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CHAPTER 6

DETERMINANTS OF HOUSEHOLD HEALTH EXPENDITURE IN INDIA AND KERALA

- 6.1. Introduction
- 6.2. Analytical Framework
- 6.3. Household Health Expenditure in India
- 6.4. Determinants of Household Health Expenditure in India
- 6.5. Financial Return and Expenditure on Health in India
- 6.6. Household Health Expenditure in Kerala
- 6.7. Determinants of Household Health Expenditure in Kerala
- 6.8. Financial Return and Expenditure on Health in Kerala
- 6.9. Determinants of Expenditure on Health in India and Kerala
- 6.10. Financial Return from Health in India and Kerala

6.1. Introduction

Spending on health generally constitutes the human capital formation. The investment on health contains two perspectives: individual and institutional. Individual investment is the investment made by the individual for himself or for the entire family. So it is the household investment for better health by providing nutritional support, preventing and curing diseases, family planning programs, maternal and child health care and so on. Private expenditure on health includes out-of-pocket expenditure, health insurance and expenditure towards health by firms and NGOs. The percentage share of health care financing by the Non-Profit Institutions Serving Households (NPISH) is increased from 1.6 percent in 2013-14 to 1.9 percent in 2014-15 (NHSRC, 2017). The institutional investment is the investment made by the government for the better health condition of the people. The public investment on health is inevitable to reduce inequality in the distribution of health care. The central, state and local governments spend on health care since healthy people is the wealth of the nations. In India the percentage share of out-of-pocket expenditure in total expenditure on health decreased from 69.4 percent in 2004-05 to 60.6 percent in 2015-16 (NHSRC, 2018). In India the major portion of the expenditure on healthcare is made by the households than the government.

The factors responsible to the spending on health by the households are varied from each household. Therefore the factors are generally classified into: (I) Personal

and biological factors, (II) Institutional factors, (III) Economic factors, (IV) Socio-cultural factors, (V) Demographic factors and (VI) household factors also.

(I) Personal and biological factors

As per NSSO report the prevalence of self-reported morbidity increased from 55 to 98 per 1000 populations within a period of two decades (1995-2014), higher among females compared to males. The household expenditure on health varies with the age, gender, and physical condition of the members of the household (Sunilkumar, 2017). The aged people need more medical and non-medical care and this will necessitate more spending on health (Sinha et al., 2016). The gender is also a crucial role in determining the expenditure on health by the household (Sen et al. 2007). The biological conditions of the household members constitute the need for healthcare (Bircher, 2014). The pregnant ladies need special medical care compared to others. The maternal and child health care is also crucial in household health care spending (Bonu, 2009; Navaneetham and Dharmalingam, 2000; Leone et al., 2013). Children represent the future and ensuring their healthy growth and development would be a prime concern of every households. The post natal period is also a critical phase in the lives of mothers and new babies. Newborns are particularly vulnerable and children are vulnerable to malnutrition and infectious diseases, many of such diseases can be effectively prevented or treated (WHO, 2013). National Policy of Children 2013 promotes prevention of disabilities, mental and physical through timely measures to take pre-natal, natal, peri-natal, and post-natal care of mother and child. Preventive, promotive, curative and rehabilitative healthcare for all is a decisive factor of household health expenditure.

(II) Institutional factors

In India utilization of health care facilities are 60 percent for private hospitals and 40 percent for public hospitals. The role of private hospitals in the health sector is immense. At the same time the expenditure on health care in private hospitals is double than that of public hospitals. The underutilization of public health care facilities paved the way for hike in the household health expenditure. There are different reasons for the underutilization of public health care facilities such as quality of services, lack of medical facilities, lack of health personnel, and lack of medicine (Nabae, 2003; John, 2012).

(III) Economic factors

It explains the two way causality between health expenditure and income. It tries to find out the relationship between health and income; whether health creates income or income creates health. It explains the determinants of health expenditure in terms of income variables. Consumption expenditure on health care is depends upon the income variable. The income variable may be household or government. They are compliment to each other in health spending. The policy of the government on health care will affect the health care spending of the households (Abolhallaje et al., 2013).

The return from health expenditure is measured by income variables. The health spending of government and households can booster economic growth. The financial return from health expenditure is shared by government and households. The comparative advantage of expenditure on health between government and households is also considered under non-financial and non-monetary returns.

(IV) Socio-cultural factors

Health is a multidimensional concept. Social background also determines the health expenditure of a household. Education, urbanisation, unemployment rate and utilization of health care services are some of the factors influencing household expenditure on health (Siddiqui et al., 1995; Angko, 2009; Samadi and Rad, 2013).

(V) Demographic factors

The factors like poverty ratio, old-age dependency ratio, life expectancy at birth and child-dependency ratio are some of the demographic factors that influence expenditure on health. The rate of hospitalisation is highest in the aged persons and youngest age group (0-14) compared to other age group (Srinivas and Manjubhashini, 2014, Hosoya, 2014).

(VI) Epidemiological factors

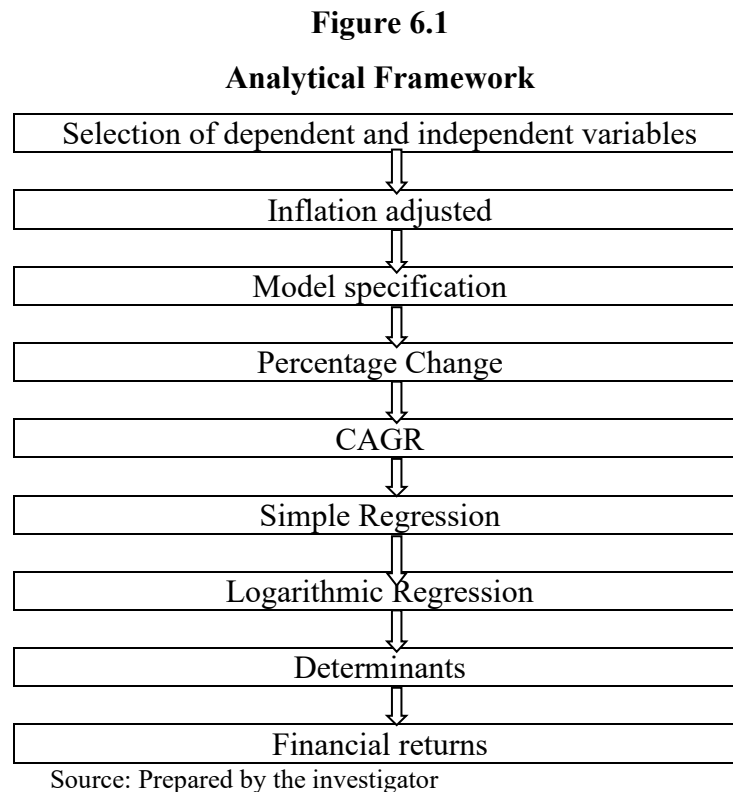
The epidemiological factors also affect the expenditure on health. The burden from injuries, communicable and non-communicable diseases shows an increasing trend. The disease burden of non-communicable diseases is rapidly increasing. As per the report of Indian Council of Medical Research in 2017, the disease burden from non-communicable diseases increased from 30 percent to 55 percent between 1990 and 2016. Disease burden due to communicable, maternal, neonatal and nutritional diseases dived from 61 percent to 33percent in the same period. As per WHO Weekly Epidemiological Update on 8th December 2020, cases of Coronavirus (COVID-19) continued to increase and reported 65.8 million cases and 1.5 million deaths globally since the start of the pandemic. Disability also caused a hike in expenditure on health.

(VII) Other factors

Factors like geography, climate, pollution, diet and exercises are other determinants of expenditure on health. The determinants of expenditure on health are different from person to person and time to time.

6.2. Analytical Framework

The analytical framework for finding the determinants of expenditure on health is in the following way.



The analytical framework to recognize the determinants of household expenditure on health is as follows:

$$\text{HHE} = f(X)$$

Where HHE refers household health expenditure, and X is a single or a set of independent variables. The equation can be given in the following functional form.

$$\text{HHE} = \alpha + \beta_i X_i + \epsilon$$

Where the symbol α is the intercept term which give the mean effect on the dependent variable for all the variables that are excluded from the model. It is the average value of dependent variables which are set equal to zero. β_i is the regression coefficient to be estimated that measures the extent to which various variables X_i influence on the household health expenditure. The coefficient β shows the change in

the levels of household expenditure associated with one unit change in the independent variable of interest. ϵ is the random error term in the equation. The model used time series data. Here time is denoted by the term 't' where $t= 1 \dots n$. The model uses annual data of India from 1999-2000 to 2018-19 and the state level data from 1994-95 to 2007-08.

The monetary variables in the regression analysis are adjusted to inflation. This would enable to assess the significant relation between variables. The national level data are adjusted to 2011-12 prices while the state level data adjusted to 2004-05 prices. Due to the non availability of recent data on expenditure variables at state level, the study confined to a limited time period. Moreover the time series data on certain variables are unavailable. The model is presented in both linear and logarithmic regression equations.

Table 6.1

Models on Determinants of Household Expenditure on Health in India and Kerala

| Sl.No | Models |
|-------|---|
| 1 | $HHE/pc = \alpha + \beta_1 GDPI_{it} + \beta_2 GDPI/pc_{it} + \beta_3 PEHI_{it} + \beta_4 PEHI/pc_{it} + \beta_5 PFCEI/pc_{it} + \epsilon$ |
| 2 | $LN HHEI/pc = \alpha + \beta_1 GDPI_{it} + LN \beta_2 GDPI/pc_{it} + LN \beta_3 PEHI_{it} + LN \beta_4 PEHI/pc_{it} + \epsilon$ |
| 3 | $GDPI = \alpha + \beta_1 PEHI_{it} + \beta_2 PEHI/pc_{it} + \beta_3 HHEI_{it} + \epsilon$ |
| 4 | $LN GDPI = \alpha + LN \beta_1 PEHI_{it} + LN \beta_2 PEHI/pc_{it} + LN \beta_3 HHEI_{it} + \epsilon$ |
| 5 | $HHEK/pc = \alpha + \beta_1 GSDPK_{it} + \beta_2 PCIK_{it} + \beta_3 PEHK_{it} + \beta_4 PEHK/pc_{it} + \beta_5 RTK_{it} + \beta_6 MIK_{it} + \epsilon$ |
| 6 | $LN HHEK/pc = \alpha + LN \beta_1 GSDPK_{it} + LN \beta_2 PCIK_{it} + LN \beta_3 PEHK_{it} + LN \beta_4 PEHK/pc_{it} + LN \beta_5 RTK_{it} + \beta_6 MIK_{it} + \epsilon$ |
| 7 | $GSDPK = \alpha + \beta_1 PEHK_{it} + \beta_2 PEHK/pc_{it} + \beta_3 HHEK/pc + \epsilon$ |
| 8 | $LN GSDPK = \alpha + LN \beta_1 PEHK_{it} + LN \beta_2 PEHK/pc_{it} + LN \beta_3 HHEK/pc + \epsilon$ |

Note: See Tables 6.2, 6.3, 6.4, 6.8, 6.9, 6.10 and 6.10

Source: Prepared by the investigator

The study used both simple and multiple regressions for linear and logarithmic equations. The analysis used household health expenditure as dependent variable in India and Kerala. In order to find the determinants of health expenditure all other variables are considered as independent variables firstly. In order to find financial return from health expenditure, health expenditure variables are considered as dependent variable. This is applicable for India and Kerala. The equation on financial return of expenditure on health used the tool of both simple and multiple regressions for linear and logarithmic equation. The study examines the cause and effect of expenditure on health in India and Kerala. Hence national and state level variables are considered here to analyse the cause and effect of expenditure on health. Table 6.1

shows the models of the analysis. The logic behind the selection of variables in the regression analysis may be of different grounds. The foremost reason behind the selection of variables is the literature review on expenditure on health. There are many views regarding the determinants of expenditure on health for different nations and for different time periods.

Table 6.2

Notation and Definitions of Household Health Expenditure and its Determinants in India

| Sl No. | Notations of Variables | Variables |
|--------|------------------------|--|
| 1 | HHEI/pc | Average Annual Per-capita Household Final Consumption Expenditure (₹) on Health in India |
| 2 | HHEI | Household Final Consumption Expenditure (₹Crore) on Health in India |
| 3 | GDPI | Gross Domestic Product of India (₹Crore) |
| 4 | GDPI/pc | Per-capita Gross Domestic Product of India (₹) |
| 5 | PEHI | Public Expenditure (₹Crore) on Health in India |
| 6 | PEHI/pc | Per-capita Public Expenditure (₹) on Health in India |

Source: Prepared by the investigator

Availability of data is the second reason for the selection of these variables. Due to the non-availability of data some of the variables are excluded from the study. Lack of time series data for suitable proxy variables limited this analysis to few variables. Economic logic is also applied for the selection of variables in the study.

6.3. Household Health Expenditure in India

Household health expenditures are the expenditures incurred by the households on health care. The private final consumption expenditure on health estimated by National Account Statistics by CSO is considered as the household health expenditure in India. The trend of household health expenditure and the related variables in India would give insight into the movement and relationship between the explanatory variables and dependent variables. Household health expenditure in India was ₹70768 in 1999-2000 and it increased to ₹360795 in 2018-19.

The percentage change in household health expenditure varies from 14.66 percent in 2014-15 to 3.35 percent in 2003-04 over the same period. The per-capita household health expenditure in India increased from ₹707 to ₹2719 over the period 1999-2000 to 2018-19. The percentage change in per-capita household health expenditure varies from 13.22 in 2014-15 to 1.78 in 2003-04 during the period 1999-2000 to 2018-19. The percentage change is positive for both household health expenditure and per-capita household health expenditure for the period 1999-2000 to

2018-19. The CAGR of household health expenditure is 8.48 percent while it is only 6.96 percent in per-capita terms in India during the period 1999-2000 to 2018-19.

Table 6.3

Private Household Final Consumption Expenditure on Health in India (2011-12 prices)

| Year | Household Health Expenditure in India (₹Crores) (1) | Percentage change (1) | Per-capita Household Health Expenditure in India (₹) (2) | Percentage change (2) |
|---------|---|-----------------------|--|-----------------------|
| 1999-00 | 70768 | 0.00 | 707 | 0.00 |
| 2000-01 | 78895 | 11.48 | 774 | 9.48 |
| 2001-02 | 90070 | 14.16 | 866 | 11.89 |
| 2002-03 | 94829 | 5.28 | 898 | 3.70 |
| 2003-04 | 98003 | 3.35 | 914 | 1.78 |
| 2004-05 | 110277 | 12.52 | 1013 | 10.83 |
| 2005-06 | 119930 | 8.75 | 1084 | 7.01 |
| 2006-07 | 130412 | 8.74 | 1162 | 7.20 |
| 2007-08 | 136262 | 4.49 | 1197 | 3.01 |
| 2008-09 | 145641 | 6.88 | 1262 | 5.43 |
| 2009-10 | 158569 | 8.88 | 1355 | 7.37 |
| 2010-11 | 170650 | 7.62 | 1439 | 6.20 |
| 2011-12 | 181334 | 6.26 | 1486 | 3.27 |
| 2012-13 | 198663 | 9.56 | 1609 | 8.28 |
| 2013-14 | 216675 | 9.07 | 1732 | 7.64 |
| 2014-15 | 248443 | 14.66 | 1961 | 13.22 |
| 2015-16 | 274549 | 10.51 | 2140 | 9.13 |
| 2016-17 | 308487 | 12.36 | 2375 | 10.98 |
| 2017-18 | 330540 | 7.15 | 2516 | 5.94 |
| 2018-19 | 360795 | 9.15 | 2719 | 8.07 |
| CAGR | | 8.48 | | 6.96 |

Note: 1. Household Expenditure on Health is also referred to as Private Expenditure on Health

Source: CSO, Various Years, Government of India

According to NSSO estimates, household health expenditure constitutes 67.74 percent of total health expenditure in India in the year 2013-14.

6.4. Determinants of Household Health Expenditure in India

When considering the growth models, a large set of macroeconomic variables which determine the household health expenditure such as GDP of India (GDPI), per-capita GDP of India (GDPI/pc), public expenditure on health in India (PEHI), per-capita public expenditure on health in India (PEHI/pc), are considered as independent variables in the analysis. In absolute terms GDP of India was ₹3823027 crores in 1999-2000 and increased to ₹13981426 crores in 2018-19. The average annual percentage change of GDP of India was positive in all years from 1999-2000 to 2018-19 and varies from 10.26 percent in 2010-11 to 3.80 percent in 2002-03. The percentage change in GDP is also low during 2000-01 and 2008-09 from 1999-2000 to 2018-19. The global financial crisis of the 2007-2009 slow down the growth rate of the economy dropped to 3.8 percent during 2008-09. After that the GDP growth rate

accelerated to 10.26 during 2010-11. The growth rate in GDP is also low during 2012-13 with 5.46 percent. The CAGR of GDP of India is 6.69 percent for the period 1999-2000 to 2018-19. The per-capita GDP of India was increased from ₹41625 in 1999-2000 to ₹105361 in 2018-19.

Table 6.4(a)

Determinants of Household Health Expenditure in India

| Year | GDP of India (2011-12 prices) | | Per-capita GDP of India (2011-12 prices) | | Public Expenditure on Health in India (2011-12 prices) | |
|---------|----------------------------------|----------------------|---|----------------------|---|----------------------|
| | Amount (₹Crores) | Percentage Change | Amount (₹) | Percentage Change | Amount (₹Crores) | Percentage Change |
| 1999-00 | 3823027 | 0.00 | 41625 | 0.00 | 39667.30 | 0.00 |
| 2000-01 | 3969870 | 3.84 | 42461 | 2.01 | 39469.67 | -0.50 |
| 2001-02 | 4161375 | 4.82 | 43610 | 2.71 | 40184.70 | 1.81 |
| 2002-03 | 4319672 | 3.80 | 44583 | 2.23 | 40497.46 | 0.78 |
| 2003-04 | 4659215 | 7.86 | 47370 | 6.25 | 41555.75 | 2.61 |
| 2004-05 | 5028360 | 7.92 | 50325 | 6.24 | 42851.87 | 3.12 |
| 2005-06 | 5495237 | 9.28 | 53478 | 6.27 | 47910.14 | 11.80 |
| 2006-07 | 6004314 | 9.26 | 56964 | 6.52 | 50665.11 | 5.75 |
| 2007-08 | 6592818 | 9.80 | 60466 | 6.15 | 58744.36 | 15.95 |
| 2008-09 | 6849342 | 3.89 | 61468 | 1.66 | 65447.44 | 11.41 |
| 2009-10 | 7430152 | 8.48 | 65394 | 6.39 | 76399.44 | 16.73 |
| 2010-11 | 8192482 | 10.26 | 69994 | 7.03 | 80821.69 | 5.79 |
| 2011-12 | 8736329 | 6.64 | 71609 | 2.31 | 84962.13 | 5.12 |
| 2012-13 | 9213017 | 5.46 | 74599 | 4.18 | 89404.64 | 5.23 |
| 2013-14 | 9801370 | 6.39 | 78348 | 5.03 | 93556.71 | 4.64 |
| 2014-15 | 10527674 | 7.41 | 83091 | 6.05 | 112817.65 | 20.59 |
| 2015-16 | 11369493 | 8.00 | 88616 | 6.65 | 132421.79 | 17.38 |
| 2016-17 | 12308193 | 8.26 | 94751 | 6.92 | 148235.04 | 11.94 |
| 2017-18 | 13175160 | 7.04 | 100268 | 5.82 | 174958.66 | 18.03 |
| 2018-19 | 13981426 | 6.12 | 105361 | 5.08 | 199876.04 | 14.24 |
| CAGR | | 6.69 | | 4.75 | | 8.42 |

Sources: 1. Reserve Bank of India, Data base on Indian Economy, Various Issues

2. Reserve Bank of India, State Finances; A Study of Budgets, Various Issues

The percentage change in per-capita GDP of India is lowest in 2008-09 (1.66 percent) and highest in 2010-11 (7.03 percent). The global financial crisis during 2007 also muted per-capita income of the country. There is a CAGR of 4.75 percent in per-capita GDP of India during the period 1999-2000 to 2018-19. Public expenditure on health (both the central and state governments) is an indicator of welfare by imparting accessible and adorable health care to the people. The public expenditure on health in India moved up from ₹39667.30 crores in 1999-2000 to ₹199876.04 crores in 2018-19. The percentage change in public expenditure on health shows a positive trend from 1999-2000 to 2018-19 except for the year 2000-01 and it is highest during 2014-15 with 20.59 percent. The public expenditure on health in India shows an increasing trend especially after the implementation of NRHM which provides affordable health care to the households (Hooda, 2013). The CAGR of public expenditure on health is

8.42 percent during the period from 1999-2000 to 2018-19. The CAGR of per-capita public expenditure on health is 6.9 percent during the period from 1999-2000 to 2018-19. It can be evident from the table that per-capita public expenditure on health in India varies from ₹404 to ₹1506 during the period from 1999-2000 to 2018-19.

Table 6.4(b)

Determinants of Household Health Expenditure in India

| Year | Per-capita Public Expenditure on Health in India (2011-12 prices) | | Per-capita Income in India (2011-12 prices) | | Per-capita Private Final Consumption Expenditure in India (2011-12 prices) | |
|---------|---|-------------------|---|-------------------|--|-------------------|
| | Amount (₹) | Percentage Change | Amount (₹) | Percentage Change | Amount (₹) | Percentage Change |
| 1999-00 | 396 | 0.00 | 32643 | 0.00 | 25679 | 0.00 |
| 2000-01 | 387 | -2.4 | 33193 | 1.68 | 26093 | 1.61 |
| 2001-02 | 386 | -0.2 | 34291 | 3.31 | 27088 | 3.81 |
| 2002-03 | 384 | -0.6 | 35079 | 2.30 | 27443 | 1.31 |
| 2003-04 | 387 | 0.9 | 37367 | 6.52 | 28635 | 4.34 |
| 2004-05 | 393 | 1.6 | 39250 | 5.04 | 29646 | 3.53 |
| 2005-06 | 433 | 10.1 | 42293 | 7.75 | 31367 | 5.81 |
| 2006-07 | 452 | 4.2 | 45629 | 7.89 | 32445 | 3.44 |
| 2007-08 | 517 | 14.4 | 49312 | 8.07 | 34318 | 5.77 |
| 2008-09 | 567 | 9.8 | 51622 | 4.68 | 35349 | 3.00 |
| 2009-10 | 653 | 15.1 | 55113 | 6.76 | 36610 | 3.57 |
| 2010-11 | 682 | 4.5 | 58854 | 6.79 | 38543 | 5.28 |
| 2011-12 | 696 | 2.1 | 63462 | 7.83 | 40250 | 4.43 |
| 2012-13 | 724 | 4.0 | 65538 | 3.27 | 41936 | 4.19 |
| 2013-14 | 748 | 3.2 | 68572 | 4.63 | 44423 | 5.93 |
| 2014-15 | 890 | 19.1 | 72805 | 6.17 | 46667 | 5.05 |
| 2015-16 | 1032 | 15.9 | 77659 | 6.67 | 49738 | 6.58 |
| 2016-17 | 1142 | 10.6 | 83003 | 6.88 | 53120 | 6.80 |
| 2017-18 | 1332 | 16.6 | 87828 | 5.81 | 56163 | 5.73 |
| 2018-19 | 1506 | 13.1 | 92085 | 4.85 | 59594 | 6.11 |
| CAGR | | 6.90 | | 5.32 | | 4.29 |

Sources: 1. Reserve Bank of India, Data base on Indian Economy, Various Issues
2. Reserve Bank of India, State Finances; A Study of Budgets, Various Issues

The percentage change in per-capita public expenditure on health is almost positive except in the years 2000-01(-2.4 percent), 2001-02 (-0.2) and 2002-03 (-0.6 percent) and the percentage change is maximum during 2014-15 (19.1 percent). Launching of NRHM in 2005 created a hike in public expenditure on health in India. The pre-NRHM period witnessed a lesser allocation to the health sector in India than after the implementation of NRHM (Hooda, 2015).

Per-capita income, an indicator of economic growth, increased from ₹32643 in 1999-2000 to ₹92085 in 2018-19 with a CAGR of 5.32 percent in India. The percentage change in per-capita income of India varies from 8.07 percent in 2007-08

to 1.68 percent in 2000-01 over the period from 1999-2000 to 2018-19. Per-capita private final consumption expenditure in India rose from ₹25679 in 1999-2000 to ₹59594 in 2018-19 and the percentage change per-capita private final consumption expenditure varies from 1.31 percent in 2002-03 to 6.8 percent in 2016-17. There is a CAGR of 4.29 percent in per-capita private final consumption expenditure in India during the period 1999-2000 to 2018-19.

The present study gives attention to a few selected independent variables in order to identify the determinants of household health expenditure in India. The CAGR of variables in the study differs from 8.42 percent (PEHI), followed by 6.90 percent (PEHI/pc), 6.69 percent (GDPI), 5.32 percent (PCII), 4.75 percent (GDPI/pc) to 4.29 percent (PFCI/pc) for the period 1999-2000 to 2018-19. Among the variables the growth rate is higher for public expenditure on health than GDP. The CAGR is more in the case of household health expenditure (8.48 percent) compared to its per-capita terms (6.96 percent) during 1999-2000 to 2018-19.

In this study two sets of regression equations, linear and logarithmic, are estimated to identify the causal relationship between household health expenditure and the selected independent variables in India. Some of the very few variables have eliminated with respect to the emergence of multicollinearity. At the same time those variables were useful to insight for a macro level analysis. The estimated results of linear regression equations are presented in Tables 6.5 (a) and 6.5 (b). The regression result shows that there exists a marginal positive association between average annual per-capita household health expenditure and per-capita income in India (Equ. 5 in Table 6.5(a)) with the high value of R^2 (0.98 percent). But data discrepancy may be there. This is characterised as the initial stages of growth and this would necessitates high public expenditure on health especially for poor people, women and children.

The association between average annual per-capita household health expenditure and GDP per-capita in India is marginally positive (Equ.1 in Table 6.5(a)). Equ.1 and Equ.5 in Table 6.5(a) shows that the per-capita income variables (PCII and GDP/pc) have a positive effect on per-capita household health expenditure in India. The regression coefficient of PCII (0.031) is more than that of GDP/pc (0.029). The relationship between income and household health expenditure is relevant in the context of India. Generally consumption is a function of income. The theoretical backbone of consumption function is income. The variations in income are highly affected by the household health expenditure (Sunilkumar, 2017).

The regression coefficients of various equations show that the selected independent variables are significant in determining household health expenditure in India (Table 6.5 (a)). Household expenditure varies with changes in consumption expenditure positively which support the influence of economic status and income in the consumption of health care. Ability and capacity to pay determines the household expenditure on health (Xu et al., 2003).

Table 6.5 (a)
Regression Results of Household Health Expenditure in India

| Equation No | Dependent Variable | Intercept (Constant) | Independent Variables | | | R ² | Adj R ² | F-ratio |
|-------------|--------------------|----------------------|-----------------------|------------------|------------------|----------------|--------------------|---------|
| | | | GDPI/pc | PCII | PEHI/pc | | | |
| Equation.1 | HHEI/pc | -537.74 (-9.09) | 0.029 (35.34) | | | 0.98 | 0.98 | 1249.02 |
| Equation.2 | HHEI/pc | 254.88 (4.38) | | | 1.759 (22.96) | 0.96 | 0.96 | 527.22 |
| Equation.3 | HHEI/pc | -738.24 (-18.15) | | | | 0.99 | 0.99 | 3128.58 |
| Equation.4 | HHEI/pc | -285.40 (-3.86) | 0.019 (7.89) | | 0.617 (4.14) | 0.99 | 0.99 | 1192.84 |
| Equation.5 | HHEI/pc | -278.01 (-4.23) | | 0.031 (27.87) | | 0.98 | 0.98 | 776.92 |

Notes: 1. Figures in parentheses indicates t-Statistic value

2. Equan: Equation

Source: Computed from variables specified in Tables 6.3, 6.4 (a) and 6.4 (b)

Total household health expenditure in India is positively associated with the GDPI. The value of regression coefficients in GDPI is statistically significant in the total household health expenditure (Equation. 2 and Equation.3 in Table 6.5 (b)). The total household health expenditure and public expenditure on health would have a significant positive association in simple (1.80) and multiple regression (0.767) equations (Equation.1 and Equation. 3 in Table 6.5 (b)). High R² implies which measures the goodness fit between the dependent and independent variables by assuming that every single variable explains the variation in the dependent variable. The value of Adjusted R² is also high for the regression result which shows the percentage of variation explained by only the independent variables that actually affect the dependent variable. Higher public expenditure on health would have positive effect on household health expenditure implies the reduction of financial burden of households through redistribution of income from the government through allocation to health care (Sloan and Hsieh, 2017). There are differences in the coefficient values of simple regression equations on HHEI and HHEI/pc with respect to independent variables. The values of regression coefficients with respect to household health expenditure in India varies from 1.80 (PEHI), 1.759 (PEHI/pc), 0.031 (PCII), 0.029 (GDPI/pc) to 0.026 (GDPI). There would have a strong positive effect of PEHI on HHEI and HHEI/pc compared

to other variables and GDPi would have a weak positive effect on household health expenditure in India. The regression analysis implies that the burden of household health expenditure would reduce through higher government expenditure on health rather than an increase in the national output.

Table 6.5 (b)

Regression Results of Household Health Expenditure in India

| Equation No | Dependent Variable | Intercept (Constant) | Independent Variables | | R ² | Adj R ² | F Ratio |
|-------------|--------------------|----------------------|-----------------------|-----------------|----------------|--------------------|---------|
| | | | GDPi | PEHI | | | |
| Equn.1 | HHEI | 26677.04 (4.17) | | 1.80 (26.84) | 0.97 | 0.97 | 720.65 |
| Equn.2 | HHEI | -32697.79 (-4.91) | 0.026 (33.86) | | 0.98 | 0.98 | 1146.71 |
| Equn.3 | HHEI | -10256.67 (-1.74) | 0.015 (7.44) | 0.767 (5.38) | 0.99 | 0.99 | 1476.32 |

Note: Figures in parentheses indicates t-Statistic value

Source: Computed from variables specified in Tables 6.3, 6.4 (a) and 6.4 (b)

The regression results based on logarithmic equation also give the association between household health expenditure and various variables which are presented in Tables 6.6 (a) and 6.6 (b). The results are more or less same in both models of regression. Both the linear and logarithmic equation regression result shows the substantially positive association between household health expenditure and per-capita income of the country.

Table 6.6 (a)

**Regression Results of Household Health Expenditure in India
(Logarithmic Equation)**

| Equn. No | Dependent Variable | Intercept (Constant) | Independent Variables | | | R ² | Adj R ² | F-ratio |
|----------|--------------------|----------------------|-----------------------|------------------|------------------|----------------|--------------------|---------|
| | | | GDPi/pc | PCII | PEHI/pc | | | |
| Equn.1 | HHEI/pc | -7.61 (-21.22) | 1.339 (41.33) | | | 0.98 | 0.98 | 1708.28 |
| Equn.2 | HHEI/pc | 1.57 (5.21) | | | 0.877 (18.76) | 0.95 | 0.94 | 351.93 |
| Equn.3 | HHEI/pc | -8.652 (-27.38) | | | | 0.99 | 0.99 | 2520.61 |
| Equn.4 | HHEI/pc | -6.94 (-6.49) | 1.239 (8.02) | | 0.068 (0.66) | 0.98 | 0.98 | 827.82 |
| Equn.5 | HHEI/pc | -5.33 (-13.07) | | 1.152 (30.77) | | 0.98 | 0.98 | 946.66 |

Note: Figures in parentheses indicates t-Statistic value

Source: Computed from variables specified in Tables. 6.3, 6.4 (a) and 6.4 (b)

Income is a major determinant of household health expenditure in India. This notion is also supported by the regression result (Equn.5 in Table 6.5 (a) and 6.6 (a)). The household health expenditure is also positively determined by GDP/pc. This result is consistent with the logarithmic equation (Equn.1 in Table 6.5 (a) and 6.6 (a)). The simple regression result of logarithmic equation shows that the per-capita public expenditure on health would substantial positive effect (regression coefficient=0.877)

on the household health expenditure in the country (Equn. 2 in Table 6.6(a)). The multiple regression result of logarithmic equation proves that the per-capita public expenditure on health would positive effect (regression coefficient=0.068) on household health expenditure (Equn. 3 in Table 6.6(a)). The regression result of linear and logarithmic equations hold the view that an increase in per-capita public expenditure on health would substantially positive influence the per-capita household health expenditure in India (Equn.2 in Table 6.5 (a) and 6.6 (a)).

The regression coefficient value of 1.15 indicates that the effect of GDPI on total household health expenditure is substantially positive in logarithmic regression equations (Equn.2 in 6.6 (b)). The contributory effect of GDPI on HHEI is true for simple and multiple regression equations.

Table 6.6 (b)
Regression Results of Household Health Expenditure in India
(Logarithmic Equation)

| Equation No | Dependent Variable | Intercept (Constant) | Independent Variables | | R ² | Adj R ² | F Ratio |
|-------------|--------------------|----------------------|-----------------------|------------------|----------------|--------------------|---------|
| | | | GDPI | PEHI | | | |
| Equn.1 | HHEI | 1.846 (4.08) | | 0.904 (22.39) | 0.96 | 0.96 | 501.76 |
| Equn.2 | HHEI | -6.19 (13.58) | 1.15 (39.80) | | 0.98 | 0.98 | 1584.08 |
| Equn.3 | HHEI | -4.84 (-4.52) | 0.948 (6.43) | 0.163 (1.39) | 0.98 | 0.98 | 834.63 |

Note: Figures in parentheses indicates t-Statistic value

Source: Computed from variables specified in Tables 6.3, 6.4 (a) and 6.4 (b)

The regression coefficient of logarithmic equation shows that the public expenditure on health in India would substantial positive effect on household health expenditure in India (Equn.1 in Table 6.6 (b)) since the regression coefficient of PEHI is 0.904 In India more than 60 percent of expenditure on health is borne by the households (NHSRC, 2019). The public expenditure on health and household health expenditure in India are complementary to each other. If the government increases the expenditure on health, that would reduce the burden of the households. Increasing share of household expenditure in health care may shut them into a vicious circle of poverty especially the marginalized sections of the society (Ghosh, 2011; Jayakrishnan et al., 2016).

The value of simple logarithmic regression coefficients with respect to HHEI and HHEI/pc is distinctive from one another. It varies from 1.339 (GDPI/pc),

1.152(PCII), 1.15 (GDPI), 0.904 (PEHI) to 0.877 (PEHI/pc). Per-capita income variables would substantial positive effect on per-capita household health expenditure compared to government expenditure on health. It is clear from the above analysis that the income variables and government expenditure would a decisive role in the determination of household health expenditure in India. The regression results of both linear and logarithmic equation suggest that the selected independent variables are key variables which influences and determines the household health expenditure in India.

6.5. Financial Return and Expenditure on Health in India

Health contributes the human capital of an individual. Healthy population act as a determinant and consequence of socio-economic development (Schultz, 1961). The investment in human capital can produce the monetary and non-monetary returns in an economy. Spending on health has both direct and indirect effect on economic growth (Becker, 1980). It is essential to examine the impact of investment on health on the productive capacity of India. It is evident that there is a positive association between per-capita GDP and household health expenditure in India during the period 1999-2000 to 2018-19. Household health expenditure can explain the productive capacity of the country in terms of GDP and per-capita income. In order to prove the relationship between expenditure on health and financial income, both linear and logarithmic regression equations are estimated.

Health is a fundamental requirement of economic development of a country. Human capital accumulation can be improved by investing in the health of the population (Schultz, 1961). It is obvious that, both public and household expenditure on health have a positive influence on the productivity of the country. The regression equation holds the same result and it is statistically significant. The productive capacity of the nation can be influenced by the spending on health by the government and the household. The GDP of the country would positively influenced by the health spending of the public and households (Equn.1 and Equn.2 in Table 6.7). The regression coefficient of GDPI is more in the case of HHEI than PHEI. At the same time the per-capita income is also dependent on the per-capita household health expenditure and per-capita public expenditure on health (Equn.3 and Equn.4 in Table 6.7). It can be observed that the regression coefficient of PCII is more in the case of HHEI/pc than PEHI/pc. The regression coefficient is also high in the case of total

public expenditure on health than per-capita public expenditure on health. The productive capacity of the nation is depend on both public and household health expenditure which enhances human capital formation.

Table 6.7

**Regression Results on Financial Returns from Expenditure on Health in India
(Logarithmic Equation)**

| Equation No | Dependent Variable | Intercept (Constant) | Independent Variables | | | | R ² | Adj R ² | F Ratio |
|-------------|--------------------|----------------------|-----------------------|------------------|------------------|---------|----------------|--------------------|---------|
| | | | HHEI | HHEI/pc | PEHI | PEHI/pc | | | |
| Equn.1 | GDPI | 5.502 (21.28) | 0.859 (39.8) | | | | 0.98 | 0.98 | 1584.08 |
| Equn.2 | GDPI | 7.048 (17.57) | | | 0.78 (21.79) | | 0.96 | 0.96 | 474.88 |
| Equn.3 | PCII | 4.74 (23.73) | | 0.851 (30.77) | | | 0.98 | 0.98 | 946.67 |
| Equn.4 | PCII | 6.036 (22.99) | | | 0.753 (18.49) | | 0.95 | 0.95 | 341.97 |
| Equn.5 | GDPI | 5.668 (18.33) | 0.747 (6.43) | | 0.105 (0.98) | | 0.98 | 0.98 | 791.02 |
| Equn.6 | PCII | 2.76 (10.31) | 0.526 (5.24) | | 0.162 (1.75) | | 0.98 | 0.98 | 701.42 |

Note: Figures in parentheses indicates t-Statistic value

Source: Computed from variables specified in Tables 6.3, 6.4(a) and 6.4(b)

The regression result of logarithmic equation also proves that the positive association of financial return from the investment in health capital. Healthy populations are productive and capable of creating new ideas. Hence healthy people can contribute to the knowledge capital which in turn enhances the productivity of the country. Hence investment in health will generate high level of income and economic growth (Bloom, 2004).

6.6. Household Health Expenditure in Kerala

Kerala holds the highest position in the human development index of India. Kerala is well known for its achievements in education and health care. The health indicators like low IMR, low MMR and high life expectancy which are comparable with the developed nations. As per the report of NITI Aayog in 2018 titled 'Healthy States: Progressive India', Kerala secured highest health index in terms of overall performance incorporating 23 indicators of health sector performance among the larger states in India. So it is identify to point out the determinants of household health expenditure in Kerala. Recent time series data on household health expenditure in Kerala is not available.

The logic behind the selection of data set on household health expenditure in Kerala is as follows:

1. Unavailability of time series data (relevant independent variables)

2. Evidences from present literature (theoretical and empirical)
3. The study examined various proxies such as number of doctors, medical institutions in both government and private hospitals, but the time series data is scanty.

Table 6.8

Average Annual Per-capita Household Health Expenditure (₹) in Kerala

| Year | Per-capita Household Health Expenditure (HHEK/pc) | Percentage Change |
|---------|---|-------------------|
| 1994-95 | 354 | 0.00 |
| 1995-96 | 374 | 5.65 |
| 1996-97 | 621 | 66.04 |
| 1997-98 | 1075 | 73.11 |
| 1998-99 | 841 | -21.77 |
| 1999-20 | 1000 | 18.91 |
| 2000-01 | 1035 | 3.50 |
| 2001-02 | 1231 | 18.94 |
| 2002-03 | 1382 | 12.27 |
| 2003-04 | 1530 | 10.71 |
| 2004-05 | 1176 | -23.14 |
| 2005-06 | 1220 | 3.74 |
| 2006-07 | 1464 | 20.00 |
| 2007-08 | 1720 | 17.49 |
| CAGR | | 11.95 |

Source: Computed from NSS Household Consumption Expenditure Survey, Various Rounds, GOI

As per NSSO estimates the household health expenditure is highest in Kerala among the states of India. Household health expenditure in Kerala is witnessing an increasing trend during the period from 1994-95 to 2007-08. In absolute terms per-capita household health expenditure in Kerala increased from ₹354 during 1993-94 to ₹1720 during 2007-08. It is clear that household health expenditure has shown a CAGR of 11.95 percent in Kerala during the period 1993-94 to 2007-08.

6.7. Determinants of Household Health Expenditure in Kerala

In connection with the previous section, a large set of state level variables such as GSDP of Kerala, per-capita GSDP of Kerala, public expenditure on health in Kerala, per-capita public expenditure on health in Kerala, total remittances to Kerala, and number of Government Medical institutions (Allopathy, Ayurveda and Homoeopathy) in Kerala have been taken into consideration to identify the determinants of household health expenditure in Kerala. The feasible association with household health expenditure and independent variables, growth rate of variables and regression results are illustrated in this section.

The independent variables are considered the level of economic development, government expenditure on health and demand and supply of health care.

Table 6.9

Notation and Definitions of Household Health Expenditure and its Determinants in Kerala

| Sl.No. | Notations of Variables | Variables |
|--------|------------------------|---|
| 1 | HHEK/pc | Average Annual Per-capita Household Final Consumption Expenditure (₹) on Health in Kerala |
| 2 | GSDPK | Gross State Domestic Product of Kerala (₹Crore) |
| 3 | GSDPK/pc | Per-capita Gross State Domestic Product of Kerala (₹) |
| 4 | PEHK | Public Expenditure (₹Crore) on Health in Kerala |
| 5 | PEHK/pc | Per-capita Public Expenditure (₹) on Health in Kerala |
| 6 | TRK | Total Remittances to Kerala (₹Crore) |
| 7 | MIK | Government Medical institutions in Kerala- Allopathy, Ayurveda and Homoeopathy (Number) |

Source: Derived from estimated functions

In order to measure the level of economic development of Kerala, the variables such as GSDP of Kerala and per-capita GSDP of Kerala are considered.

Table 6.10 (a)

Determinants of Household Health Expenditure in Kerala

| Year | GSDP (2004-05 prices) in ₹crores | Percentage Change | Per-capita income (2004-05 prices) in ₹ | Percentage Change |
|---------|----------------------------------|-------------------|---|-------------------|
| 1994-95 | 68046 | 0.0 | 22522 | 0.0 |
| 1995-96 | 71119 | 4.52 | 23318 | 3.53 |
| 1996-97 | 73750 | 3.70 | 23964 | 2.77 |
| 1997-98 | 75881 | 2.89 | 24448 | 2.02 |
| 1998-99 | 81239 | 7.06 | 25963 | 6.20 |
| 1999-20 | 87368 | 7.54 | 27709 | 6.72 |
| 2000-01 | 90450 | 3.53 | 28482 | 2.79 |
| 2001-02 | 95124 | 5.17 | 29752 | 4.46 |
| 2002-03 | 102071 | 7.30 | 31598 | 6.20 |
| 2003-04 | 108449 | 6.25 | 33276 | 5.31 |
| 2004-05 | 119264 | 9.97 | 36825 | 10.67 |
| 2005-06 | 131294 | 10.09 | 40346 | 9.56 |
| 2006-07 | 141667 | 7.90 | 43325 | 7.38 |
| 2007-08 | 154093 | 8.77 | 46899 | 8.25 |
| CAGR | | 6.01 | | 5.37 |

Sources: 1. Economic Review, Various Issues, GOK

2. Department of Economic and Statistics, GOK

Secondly, government expenditure on health is measured in terms of two aspects such as public expenditure on health in Kerala and per-capita public expenditure on health in Kerala. The supply of health care facilities is measured through the availability of medical institutions especially in the public hospitals. The medical institutions include the three systems of medicine i.e. Allopathic, Ayurveda and Homoeopathy. The private health care facilities are not considered because of insufficient information on the health care facilities in the private sector. This research considered various aspects aspect such as number of hospitals, number of beds,

number of physicians etc. especially in the private sector. But the data is not sufficient to build a model to associate the determinants of household health expenditure in Kerala. The study confined to only public health care facilities in relation to supply of health care facilities in Kerala.

Total remittances to Kerala play a pivotal role in the economic scenario of the state. Remittances lead to a boom in the purchasing power of the households in Kerala. Remittances would act as a determinant of demand for and supply of health care facilities due to the hike in income. The details of selected variables are presented in the Table 6.10 (a), 6.10 (b) and 6.10 (c).

Table 6.10 (b)

Determinants of Household Health Expenditure (₹) in Kerala

| Year | Public expenditure on health in Kerala (2004-05 prices) crores | Percentage Change | Per-capita public expenditure on health (2004-05 prices) | Percentage Change |
|---------|--|-------------------|--|-------------------|
| 1994-95 | 539 | 0.00 | 196 | 0.00 |
| 1995-96 | 643 | 19.29 | 211 | 7.65 |
| 1996-97 | 668 | 3.89 | 217 | 2.84 |
| 1997-98 | 720 | 7.78 | 232 | 6.91 |
| 1998-99 | 766 | 6.39 | 245 | 5.60 |
| 1999-20 | 917 | 19.71 | 291 | 18.78 |
| 2000-01 | 831 | -9.38 | 262 | -9.97 |
| 2001-02 | 878 | 5.66 | 275 | 4.96 |
| 2002-03 | 904 | 2.96 | 280 | 1.82 |
| 2003-04 | 910 | 0.66 | 279 | -0.36 |
| 2004-05 | 921 | 1.21 | 284 | 1.79 |
| 2005-06 | 956 | 3.80 | 294 | 3.52 |
| 2006-07 | 1021 | 6.80 | 312 | 6.12 |
| 2007-08 | 1105 | 8.23 | 336 | 7.69 |
| CAGR | | 5.26 | | 3.92 |

Sources: 1. Economic Review, Various Issues, GOK
2. Department of Economic and Statistics, GOK

It can be evident from the Table 6.11 (a) that the GSDP of Kerala increased from ₹68046 crores in 1994-95 to ₹154093 crores in 2007-08 with a CAGR of 6.01 percent. The percentage change in GSDP of Kerala varies from 2.89 percent in 1997-98 to 10.09 percent in 2005-06 during the period from 1994-95 to 2007-08. The per-capita income also shows an increasing trend. It rose from ₹22522 in 1994-95 to ₹46899 2007-08. The CAGR of per-capita income is 5.37 and CAGR of GSDP is 6.01 during 1994-95 to 2007-08. The percentage change in per-capita income of Kerala is highest during 2004-05 (10.67 percent) and lowest in 1997-98 (2.02 percent). The percentage change in per-capita income is also low in 1996-97 and 2000-01.

The total health expenditure is shared by the government and the households. The role of government in health care spending can stimulate the human capital formation of a country. The public expenditure on health in Kerala increased from ₹539 crores in 1994-95 to ₹1105 crores in 2007-08. The public expenditure on health shows a CAGR of 5.26 percent from 1994-95 to 2007-08. The percentage change in public expenditure on health in Kerala shows a negative rate during 2000-01 (-9.38 percent) and shows a maximum during 1999-2000 (19.71 percent) and 1995-96 (19.29 percent).

Table 6.10 (c)

Determinants of Household Health Expenditure in Kerala

| Year | Remittances to Kerala(2004-05price) in ₹Crores | Percentage Change | Number of Government Medical Institutions(Allopathy, Ayurveda and Homoeopathy) | Percentage Change |
|---------|---|-------------------|--|-------------------|
| 1994-95 | 10529 | 0.0 | 2370 | 0.00 |
| 1995-96 | 11833 | 12.38 | 2415 | 1.90 |
| 1996-97 | 14477 | 22.34 | 2468 | 2.19 |
| 1997-98 | 15197 | 4.97 | 2524 | 2.27 |
| 1998-99 | 15343 | 0.96 | 2564 | 1.58 |
| 1999-20 | 17851 | 16.35 | 2664 | 3.90 |
| 2000-01 | 17758 | -0.52 | 2678 | 0.53 |
| 2001-02 | 18741 | 5.54 | 2707 | 1.08 |
| 2002-03 | 19807 | 5.69 | 2696 | -0.41 |
| 2003-04 | 20017 | 1.06 | 2706 | 0.37 |
| 2004-05 | 20161 | 0.72 | 2711 | 0.18 |
| 2005-06 | 20713 | 2.74 | 2711 | 0.00 |
| 2006-07 | 20873 | 0.77 | 2711 | 0.00 |
| 2007-08 | 22234 | 6.52 | 2706 | -0.18 |
| CAGR | | 5.48 | | 0.95 |

Sources: 1. Economic Review, Various Issues, GOK
2. Department of Economic and Statistics, GOK

The per-capita public expenditure on health in Kerala increased from ₹196 in 1994-95 to ₹336 in 2007-08 with a CAGR of 3.92 percent. The percentage change in per-capita public expenditure on health also shows a negative rate during 2000-01 (-9.97 percent) and 2003-04 (-0.36 percent) and exhibits a maximum during 1999-2000 (18.78 percent). The role of remittances in the development scenario of Kerala is admirable (Kannan and Hari, 2002; Zachariah, 2002; Sunny, 2019). Remittances paved the way for development in education and health care in Kerala. Remittances to Kerala mounted from ₹10529 crores in 1994-95 to ₹22234 crores in 2007-08 with a CAGR of 5.48 percent. The percentage change in remittances to Kerala displayed a

negative rate during 2000-01 (0.52 percent) and maximum during 1996-97 (22.34 percent). The role of medical institutions for attaining a favourable health index is immense. The health institutions in the private sector also contributed to the better health indicators to the state. But there is no sufficient data regarding private health care facilities. The supply of health care is measured only with government medical institutions. The number of government medical institutions also exhibits an increasing trend and it rose from 2370 in 1994-95 to 2706 in 2007-08 with a CAGR of 0.95 percent. The percentage change in the number of medical institutions is high during 1999-2000 with 3.90 percent. The CAGR of variables varies from 6.01 percent (GSDPK), 5.48 percent (RTK), 5.37 percent (PCIK), 5.26 percent (PEHK), and 3.92 percent (PEHK/pc) to 0.95 percent (MIK). The CAGR of HHEK/pc is 11.95 percent which outruns all the selected variables in Kerala.

Table 6.11 (a)

Regression Results of Household Health Expenditure in Kerala

| Eqn. No | Dependent Variable | Intercept (Constant) | Independent Variables | | | | | R ² | Adj R ² | F Ratio |
|---------|--------------------|----------------------|-----------------------|-----------------|----------------|------------------|-----------------|----------------|--------------------|---------|
| | | | GSDPK | PEHK | PEHK/pc | TRK | PCIK | | | |
| Eqn.1 | HHEK/pc | -271.58 (-0.96) | | | | | 0.042 (4.91) | 0.68 | 0.64 | 24.06 |
| Eqn.2 | HHEK/pc | -1375.38 (-4.06) | | | 9.23 (7.31) | | | | | |
| Eqn.3 | HHEK/pc | -168.76 (-0.68) | 0.012 (5.16) | | | | | 0.69 | 0.66 | 26.57 |
| Eqn.4 | HHEK/pc | -959.38 (-3.73) | | 2.415 (8.03) | | | | 0.84 | 0.83 | 64.41 |
| Eqn.5 | HHEK/pc | -846.25 (-4.34) | | | | 0.109 (10.03) | | 0.89 | 0.88 | 100.53 |

Note: Figures in parentheses indicates t-Statistic value

Source: Computed from variables specified in Tables 6.8, 6.10(a), 6.10(b) and 6.10(c)

Among the variables related to expenditure on health in Kerala the annual growth rate is more in the case of per-capita GSDP of Kerala followed by remittances to Kerala, per-capita income, public expenditure on health, per-capita public expenditure on health and medical institutions in Kerala. The simple and multiple regression analysis of per-capita household health expenditure in Kerala is presented in Table 6.11 (a), 6.11 (b), 6.12 (a) and 6.12 (b). Both the linear and logarithmic equations are considered to identify the determinants of expenditure on health in Kerala.

The regression result shows a marginal positive association between per-capita income and the per-capita household health expenditure in Kerala (Eqn.1 in Table 6.11 (a)). The per-capita income of Kerala marginally influences the variations in the

per-capita household health expenditure in Kerala. This is applicable to both simple and multiple regression analysis (Equation.1 in Table 6.11 (a) and 6.11 (b)). The regression result reveals that per-capita household expenditure on health also likely have a substantial positive association with per-capita public expenditure on health (Equation.2 in Table 6.11 (a)). It should be noted that the per-capita household health expenditure and public expenditure on health are complimentary to each other (Equation. 2 in Table 6.11 (a)). The state has a significant role in the process of structural transformation, and rejuvenation of health care facilities (Arun and Kumar, 2013). The public expenditure on health in Kerala would have a substantial positive effect on per-capita household health expenditure. The regression coefficient of PEHK is 2.415 which shows a substantial positive effect on household health expenditure in Kerala (Equation.4 in Table 6.11 (a)). The availability of health care facilities at an easy pocket is highly influential in the health care spending of the households, especially weaker sections of the society. The development policy of the government would be highly effective in reducing the burden of people for utilising health care (Imoughele and Ismaila, 2013)

Table 6.11 (b)

Regression Results of Household Health Expenditure in Kerala

| Equation No | Dependent Variable | Intercept (Constant) | Independent Variables | | | R ² | Adj R ² | F Ratio |
|-------------|--------------------|----------------------|-----------------------|----------------|-----------------|----------------|--------------------|---------|
| | | | PEHK/pc | MIK | PCIK | | | |
| Equation. 1 | HHEK/pc | -1359.89 (-3.21) | 9.049 (2.99) | | 0.001 (0.07) | 0.82 | 0.78 | 24.52 |
| Equation. 2 | HHEK/pc | -6715.31 (-5.90) | | 2.98 (6.85) | | 0.79 | 0.78 | 46.98 |

Note: Figures in parentheses indicate t-Statistic value

Source: Computed from variables specified in Tables 6.8, 6.10(a), 6.10(b) and 6.10(c)

The GSDP of Kerala would have a marginal positive effect on per-capita household health expenditure in Kerala (Equation.3 in Table 6.11 (a)). The economic growth of a country determines the level of private spending in health care. Remittances to Kerala also have a marginal positive effect on household health expenditure in Kerala. The spending habit of the people is drastically changed on account of high remittances to the state. The demand for education and health care facilities increased due to the flow of remittances to Kerala. Household health expenditure is positively affected by the remittances to Kerala (Equation.5 in Table 6.11 (a)). The value of R² and adjusted R² in this equation (0.89 and 0.88 respectively) shows the significant effect of the variables.

Health care facilities would influence the health care spending of the households. Public health care facilities are crucial for meeting the basic health requirements of the people since health infrastructure has significant and positive influence on health indicators (Lakshmi and Sahoo, 2013). The regression result shows that the medical institutions have a positive bearing of household health expenditures (Equn.2 in Table 6.11 (b)). The relative influence of variables in simple linear regression equation on HHEK/pc differs from 9.23 (PEHK/pc), 2.98 (MIK), 2.415 (PEHK), 0.109 (TRK), 0.042 (PCIK) to 0.012 (GSDPK). Hence it is clear from the regression analysis that the per-capita public expenditure on health would have a pivotal role in determining the household health expenditure in Kerala compared to other variables.

Table 6.12 (a)

Regression Results of Household Health Expenditure in Kerala (Logarithmic Equation)

| Equation No | Dependent Variable | Intercept (Constant) | Independent Variables | | | | | R ² | Adj R ² | F Ratio |
|-------------|--------------------|----------------------|-----------------------|-----------------|-----------------|------------------|-----------------|----------------|--------------------|---------|
| | | | GSDPK | PEHK | PEHK / pc | TRK | PCIK | | | |
| Equn.1 | HHEK/pc | -9.79 (-2.59) | | | | | 1.615 (4.41) | 0.62 | 0.59 | 19.43 |
| Equn.2 | HHEK/pc | -8.84 (-4.06) | | | 2.824 (7.23) | | | 0.81 | 0.80 | 52.31 |
| Equn.3 | HHEK/pc | -10.27 (-2.82) | 1.49 (4.71) | | | | | 0.65 | 0.62 | 22.20 |
| Equn.4 | HHEK/pc | -8.44 (-4.48) | | 2.281 (8.13) | | | | 0.85 | 0.83 | 66.04 |
| Equn.5 | HHEK/pc | -13.59 (-7.82) | | | | 2.099 (11.78) | | 0.92 | 0.91 | 138.88 |

Note: Figures in parentheses indicates t-Statistic value

Source: Computed from variables specified in Tables 6.8, 6.10(a), 6.10(b) and 6.10(c)

GSDPK would have a weak positive association on household health expenditure. Medical institutions in Kerala would have a strong positive effect on household health expenditure. The availability and accessibility of health infrastructure would positively influence on health spending of the households (Dey et al., 2013; Santos et al., 2015). The regression result of logarithmic equation of household health expenditure in Kerala holds more or less same result in linear equation. The regression result of logarithmic equation household health expenditure in Kerala is presented in Table 6.12 (a) and 6.12 (b).

The per-capita public expenditure on health would have a positive significance on per-capita household health expenditure in Kerala. Medical institutions in Kerala would have a strong positive influence on household health expenditure in Kerala. The variable of remittances indicates a highly positive association with the household health expenditure in Kerala. Public expenditure on health is essential to reduce the

inequality in the distribution of health care. Hence public expenditure seems to have a high association with the household expenditure on health. Public expenditures are inevitable to reduce the income inequality in terms of providing accessibility of health care (Angko, 2009).

Table 6.12 (b)

Regression Results of Household Health Expenditure in Kerala (Logarithmic Equation)

| Equation No | Dependent Variable | Intercept (Constant) | Independent Variables | | | R ² | Adj R ² | F Ratio |
|-------------|--------------------|----------------------|-----------------------|----------------|-------------------|----------------|--------------------|---------|
| | | | PEHK/ pc | MIK | PCIK | | | |
| Equn.1 | HHEK/ pc | -7.90 (-2.85) | 3.318 (3.49) | | -0.357 (-0.57) | 0.82 | 0.79 | 24.86 |
| Equn.2 | HHEK/ pc | -67.56 (-7.93) | | 9.46 (8.74) | | 0.86 | 0.85 | 76.32 |

Note: Figures in parentheses indicates t- Statistic value

Source: Computed from variables specified in Tables 6.8, 6.10(a), 6.10(b) and 6.10(c)

The relative influence of variables in logarithmic equation on HHEK/pc differs from 9.46 (MIK), 2.824 (PEHK/pc), 2.281 (PEHK), 2.099 (TRK), 1.615 (PCIK) to 1.49 (GSDPK). The regression result shows the association of household health expenditure in Kerala and the variables determining it. The regression result helps to find out of the relative influence of household health expenditure in Kerala and macro economic variables such as GSDP, per-capita income, remittances and public expenditure on health. The regression result of logarithmic equation indicates a strong positive effect of MIK and a weak effect of GSDPK on household health expenditure in Kerala.

6.8. Financial Return and Expenditure on Health in Kerala

The productive capacity of the economy can be measured by GSDP, per-capita GSDP and household income through remittances. In order to find relationship between financial return and expenditure on health linear and logarithmic regression equations are used.

In the economic assessment both of the cost and outcome of the health investment are considered. The cost dimension includes cost-minimization, cost-benefit, cost-effectiveness or cost-utility (Ferraz, 1995). It can be evident from the regression result of return on expenditure on health that public expenditure on health in Kerala would influence substantial positive effect on GSDPK (Equn.2 in Table 6.13). Investment in human capital enhances the productivity of the state. Human capital formation through education and health increases the productivity of the labour which fosters economic development. In Kerala household expenditure on education seems to be positively significant on productivity in terms of per-capita

income and state domestic product. Just like education, the spending on health by households contributed to the economic growth. The per-capita household health expenditure would a positive bearing on GSDPK (Equn.1 in Table 6.13). Not only the government but also the household sector also contributed to the nation income. So it is clearly said that the expenditure on health whether it is government or household will enhance the economic growth.

Table 6.13
Regression Results of Household Health Expenditure in Kerala (Logarithmic Equation)

| Equation No | Dependent Variable | Intercept (Constant) | Independent Variables | | | | R ² | Adj R ² | F Ratio |
|-------------|--------------------|----------------------|-----------------------|----------------|-----------------|------------------|----------------|--------------------|---------|
| | | | HHEK/pc | PEHK | PEHK/pc | TRK | | | |
| Equn.1 | GSDPK | 8.49 (13.33) | 0.43 (4.71) | | | | 0.65 | 0.62 | 22.20 |
| Equn.2 | GSDPK | 3.32 (3.05) | | 1.21 (7.50) | | | 0.82 | 0.81 | 56.32 |
| Equn.3 | GSDPK | 3.16 (1.66) | | 1.14 (1.54) | | 0.069 (0.106) | 0.82 | 0.79 | 25.84 |
| Equn.4 | PCIK | 7.69 (12.84) | 0.38 (4.41) | | | | 0.62 | 0.59 | 19.43 |
| Equn.5 | PCIK | 8.87 (49.94) | | | 0.005 (8.25) | | 0.85 | 0.84 | 68.00 |
| Equn.6 | TRK | 6.73 (26.23) | 0.438 (11.78) | | | | 0.92 | 0.91 | 138.88 |

Note: Figures in parentheses indicates t-Statistic value

Source: Computed from variables specified in Tables 6.8, 6.10 (a), 6.10 (b) and 6.10 (c)

The remittances also contribute the development strategy of Kerala and enhance the way for economic growth. Remittances would have a strong positive influence on GSDPK. The positive association of remittances and state income can be evident from the regression result (Equn.3 in Table 6.13). Another interesting regression result is that the household health expenditure significant on volume of remittances to Kerala (Equn.6 in Table 6.13). Health is an important factor of human capital formation and this would enable the labour productivity. Spending on health has a direct welfare effect to boost economic growth (Becker, 1980; Alvi and Ahmed, 2014).

Income level of the individual also depends upon the investment in health capital which enhances productivity of labour and enabled him to earn more. Improved health has direct and indirect effect on income (Bloom 2004; Jamison et al., 2005). The per-capita public expenditure on health seems to be highly positive significant effect on per-capita income of an individual (Equn.5 in Table 6.13). Not only the public expenditure but also the per-capita household health expenditure in Kerala would influence highly on PCIK (Equn.4 in Table 6.13). The financial return

from household expenditure on health and its impact on macroeconomic variables like GSDP and per-capita income is noteworthy. The association between investment in human capital and returns from investment in human capital makes bi-directional.

The regression result of logarithmic equation on financial return from spending on health is shown in Table 6.13. The regression result of logarithmic equations is coexistent with the result of linear equations of financial returns. The investment in health would create productivity which in turn paved the way for economic growth. The investment in health both by the government and the household increases the productive capacity of the individual and this result in increase in the income level and economic growth. Health can affect economic growth through its impact on physical and human capital accumulation (Tang, 2011). Investment in human capital leads to the development of a nation. This does not mean that human capital alone create income growth, there are some other variables which contributed the growth process. Human capital investment is inevitable in the process of economic development.

6.9. Determinants of Expenditure on Health in India and Kerala

The national and state level analysis on the determinants of expenditure on health gives a comparative picture even though there are some differences between them. The regression results show that the household health expenditure is highly influenced by the public expenditure on health in India as well as in Kerala. Per-capita public expenditure on health would have highly positive effect on per-capita household health expenditure in Kerala than in India (Equn.2 in Table 6.5 (a) and in Table 6.12 (a)). Per-capita income is one of the key determinants in the household health expenditure at the state and national level. The significance of per-capita income on per-capita household health expenditure is more in Kerala than in India (Equn.5 in Table 6.5 (a) and Equn.1 in Table 6.12 (a)). The effect of GDPI over GSDPK is high in determining household health expenditure (Equn.2 in Table 6.5 (b) and Equn.5 in Table 6.12 (a)). Household expenditure varies with changes in consumption expenditure positively. GDPI would have a weak positive effect on household health expenditure in India. The GDP of the country would positively influenced by the health spending of the public and households. Public expenditure on health also shows a substantially positive effect on household health expenditure in India.

6.10. Financial Return from Health in India and Kerala

The financial return from health concentrates the macroeconomic productivity indicators such as per-capita income and national income. This section tries to compare the returns from health expenditure in Kerala and in India. The financial return is greater from public expenditure on health than household health expenditure both in Kerala and in India. Moreover the effect of GDPI or GSDPK from public expenditure on health is higher in Kerala than in India. The impact of household health expenditure on income is more in Kerala than in India. The regression result is mostly consistent with both linear and logarithmic equation on financial returns on health in India and Kerala.

The regression results help to find out the influence of independent variables on household health expenditure in Kerala and in India. It also throws light on the productive capacity from expenditure on health. The analysis helps to find the strength among the variables. The variables like PEHI, PEHI/pc, PCII, GDPI and GDPI/pc have a significant role in determining the household health expenditure in India. In Kerala the variables such as PEHK, PEHK/pc, GSDPK, PCIK, RTK and MIK plays a prominent role in determining the household health expenditure. The productive capacity from household health expenditure in India is in terms of PCII and GSDPI. In Kerala the productive capacity is in terms of PCIK and GSDPK. The public expenditure on health is the most crucial factor to determine the household health expenditure in Kerala. Apart from these variables there are several factors contributed to the household health expenditure in Kerala. Hence to identify the micro level variables, a detailed primary data base analysis is needed.