

Chapter3

Research Methodology

Introduction

This chapter explain the methodology used, selection of variables, hypothesis, sources of data, research design and tool and technique through getting the objective. This chapter divided into different parts. As 3.1 is basic framework, it indicates which concept used in the study. 3.2 is theoretical framework. 3.3 is hypothesis of the study. 3.4 is period of study. 3.5 is sources of the study. 3.6 is selection of variable. 3.7 is tool and technique. 3.8 is health index.

3.1 Basic Framework

Health is proved internationally that health plays fundamental role in productivity and development in the long run and short run. It is basic factor of living of standards for people. For example health is input factor which produce to development and growth of economic through human capital formation. It is improvement of health status, socio-economic factor, water, nutrition, sanitation sector for welfare of society. In one hand human capital is provided economic activities which produce productivity of individual and society level for better living standard. In second side health improve the health status as decrease disease, work productivity increase which health service better and better management of resource.

Good health, as people know from their own experience is a crucial part of well-being, but spending on health can also be justified on purely economic grounds. Improved health contribution to economic growth in four ways- it reduce production losses caused by worker illness, it permits the use of natural resources that had been totally or nearly inaccessible because of disease, it increase the enrolment of children in school and increase their learning and its frees resources for alternative uses that would otherwise have to be spent on treating illness. The economic gains are relatively greater for poor people, who are typically most handicapped by ill health and who stand to gain the most from the development of underutilization of natural resources.

In India, health is basic problem. And in Asian and African countries is also basic problem. It is reduce economic activities, loss of human capital, available of resources not proper management like dropper rate of schooling children, human development etc. Health improve the health status which improve the

low population growth rate, per capita income, living of standards, high income growth, economic growth and development of society factor. Basically provides economic activities and efficient learning. It is provide better human capital, productivity for economic growth.

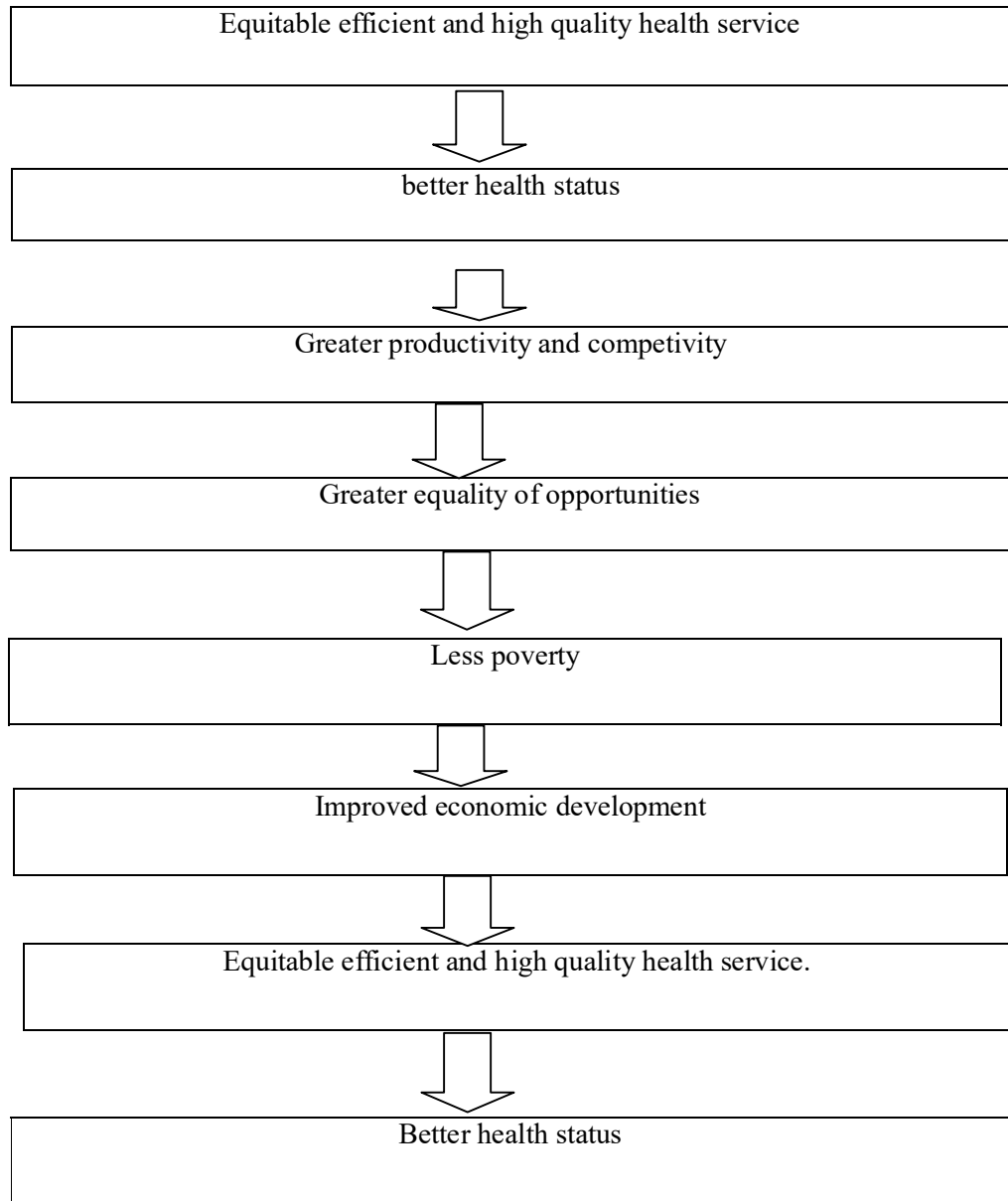
Inability of growth rate convergence of developing countries necessitates the emergence of new growth theories. Along with physical capital, new growth theories, emphasized on human capital formation and its importance for economic growth. Health is a prominent part of human capital along with education (Zur, 2010).

According to W.H.O. conference (1987), by 2000 every one should enjoy “a level of health that will permit them to lead a socially and economically productive life”. Achieving this goal would require economic and social development, as well as action within the health sector. The declaration view better health as “most important world -wide social goal”. Health is essential to building strong societies, with improved health leading to social development, improved quality of life and condition more conducive to world peace. The importance of a socially based understanding of health-with health having social determination, social impacts and social remedies – is advanced by recent research. (Biswajit Chatterjee,2000)

According to World Bank report (1993), developing countries, the number of people in poverty is especially an important reason for differences in health. One study looked at twenty-two developing countries with comparable data on poverty and found that variation in the prevalence of poverty and in per capita public spending on health is important in explaining cross country variation in life expectancy. Differences in income per capita became unimportant once these two factors were taken into account. This does not mean that income growth is irrelevant to increase to life expectancy, rather, its main effect lies in how much it reduces poverty and support public health services. In the twenty two countries, roughly one thirds of the effect of economic growth on life expectancy came through increase public spending on health. In Sri Lanka, an increase in per capita public spending on health was twenty two times more effective in reducing infant mortality than was the same increase in average income (world development Report, 1993).

Malick (2015) examined that increase in the percentage of health expenditure cause life expectancy rate high and influence people to become more efficient for any kind of skill work. Govt. should make effective National level policy on health which improves health status and its basic need of people. How to **effect of health to income and investment** shows that as following figure:-

Figure 3.1



(Sources: Researcher Calculation)

The figure3.1 show that if it is better equitable efficient and high quality health services, staff and infrastructure in the society and nation. Then it will increase the health status which improves the

human capital and utilization of resources. If better human capital then it will greater productivity which generate the competition, trade, business, economic activities etc. if produce economic activities, productivity then will be less poverty. If less poverty means per capita, and gross domestic product will be increase. If increase the per capita income, and gross domestic product then will improve the economic growth and development of society and country. If economic growth and development increase then will people or Government purchase and provide the equitable efficiency and quality health service. It will increase living standard of people. Therefore do enjoy life and gain better health status. If this cycle process continuous that means health and economic growth direct relationship with each other. If do will productive investment in health sector that will boost economic growth and development of the country. Then far too unequal balance regarding to poverty, health sector, and employment etc.

Improved health can contribute substantially to economic growth, predominantly by way of reducing Production losses caused by worker illness and raising labour productivity. Most obvious sources of gain are fewer working days lost to illness, greater opportunities to obtain better-paying jobs, and longer working lives (World Bank, 1993)

3.3 Theoretical framework

Guire (1993) analysed that health has been ill fame. Because lacking of theoretical model or not any adopted theories. Grossman (1972) describe to a theoretical concept or model for health care market which people according to need be adoptable. But health care market not perfect. Grossman (1972) human capital model of the demand for health has been argued by some by to be one of major theoretical innovation to have emerged from health economics. Health capital is both a consumption and investment good in the Grossman model. The individual has an initial stock of health capital, which depreciates over time. However, the depreciation can be replenished by investing in health with medical care service, e.g. exercise. Thus we can consider that one's health level depends upon the quantity of resources allocated to the production of health. The quantity of health capital produced is also affected by harmful behaviour to health. For example smoking increase the rate of depreciation, causing the stock of health capital to decrease *ceteris paribus*.

Some study after find out that if increase income then effect on decrease mortality and it's distribute the income that people support the equal right and opportunities. Most of the studies on the determinants of health expenditures used demand function approach to specify the models, specifically,

real health care expenditures (HCE) is hypothesized to be a function of real GDP and a selection of economic and non-income variables. It is explained in many empirical studies on health and health care demand that the determination of health expenditures includes political and economic actors.

In India, the priority of issues and choice of options should vary according to policy formation and implementation will help to continually evolve the health system is improving the health of all Indians in an accountable and equitable and reasonable manner India must give more attention than it has in the past to the monitoring of health system outcomes and to improving the distribution of services among different groups of Indians particularly among the poor.

Given the great variation in condition among states, revision in national policy also ought to allow better specify and flexibility in dealing with the various states. In particulars the new plans must discover ways that national right of way programs can be productivity decentralize to state and local bodies and ways that the central government can provide relevant support to states facing different issues. In term of production function, Grossman (1972) showed the health derived to production function approach. This approach used in empirical studies of health and health care. But Grossman stated that the demand for health care is copied which is produced through a process defined by a production function. His model is widely used in empirical studies of health and health care. Grossman (1972) developed a theoretical model of health care which is commonly useful for analysing the factors affecting health status and its relationship with economic and non-economic factors. As model is that:-

$$H = f(A) \dots\dots\dots (1)$$

In equation (1) It means H is the function of A. H indicate the health. And A indicate of other factor, it means GDP, education, per capita income, etc. other factor. All these factor affected to health. But Grossman model (1972) concept or model presented at small level or low level area as individual or micro level. This model if applied the macro level that means create the GDP. Its far to inequality and gain the biased result.

3.3 Hypothesis of the Study

- H0:- GSDP does not Cause SPHE
- H0:-SPHE does not Cause GSDP
- H0:-GDDP does not effect DHI
- H0:- DHI does not effect GDDP

3.4 Period of the Study

This study based on empirical and secondary data. And used the time period from 1991 to 2011(20 year).

3.5 Sources of Data

This study is based on secondary data. The data obtained from various sources as Haryana statistical abstract of Haryana, human development of Haryana, economic survey of Haryana, UNDP, health and family welfare statistical department, health and service department of Haryana, Indiatat., Ministry of statistical and programme implementation. .

3.6 Selection of Variable

In this study used different type of variable. In term of growth is used GDP variable and for health index variables such as PHE, allopathic institute (PHC, CHC, Dispensaries, sub- centre) Ayurvedic, Unani, Homeopathic institute, beds in hospitals (per lakhs, total), No. of hospitals (per lakh, total), birth rate, death rate. Infant mortality rate, patient treatment has been used.

3.7 Tool and Technique

In this study time series data is used. Time series data do not easily work which face of different type of problem. One of them is data is non stationary and stationary. Some study indicated that time series data is not stationary. And spurious. Spurious relationship show that two variable between not good or worthy link, therefore result is invalid or correct.

Co-integration indicate analyses the two or more variable between short run and long run relationship. The basic idea underlying co-integration analysis is that if two or more variables are integrated of the same order (i.e., integrated of order one) than long run relationship using co-integration approach can be establish if the error term obtained is stationary or integrated of order lower than that of variables entering in the co-integration model.(zur, 2011)

3.1 Unit root test

Dickey and Fuller (1981) test for unit root test which use in time series data. Firstly check out the series is stationarity and non stationarity which important for square test, t-value. If series is not obtained stationarity then will be spurious regression result. Spurious result refer to according to time change mean and variance of regression result. A series is non stationary (stationary) if its mean and variance are independent of time or in other words remain changes (constant) over time and the value of covariance between times period depends only on the lag between time periods (Gujarti, 2009).

3.7.2 Augmented Dickey-Fuller for Unit root test

Different test for unit root test but the Dickey-Fuller test (1981) is most accepted and usually used. The DF/ADF-tests based on the condition. This test involves estimating Dickey- fuller test in three different equation forms as follow equation 1, 2,3, as respectively:-

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \alpha_2 Y_{t-1} + \mu_t$$

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \mu_t$$

$$\Delta Y_t = \alpha_1 Y_{t-1} + \mu_t$$

Equation (1) indicated the random walk without drift around a stochastic trend. Equation (2) indicated the random walk with drift. Equation (3) indicated random walk without drift. Fuller, test statistic for unit root test is t-statistic and the critical values are used in these equation. But some equation estimates the unit root test hypothesis with drift term and without drift term. If the calculated value is larger than the critical value, then Y_t is non-stationary and therefore null of unit root is allow or accepted. From equation we can also test the joint hypothesis of unit root and no trend against the alternative hypothesis of trend stationarity. Y is the time series and t is time trend. If the calculated value is less than the critical value, the null hypothesis is accepted and Y_t is non-stationarity with insignificant trend; conversely, if the null hypothesis is rejected, Y_t is stationarity with significant trend and is a trend stationarity series (Gujarati, 2010). In equation if α_0 and α_1 is set equal to zero, α_2 is unity. That means data is non- stationarity. After that the non stationarity need of stationarity. Therefore make differencing. That called all process stationarity. And that trend called stochastic trend. If α_0 is not equal to zero and α_1 is equal to zero and α_2 is equal to unity. Then the equation is random walk with drift. It means data is non stationarity. Therefore make differencing through stationary. But Y_t can show the negative or positive trend depend on α_0 is negative or positive. If α_0 is not zero and α_1 is not zero and α_2 is equal to zero. That means series is stationarity and in this situation mean of Y_t is time variant and not constant (*i.e.*, $\alpha_0 + \alpha_1 t$) while its variance is constant over time. To get stationary in this case we have to subtract the mean of Y_t from Y_{t-1} , the resulting series will be stationary and is called trend stationarity (Gujarati, 2010).

3.7.3 Co-integration Test

The test of co-integration is refer to long-run relationship between the two or more variable, if exists, that means deviation from the long-run equilibrium path is restricted, it called two or more variables co-integrated. We can say that variable in short run and drift apart from each other but direction and long run relationship exists. This type of situation two point raised, firstly is individual two variables integrated of same order, secondly a linear combination of the variables exist which is integrated to an order lower than the individual variables. If the variables become stationary after differencing but error noise refer to regression is stationarity. Then the error term from the co-integration regression is stationary (Hansen, 1995), the co-integration regression as:-

$$Y_t = \beta_1 + \beta_2 X_t + \mu_t \dots \dots \dots (1)$$

Where, slope β_2 is the co-integrated. If the series Y_t and X_t cointegrated at first order and the error term μ_t are stationarity at order zero, then the series are co-integrated at zero order and one and β way the equilibrium relationship between the series Y_t and X_t , and μ_t is the deviation from the long-run (mean) equilibrium path.

The Y_t and X_t are connected in form of equilibrium relationship, then Y_t and X_t are non-stationary. Therefore, the concept of co-integration imply the presence of long-run equilibrium to which an economic system move overtime, and μ_t may thus be interpret as the disequilibrium error that is the extent to which the relationship deviates from equilibrium (Harris and Sollis, 2003).

3.7.4 Granger causality test

After co-integration, next step is to check the causality among variables. However, Granger (1969) mentioned a definition of causal relation of between variables basis of time series data. In this study used time series data based on past data. causality in term of time series sense that is either $SPHE_t$ causes or does not causes $GSDP_t$. Therefore find out causality as unidirectional or bi-directional. If long run relationship in variable that called co-integrated. This test after will use Granger causality. In this test variable $GSDP_t$ is cause $SPHE_t$, if $GSDP_t$ can be predicate to past value of the $SPHE_t$). In the Granger sense, if the series $GSDP_t$ and $SPHE_t$ integrated at order one and that means long run

relationship exists. i.e., after the co integration then this equation checks the causality. As following equation:-

$$\Delta \ln SPHE_t = \alpha_0 + \sum_{l=1}^K \alpha_1 \Delta \ln SPHE_{t-l} + \sum_{l=1}^K \alpha_2 \Delta \ln GSDP_{t-l} + \varepsilon_t \dots \dots \dots (1)$$

$$\Delta \ln GSDP_t = \beta_0 + \sum_{l=1}^K \beta_1 \Delta \ln SPHE_{t-l} + \sum_{l=1}^K \beta_2 \Delta \ln GSDP_{t-l} + \varepsilon_t \dots \dots \dots (2)$$

In this equation Δ is difference of variable; it means what is change in variable SPHE and GSDP. ε_t and ε_t are white noise error terms which shows uncorrelated., α_0 means coefficient, $t - 1$ means log at 1, but in this study take at log at five. This shows that optimal lag length 1). In this equations (1) shows that: $SPHE_t$ causes $GSDP_t$ only in equation (1) but lag value of $SPHE_t$ in equation may be statistically different from zero. In equation (2) shows that $GSDP_t$ causes $SPHE_t$ only in Equation (2) but lag value of $GSDP_t$ in equation (2) may be statistically different from zero. In equation first and second value of $GSDP_t$ and $SPHE_t$ are not different from zero is respectively. iii) bidirectional causality occurs when both the lagged values of terms $SPHE_t$ and $GSDP_t$ are significantly different from zero using equation 1 and 2 iv) when both $SPHE_t$ and $GSDP_t$ are significantly not different from zero and are independently moving on their paths in the long run without influencing each other. There is no causal relation between these two variables in this case (Asteriou, 2006).

3.7.5 Regression Analysis

To measure the effect of district domestic product on the aggregate level of health development in context of Mahendergarh simple linear regression has been employed. The functional relationship used as

$$Y = \alpha + bX \dots \dots \dots (4)$$

Where α is the constant intercept and b is the coefficients regression. It is taken calculate of change in the value dependent (DDP) variables and X is the health index. And significance of regression has been tested 5% level of significance.

3.7.8 Health Index

Health index measures the health quality which refers to health status. Several indicators such as infant mortality rate, birth rate, death rate, availability of beds and hospitals, no. of PHC, CHC institutions, dispensaries has been used to construct the Health Development Index. Health index prepared all these variables as follow:

$$\text{Health index} = \frac{\text{Actual value} - \text{minimum value}}{\text{Maximum value} - \text{Minimum value}}$$

The value of index would be range from 0 to 1. Zero value indicates the absence of any health development. If value lies between above 0.8 it will considered a highly developed in health status. If value lies in between 0.5 to 0.8 than the district remain as moderately developed and if values lies less than 0.5 the district would be treated as backward in health status.