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HEALTH INFRASTRUCTURE IN HARYANA: AN ANALYSIS

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ABSTRACT

Health is very essential ingredient to economic growth in every economy including Haryana. It refers to the state of complete physical, mental, spiritual and social well-being and not merely an absence of disease and infirmity. The status of health depends on the availability of health infrastructure which in turn is a function of health spending in the economy. Therefore, public expenditure on health infrastructure assumes a greater significance all over the world. And the evidences from both developed and developing countries revealed that public expenditure on health infrastructure leads to the sustained economic growth. Keeping in above backdrop the present study makes an analysis of health infrastructure in the State of Haryana. The study confirms that some health infrastructural facilities have grown considerably while some have experienced negative growth over the years. The study also examines the relationship between health infrastructure and economic growth by applying an econometric approach and reveals that health infrastructure leads to economic growth. Therefore, health infrastructure should be undertaken as basic infrastructural activity and public expenditure on it must be increased every year. To attain the target of equity, efficiency and sufficiency in health services in the State, there is logic and rationale for Public Private Partnerships (PPP) in health sector.

KEYWORDS
GSDP, Haryana, Health Infrastructure, Public expenditure.

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I. INTRODUCTION

Health is very essential ingredient to economic growth in every economy including Haryana. It is one of the crucial components of social infrastructure and is a key to the development of human resources. It refers to a state of complete physical, mental, spiritual and social well-being and not merely an absence of disease and infirmity. Health is fundamental to national progress in any sphere. In terms of resources for economic development nothing can be considered of higher importance than the health of the people. It is a measure of their energy and capacity as well as of the potential of man-hours for productive work in relation to the total number of persons maintained by the nation. For the efficiency of industry and agriculture, the health of the workers is an essential consideration (Government of India: First Five Year Plan, 1951).

Out of eight Millennium Development Goals (MDGs) three viz. reducing child mortality, improving maternal health and combating HIV/AIDS & other diseases are directly health related and their attainment requires equity, efficiency and sufficiency in health infrastructure which in turn depends upon the health spending in the economy. Therefore, public expenditure on health infrastructure assumes a greater significance and is universally recognized as a valuable investment helpful in building and maintaining a productive labor force as well as in improving the lives of the people and quality of the society. There are strong evidences from both developed and developing countries that public expenditure on health infrastructure leads to the sustained economic growth. Over the last four decades, a number of studies found a strong and positive relationship between national income and health care expenditure (Kleiman, 1974; Newhouse, 1977, 1987; Leu, 1986; Parkin et al, 1987; Pritchett and Summers, 1996; Filmer and Pritchett, 1999).

Keeping in above backdrop, the study has been organized as follows: Section II is dedicated on the review of concerned literature. Section III describes the data and methodology and Section IV provides an analysis of health infrastructure & discusses the empirical findings and lastly, Section V concludes the study with policy implications.

II. REVIEW OF LITERATURE

There is a large literature on the issues concerned with health infrastructure which has been discussed by economists, researchers and policy makers in both developed as well as developing countries. To justify the need of the present study, following literature has been reviewed:

Goel and Ahlawat (1993) analyzed growth of health expenditure, existing infrastructure for health, medical staff and patients treated in hospitals and dispensaries in Haryana and emphasized investment in health sector for creating health culture in country. They concluded that better health and medical care services for the rural and poor people can be provided through proper health planning.

Raman Kutty (2000) analyzed the development of healthcare facilities in Kerala state. He observed that health sector spending continued to grow even after 1980 when generally the fiscal deficit in the state budget was growing and government was looking for ways to control expenditure. But growth in the number of beds and institutions in the public sector had slowed down by the mid-1980s. He found that the health sector development in Kerala after the mid-1980s had been dominated by the private sector.

Singh (2004) examined the growth and pattern of public expenditure on health and rural health infrastructure and services in Punjab. The study revealed that expenditure on health sector experienced a deceleration in the growth rate, particularly in 1990s after the introduction of National Economic Policy (NEP)-1991. Since 1991, no expansion of health infrastructure was made by the state government both in rural and urban areas, except the establishment of PHSC only to upgrade secondary health care.

Duraisamy and Mahal (2005) examined the determinants of economic growth and health using panel data of 14 major India states for the period 1970/71-2000/01 and found two-way causation between economic growth and health status. Weil (2007) suggested that health's positive effect on GDP is strongest among poor countries. For rich countries, the existing empirical evidence on whether health capital formation stimulates GDP growth is mixed.

Goel and Garg (2011) examined the causal relationship between public expenditure on health and economic growth in Haryana for the period 1991-92 to 2007-08 by using granger causality test and found the existence of uni-directional causal relation between public expenditure on health and economic growth. And the direction of causality was to be found from economic growth to public expenditure on health but the reverse causality was absent.

The above literature shows that the various studies have been conducted to examine the status and performance of health infrastructure and its link with economic growth. Similarly, the present study is a humble attempt to examine the growth of health infrastructure and the relationship between health infrastructure & economic growth for the State of Haryana.

III. DATA & METHODOLOGY

The present study is exclusively based on secondary data which has been collected from the various issues of Statistical Abstract of Haryana and Haryana Economy published by Government of Haryana. The available data have been processed and presented in suitable tables. The growth of health infrastructure is

judged by Linear Growth Rate (LGR). And LGR is computed through Ordinary Least Square (OLS) technique by fitting a linear function to the available data and linear trend equation is defined as

$Y = b_0 + b_1 t + u_t$ ..... (1)

The values of parameters, b_0 and b_1 in equation (1) are estimated by using Ordinary Least Square (OLS) method. The Linear Rate of Growth (LGR) is computed by using following formula:

$$LGR\ (g\ \%) = \frac{b_1}{Y} \times 100 \quad \text{..... (2)}$$

In order to examine the relationship between health infrastructure and economic growth, public expenditure on health (PHE) is used as a proxy for health infrastructure and gross state domestic product (GSDP) for economic growth. And this relationship can be analyzed through simple linear regression model of the form as follows

$GSDP_t = \alpha_0 + \alpha_1 PHE_t + U_t$ ..... (3)

The above model (3) depicts that current year public expenditure on health influences the current year GSDP and it has no time lag. Since, expenditure on health does not yield immediate return to the economy. Therefore, to identify the time lag, through the explanatory power of the independent variable, viz, public expenditure on the health, we should run regression models with varying time lag. Hence the following distributed lag model is used

$GSDP_t = \alpha_0 + \alpha_1 PHE_{t-k} + U_t$ ..... (4)

Where, k=1, 2, …., 12

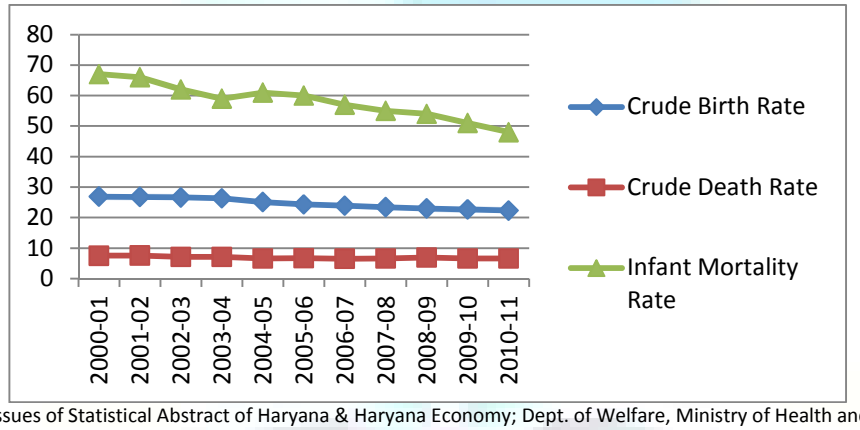
The above model depicts that GSDP of period 't' depends on PHE of period 't-k' where k goes from 1 to 12. In above model GSDP is regressed on each PHE individually through Ordinary Least Square (OLS).

IV. ANALYSIS OF HEALTH INFRASTRUCTURE IN HARYANA

Haryana is geographically a small State which came into existence in 1966 and is one of the significant contributors of national gross domestic product (GDP). Since 1966, State has experienced considerable improvement in social infrastructure including education and health. The State Government is committed to provide quality health care to all its citizens. And its vision is to attain the level of health that will enable every individual to lead a socially and economically productive life.

Due to the sincere efforts of State Government, health facilities are expanding and consequently promoting the health status of people in the State. The life expectancy of male and female has increased to 65.50 and 70.00 years respectively in 2011 while for India as a whole it is 64.6 and 67.7 years for male and female respectively. Birth rate and death rate has improved and stood at 22.3 and 6.6 per thousand respectively in 2010-11 as against 33.34 and 9.21 per thousand respectively in 1966. But these rates for India are estimated to be 21.8 and 7.1 per thousand respectively. Infant mortality rate (IMR) in Haryana is still higher i.e. 48.0 per thousand live births in comparison of India where it is 44.0 per thousand live births. The State has done well in reducing the maternal mortality ratio (MMR) which is 153 per one lakh live births in 2010-11 and for India it is 212 per one lakh live births. Haryana has achieved a Total Fertility Rate (TFR) of 2.3 as against all India average of 2.5 and the State Health Department is taking effective steps to bring it further down to 2.1 to accomplish the goal of population stabilization. In case of effective couple protection rate the State with 41.4 per cent is lagging behind from India with 46.5 per cent 2008. The trends in important health indicators in Haryana is shown in the following figure

FIGURE 1: TRENDS IN MAJOR HEALTH INDICATORS IN HARYANA



Source: Various issues of Statistical Abstract of Haryana & Haryana Economy; Dept. of Welfare, Ministry of Health and Family Welfare

The improvement in health indicators is the result of a remarkable and impressive development that Haryana has made in health infrastructure. In 1968, there were only 785 medical institutions (out of which 656 were rural and 129 were urban) which increased to 3191 (out of which 2899 were rural and 292 were urban) in 2007-08. The total medical staff was only 3312 in 1966 but in 2007-08 it reached to 12978. There were only 8 institutions per one lakh of population in 1968 but in 2007-08, the institutions have increased to 13 per one lakh population. Ayurvedic, unani and homeopathic institutions have increased from 143 in 1966-67 to 517 in 2007-08. Medical personnel in these institutions have also increased from 286 in 1966-67 to 907 in 2007-08.

Such expansion in health facilities could not be possible without State spending. Since 1966 public expenditure on health infrastructure in Haryana has been increasing. It is increased from ₹ 164.49 crores in 1991-92 to ₹ 1812.62 crores in 2007-08. Whereas, development revenue expenditure incurred on health was ₹ 155.92 crores in 1991-92 and rose to ₹ 1078 crores in 2007-08. But its proportion in total development revenue expenditure has declined from 10.39 per cent in 1991-92 to 9.02 per cent in 2007-08. The capital expenditure on health is reached to ₹ 734.28 crores in 2007-08 from ₹ 8.57 crores in 1991-92. And its percentage share in total capital expenditure is also increased from 5.87 per cent in 1991-92 to 19.78 per cent in 2007-08 The linear growth rate (LGR) of important indicators of health infrastructure during 1991-92 to 2007-08 is presented in the following table 1

TABLE 1: LINEAR GROWTH RATE OF HEALTH INFRASTRUCTURE IN HARYANA (IN %)

Indicators↓ / Years→	1991-92 to 2000-01	2001-02 to 2007-08	1991-92 to 2007-08
Hospitals, Dispensaries and Health Centers (HCs)	0.11	1.13	0.40
Medical Staff in Hospitals, Dispensaries and Health Centers (HCs)	0.61	-0.83	0.08
Family Welfare Clinics	0.00	-6.63	-1.58
Medical Institutions/ 1 Lakh Population	-1.83	-1.02	-1.89
Beds/ 1 Lakh Population	-2.20	-4.68	-2.92
Ayurvedic, Unani and Homeopathic Institutions	0.85	1.45	1.23
Medical Staff in Ayurvedic, Unani and Homeopathic Institutions	-1.92	2.82	-0.02
Per Capita Public Expenditure on Health	10.87	5.71	7.56
Development Revenue Expenditure on Health	12.99	9.55	10.04
Capital Expenditure on Health	16.87	24.17	16.30
Public Expenditure on Health	13.82	14.37	11.85

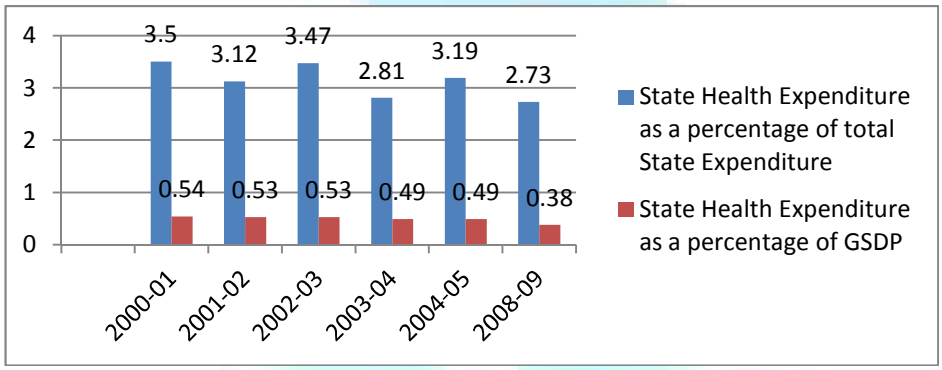
Source: Various issues of Statistical Abstract of Haryana and Author's calculations.

Note: Medical Institutions include Hospitals, Dispensaries and Health Centers

It is cleared form the table 1 that the number of hospitals, dispensaries and health centers have grown over the years. During 2001-02 to 2007-08 their growth rate is found to be more than in comparison of other time periods. The growth rate of medical staff is stood at 0.61 per cent for the period 1991-92 to 2000-01 while it is negative during 2001-02 to 2007-08. Family welfare clinics have not achieved any rise or fall in their number for the period 1991-92 to 2000-01 but have experienced negative growth for other years. The negative growth rates of medical institutions and beds per one lakh population reveals that their numbers have declined over the years in Haryana. Each type of expenditure of State Government on health has grown significantly. Per capita public expenditure as well as development revenue expenditures on health have considerable linear growth rate during 1991-92 to 2000-01. While capital expenditure and public expenditure on health have grown at appreciable LGR i.e. 24.17 per cent and 14.37 per cent respectively during 2001-02 to 2007-08.

The development of health infrastructure depends up to a certain extent on the proportions of the GSDP as well as of total expenditure that a State devotes to its health infrastructure. Haryana's health spending as a proportion of GSDP was just 0.54 per cent in 2000-01 and fell to 0.38 per cent in 2008-09. And a decline is also found in percentage share of State health expenditure in its total expenditure from 3.50 per cent in 2000-01 to 2.73 per cent in 2008-09. Thus, State's health expenditure as a percentage of GSDP as well as of total expenditure seems to be low in comparison of Haryana's overall performance. The trend in health expenditure as a proportion of GSDP as well as total health expenditure for the period 2000-01 to 2008-09 is explored through following figure

FIGURE 2: HEALTH EXPENDITURE AS A PERCENTAGE OF TOTAL EXPENDITURE AND GSDP IN HARYANA



Source: Various issues of RBI Bulletin.

There is ample evidence to throws light on the interdependency between health infrastructure and economic growth. On the one hand, economic growth helps in developing the health infrastructure and thus leads people to live better, longer lives and good health and on the other hand improved health and health care services uplift the economic welfare and growth. To investigate the relationship between health infrastructure and economic growth in Haryana, distributed lag model approach is applied and its results are presented in the following table.

TABLE 2: RESULTS OF LAGGED REGRESSION MODEL

Time Lag (K)	α_0	α_1	SEα_1	t-statistic	R^2	Adj.R^2	R	F-value
1	-5961.29	108.27*	4.27	25.37	0.979	0.977	0.989	643.48
2	-6881.38	124.73*	7.62	16.37	0.954	0.950	0.977	268.00
3	-6043.23	138.80*	11.14	12.46	0.928	0.922	0.963	155.14
4	-2601.92	147.03*	10.28	14.31	0.949	0.944	0.974	204.65
5	-742.07	162.40*	14.36	11.31	0.927	0.920	0.963	127.83
6	2821.02	174.95*	19.60	8.93	0.899	0.887	0.948	79.72
7	8011.04	185.47*	24.06	7.71	0.881	0.867	0.939	59.43
8	14945.57	191.47*	21.61	8.86	0.918	0.906	0.958	78.49
9	20547.13	206.24*	27.94	7.38	0.901	0.884	0.949	54.49
10	25396.57	228.34*	40.58	5.63	0.864	0.836	0.929	31.67
11	36472.49	230.77**	52.39	4.41	0.829	0.786	0.911	19.40
12	43466.29	260.17***	90.42	2.88	0.734	0.645	0.857	8.28

Source: Author's calculations.

Note: *Significant at 1% level of significance; **Significant at 2% level of significance; *** Significant at 10% level of significance

The results of lagged regression model are discussed as follows:

- The results of distributed lag model states that regression coefficient (α_1) is relatively smaller in the initial stages and is increasing with the rising time lag. The regression coefficient is statistically significant which implies PHE is important variable affecting the GSDP, in each time lag. The highest value of t-statistic is 25.37, when k=1.

- Standard error is an indicator of the variance of the parameter. The standard error of parameter (α_1) is relatively low i.e. 4.27 when k = 1. Therefore, the model having lagged one is the best.
- To measure the 'goodness of fit' of the model, R^2 and adjusted R^2 are used. The highest value of R^2 and adjusted R^2 are 0.979 and 0.977 respectively when k =1.This implies PHE is capable of explaining 98 per cent of variations in GSDP.
- Correlation coefficient (R) is around 0.9 in all the time lags. This implies that in each time lag PHE is significantly related with GSDP. Correlation coefficient is highest 0.989 when the time lag is 1 year. Hence, the degree of co-variation between GSDP and the PHE is the highest when the time lag is 1.
- To judge the overall significance of the model, F-statistic is used. F-statistic is found to be significant in each time lag. This implies PHE is significant explanatory variable in each time lag. The F statistic touches the highest value i.e. 643.48 when the time lag is 1.

The results of this model indicate that PHE is positively related to GSDP, when time lag ranges between 1 to 12 years and the relationship between the two is found to be highly significant when time lag is of one year. It can be concluded that there is a significant relationship between past values of PHE and GSDP. Thus the results of this regression suggest that PHE do lead to economic growth. It can also be seen from the study that public expenditure on health requires one year for making its positive impact on GSDP at the highest level for Haryana during the period under investigation. Therefore, the inference can be drawn from the study that health infrastructure promotes economic growth.

V. CONCLUSION AND POLICY IMPLICATIONS

It can be concluded that Haryana has attained much improvement in health facilities since its inception, but it is not adequate according to the need of growing population in the State. It is found in the study that the public expenditure on health infrastructure has grown over the years despite that the growth of some health infrastructural facilities is negative while some have grown at insignificant rate. However, health expenditure of the State as a proportion of total expenditure as well as GSDP is not enough in comparison of State's overall progress. The study also highlights the presence of positive relationship between health infrastructure and economic growth in Haryana. This implies health infrastructure leads to economic growth. Therefore, health infrastructure should be undertaken as basic infrastructural activity. And State health expenditure in total and as a proportion of total expenditure as well as of GSDP must be increased every year.

There is a strong case to enhance the number of medical institutions and beds as well as medical staff in these institutions to follow World Health Organization (WHO) recommendations regarding health care. To bring equity, efficiency and sufficiency in health services, the Public Private Partnerships (PPP) in health sector is need of the hour. The attainment of population stability urgently requires more number of family welfare clinics in the State. To sustain the contribution of health infrastructure in economic growth there is rationale for good governance in health sector so that financial leakages and wastages can be plugged.

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