63.8. The infant mortality lowest for the females was in the year 2001-02 accounted for 38 (Table 4. 26).

Fig.4.10 Infant mortality in rural area by sex
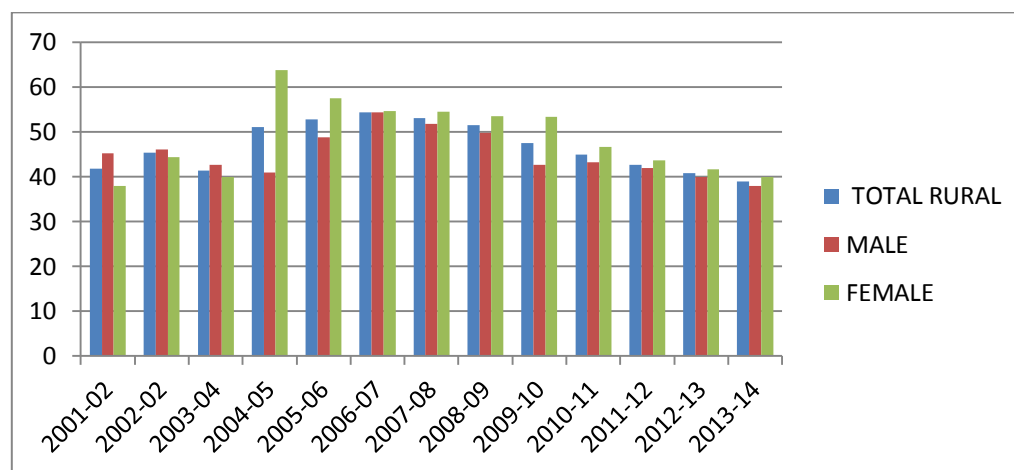
Source based on the table 4. 26 of infant mortality

Table 4.26 Infant mortality by residence and sex

Year	Total rural	Male	Female	Total urban	Male	Female
2001-02	41.8	45.2	38	36.2	33.6	26
2002-03	45.3	46.1	44.4	28.4	38.1	18
2003-04	41.4	42.6	40	23.1	26.8	18
2004-05	51.1	40.9	63.8	36.9	39.9	34
2005-06	52.8	48.8	57.5	38.8	36.1	43
2006-07	54.4	54.3	54.6	38.4	33	44
2007-08	53.1	51.8	54.5	37.9	36.6	39
2008-09	51.5	49.8	53.5	36.9	35.2	39
2009-10	47.5	42.7	53.3	34.3	30.6	39
2010-11	44.9	43.2	46.7	31.6	27.5	37
2011-12	42.7	41.9	43.6	28.4	28.2	29
2012-13	40.8	40	41.6	28.2	26.6	30
2013-14	39	38	40	28	27	28

Source: author's calculations, various census reports (2001, 2011)

Fig. 4.11 Infant mortality in urban area by sex
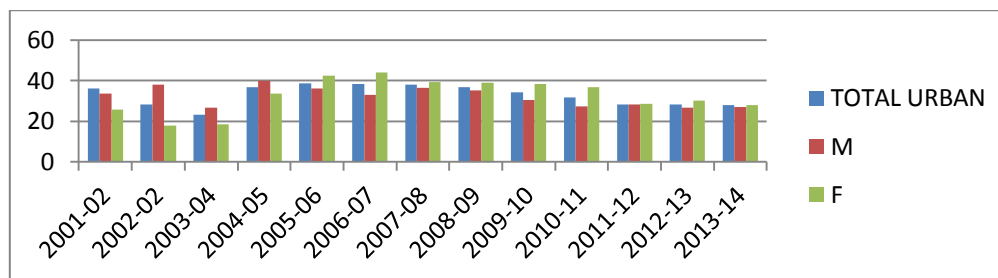
Source based on the table 4.26 of infant mortality

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As far as the infant mortality total in urban is concerned it remains low than rural in total and by sex as well. Infant mortality was 36.2 in 2001-02 in urban total and reached to 28 in 2003-04. Infant mortality total in urban was highest in 2005-06 accounted for 38 and lowest was in the year 2013-14 accounted for 27 (table 4.25).

As far as the infant mortality in urban by sex is concerned it was 33.6 in 2001-02 for males and reached 27 in 2013-14, while as females in urban are concerned the mortality was 26 in 2001-02 and reached to 28 in 2013-14 (Table 25). The infant mortality was highest for males in urban in the year 2004-05 accounted for 39.9 and lowest was in the year 2012-13 accounted 26.6 while as the infant mortality in urban females was more in the year of 2005-06 accounted for 43 and lowest was 18 in the two consecutive years 2002 and 2003 (Table 4. 26).
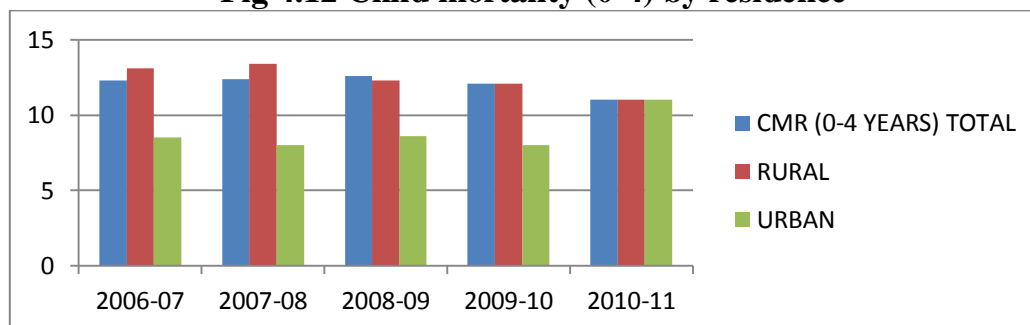
4.20 Child mortality

Child mortality (the probability of dying between exact ages one and five) data revealed that the mortality was more in rural areas in the prescribed age group as compared to urban areas. In total child mortality was 12.3 in 2006-07 and reached 11 in 2010-11 (Table 4. 27).

Table 4.27 Child mortality rate (0-4 years)

YEAR	CMR (0-4 YEARS)	RURAL	URBAN
2006-07	12.3	13.1	8.5
2007-08	12.4	13.4	8
2008-09	12.6	12.3	8.6
2009-10	12.1	121	8
2010-11	11	11	11

Source: planning report (2013-14), J&

Fig 4.12 Child mortality (0-4) by residence

The child mortality was 13.1 in rural areas in 2006-07 and decreased to 11 in 2010-11. In the urban areas the mortality was 8.5, 8 and 8.6 in 2006-07, 2007-08 and 2008-09 but increased to 11 in 2010.

4.21 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.

Table 4.28 Total fertility rate in the state by residence

YEAR	TOTAL	RURAL	URBAN
2008-09	2.2	2.4	1.5
2009-10	2.2	2.4	1.4
2010-11	2	2.2	1.4
2011-12	1.9	2.1	1.3
2012-13	1.9	2	1.3
2013-14	1.9	2	1.3

Source: Based on the data of planning report

Fig 4.13 Total fertility rate in the state by residence
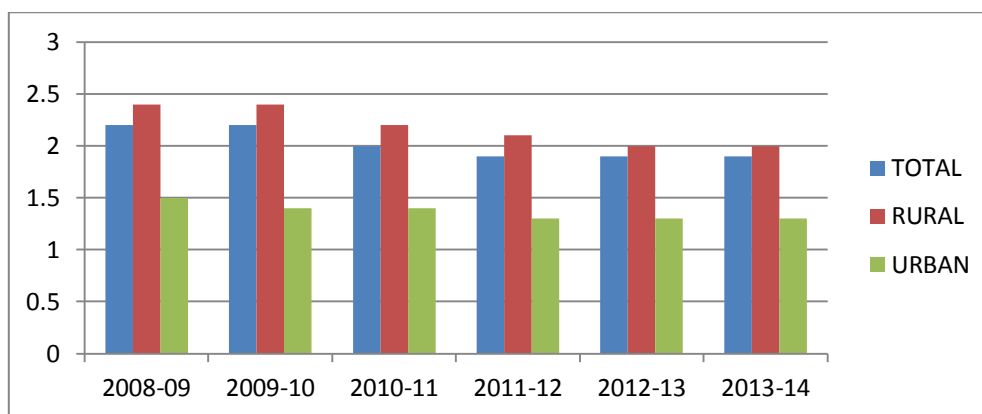
Source: Based on the data of table 4.28

Table 4.29 Compound annual growth rates of various health indicators

Variables	CAGR
Total expenditure on health	12.97**
Health expenditure as percentage share of total expenditure	1.62**
Health expenditure as share of GSDP	2.09**
Institutional availability total	0.46**
Primary health centers	0.92*
District and sub district hospitals	0.23
Ayurvedic dispensaries	8.6
Man power availability	0.925

Source: Authors own calculation

The State has succeeded to a great extent to improve the healthcare scenario despite host of constraints like low density of population, difficult

terrain, problem of accessibility, poor road connectivity and limited presence of private sector/NGOs.

While comparing the indicators with the national average, it can be safely concluded that the State has performed well on most of the parameters. However, still a lot more needs to be done to provide quality, accessible, affordable and acceptable healthcare services to the people in the State which is not only comparable with the neighboring States of Himachal Pradesh, Haryana and Punjab, but with well-performing states in the country as well.

Section IV

Summary and conclusions

The present chapter was aimed at estimating and analyzing the growth of human capital formation in Jammu and Kashmir. The education and health component of the human capital was taken as proxy variables for the estimation of human capital formation in Jammu and Kashmir. The proxy variables for education component of human capital were divided into inputs and outputs. The Proxy variables as inputs and outputs for the education human capital were total education expenditure, expenditure on education as percentage share of total expenditure and percentage share of GSDP, institutional availability, pupil's teacher ratios, gross enrollment ratios at primary, secondary and at higher, literacy rate and dropout rates. The proxy variables for health component of human capital as inputs and output were total expenditure on health, expenditure on health as the percentage share of the total and percentage share of GSDP, manpower availability, institutional availability, death rates, birth rates, natural growth rates, life expectancy total and by sex, infant mortality by residence and sex and total fertility rates. The econometrics method of ordinary least square was used to estimate the model parameters and compute CAGR. Percentage methods for the growth estimation were also used. Besides these two methods graphs, percentages and tables were also used for the analysis and estimations.

Major findings

Based on the estimations perusal of year to year growth rates of expenditure on education from the time period 1995-96 to 2015-16 exhibits

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quite fluctuating trend. The growth was highest in 2009-10 accounted for 34.80 %. The compound average growth rate of the expenditure on education stood at 12.46 % and remained the significant at ten percent level of the significance.

As far as the expenditure on education to as a percentage share of total expenditure of the state is concerned it shows negative trend in most of the years. The compound annual growth rate of the expenditure on the education as a percentage share of the total expenditure was 1.01 % and was significant at five percent level of the significance. The CAGR of the expenditure as the percentage share of the GSDP was 0.7 % and was significant.

The pupil teacher ratio in primary was highest in 2001-02 accounted for 34 and lowest 13 in 2004-05. In upper primary it never goes beyond 20 and in secondary the ratio was 16 highest in maximum years. In all schools the highest ratio was in 2007-08 accounted for 23. The estimated compound annual growth rates stood for -1.30 %, -3.69 % and -2.51% for secondary, upper primary and all schools pupil teachers ratio.

The institutions in the category of the primary schools in the state have increased from the number 11237 in 2006-07 to 15245 in 2011-12. Similarly the upper primary has increased roughly from 5313 in 2006-07 to 10995 in the year 2011-12. The establishment of the schools in secondary has also increased from 1511 to 4757 in 2013-14. The primary institutions are more as compared to upper primary and secondary in the state. The compound growth rates of the institutional availability of primary; upper

primary and secondary in the state estimated stood at 5.19 %, 15.34 % and 11.94% respectively and were significant.

The estimated annual compound growth rate of the gross enrollment of the primary level stood at low of 0.46 % and was significant. The estimated compound annual growth rate of the gross enrollment ratio at secondary level stood at 0.69 % and was significant.

The year to year growth rates estimated for the gross enrollment ratio of the higher education in the state of the Jammu and Kashmir revealed that it was 6.34% in the year of 1996-97and increased to 20.95 % in1998-99. The highest growth rate recorded was 53.15 % in 1999-2000 and decreased dramatically to -3.058% in 2001-02. The estimated compound annual growth rate stood at 0.46 % in the higher education and is significant.

Although, the literacy rate of the state is well short of the rate recorded at the national level, yet figures reveal that the rate of increase in the literacy in the state is faster than at the national level. During 1961-2011, while the literacy rate in the State increased by 58 points, it recorded increase of 46 points at the national level. Category-wise also, the rate of increase in literacy percentage both among males and females is better in the State than the country.

As far as the absolute values are concerned the total expenditure on the health stood at 146.493 in the year 1995-96 and went to 383 in 2000-

01. As far as the CAGR are concerned it accounted for 12.97 % and was significant at five percent level of significance.

The estimate year to year wise growth rates of the expenditure on the health as a percentage of the total expenditure was -17.07 % in the year 1996-97. The highest growth rate was in the year 1998-99 accounted for 22% followed with 20% in 2006-07.The estimated CAGR of the expenditure on the health as a percentage of the total was 1.62% and was significant at five percent level of significance.

The growth rate of the expenditure on the health as a percentage of the gross domestic product was negative in the last five years except in the year of 2013-14 and 2015-16 accounted for 9.10% and 20.1% respectively. The estimated CAGR of the expenditure on the health as percentage of the gross state domestic product was 2.09 % and significant.

The highest growth rate of availability of man power in the state was seen in the year of 2011-12 accounted for 16.81%.The CAGR of the availability of the man power in the state was estimated 0.925 % and was insignificant. The possible idea is simple that growing demands of the population are not met with the existing manpower of the state in health sector.

The availability of the health centers total number has never crossed the 4000 number. The availability of the district and sub district hospitals out of the total was increased to 120 in 2013-14 which were 111 in 2001-02. The total availability of the primary health centers were 361 in 2001-02 and increased to 388 and 394 units in 2003-04 and 2004-05. The primary health centers were 408 highest in the year of 2013-14.

The availability of the ayervedic institutions in the state were 433 units in the year of 2001-02 and decreased to 423 units in 2014-15. The growth of total institutional availability was 1.90 % in the year 2004-05 and 1.49 % in 2008-09. The estimated CAGR was 0.46 % and was significant.

The estimated CAGR for sub-district and district hospitals were 0.23 but insignificant. . The estimated CAGR for primary health centers was estimated 0.92 % and was significant. The CAGR estimated was 8.6.

As far as the medical attention received by mothers at delivery is concerned it is increasing from 2006. The attention was 48% in 2006 and it reaches 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.

As far as the death rates of the state are concerned it accounted for 5.4 in the year 1998-99 and increased to 6.3 and 6.2 in the year 1999-00 and 2000-01. The death rate has decreased to 5.3 in 2013-14. The death rates were highest in the year1999-00 accounted for 6.3 and lowest were 5.3 in the year 2013-14.

The natural growth rates of the state are concerned it was 14% in 2001-02. The growth rate accounted for 13.5% in 2002-03 and 12.8% in 2006-07. The estimated growth rate was 12.2% in2013-14.

Total life expectancy increased from 69.8 in 2004-08 to 72 in 2009-13. Life expectancy for male in the respective time period increased from 69 to 72.4 and for female life expectancy increased from 70.6 to 74. On

average the total life expectancy increased followed by increase in the male as well as female life expectancy.

One important analysis is that the life expectancy is more for females in the state of Jammu and Kashmir than the males of Jammu and Kashmir. In the recent data of India the state of Jammu and Kashmir has left behind the Kerala in the life expectancy. The state is doing well as for as the life expectancy is concerned.

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 total rural infant mortality was highest in the year 2006-07 accounted for 54.4 and lowest was 38 in 39 in 2013-14. As far as the infant mortality total in urban is concerned it remains low than rural in total and by sex as well. As far as the infant mortality in urban by sex is concerned it was 33.6 in 2001-02 for males and reached 27 in 2013-14 while as for females in urban the mortality was 26 in 2001-02 and reached to 28 in 2013-14.

The child mortality was 13.1 in rural areas in 2006-07 and decreased to 11 in 2010-11. In the urban areas the mortality was 8.5, 8 and 8.6 in 2006-07, 2007-08 and 2008-09 but increased to 11 in 2010-11. The TRF level is also better in the State when compared with the national average which stood at 2.5.

Recommendations

Following the findings the study recommends the attention of government to increase the standard of education in Jammu and Kashmir as a policy implication in the state. Increase in the gross enrollment ratios should be taken as a mandatory step especially at the primary and higher levels.

The manpower in the education sector must be increased. Better incentives and policy schemes to increase the enrollments is recommended. Financing of the education should be made efficient in order to gain gains from the education expenditure in the state.

The state has turned successful in increasing the institutional availability in the state and make such availability in rural areas more is strongly recommended. Substantial amount of government budgetary allocation should be directed towards the educational sector is strongly recommended.

Following the findings of the chapter it is recommended that government spending on 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 are 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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