



# Public Expenditure on Health and Education and its Impacts on Human Development in India: Evidence from Time-Series Analysis (2000-2022)

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**Abstract:** Public expenditure on health and education plays a significant role by enhancing quality of life and improving Human development, so it is considered as a pillar of sustainable development in India. Human Development is the prominent development that captures the indicators including health in terms of life expectancy, education and Per capita Income. This study examines the relationship between Human Development Index (HDI), health expenditure and education expenditure in India during the period of 2000 to 2022. This study is exclusively based on the secondary time series data from the World Bank and United Nations Development Programme (UNDP) and it ensures the reliability and consistency. Statistical techniques including descriptive analysis, Trend Analysis, Ordinary Least Square (OLS) Regression and ANOVA are undertaken to test the association between these variables. The findings reveal that the expenditure on health and education are associated with the enhancement of HDI. Health expenditure shows a more important and pronounced effect through gains in Life expectancy and education expenditure gradually contributes by improving skills and knowledge formation. The study reveals that well-targeted and sustained public investment in education and health is necessary for achieving sustainable development.

**Key words:** Public expenditure (Education and Health Expenditure), Human Development Index (HDI), Inclusive growth, Sustainable development.

## 1. INTRODUCTION

The concept of development shifted from a narrow concept of economic development to a broader concept of human well-being and economic growth. Modern development reflects that not only income expansion ensures the standard of living but also the public expenditure on health and education is needed. Education and health are considered as significant pillars of our economy because they are improving individual capability, productivity, quality of life and standard of living.

Public expenditure plays a crucial role in shaping long-term development outcomes. Education improves knowledge, skills and innovation, thereby enhancing employability and sustainable productivity. Investment in health strengthens the efficiency of the workforce, reduces mortality and enhances the life expectancy rate. India has undergone considerable transformation since the twenty-first century marked a steady growth rate of GDP and substantial sectoral changes. Even though achievements, challenges including difficulty in access to equal education, healthcare infrastructure gaps and variation in regional disparities and social indicators continue to persist.



HDI combines the indicators including health, education and per capita income which lead to improve the framework for attaining human welfare. Therefore the study examines the relationship between the expenditure on health, education and HDI during the time period of 2000 to 2022, with a view to suggest the policy decision on inclusive growth and sustainable development.

## **2. Statement of the problem**

Past two decades India attains the steady growth and structural changes. Persistent challenges including difficult to access quality education, regional disparities, health care infrastructural gaps, and variation in life expectancy increase important question about the government investment in health and education impact on welfare. HDI increases substantially and also reflects the gaps in economic potential and social progress. Without empirical analysis it is difficult to understand whether the public spending enhances the HDI or other structural factors weaken its impacts.

## **3. Review of Literature**

Ilonze, U. P. et.al (2022) Conducted the study in Nigeria to analyse the relationship between the human capital and public expenditure over the period of 1987 -2022 by utilized the secondary data and analysed the endogenous growth, public expenditure theories and human capital. The study found that there was a strong relationship between the human capital and the public expenditure. Education expenditure was increased and enhanced the human capital and in contrast poverty and health expenditure showed the negative effect.

Reddy, S. M., & Narsi Reddy, V. V. (2019) Scrutinized the relationship between the socio economic factors and the human development for the period of 2001-02 to 2015-16. Used a secondary data form World Bank and RBI and they applied a Tobin Regression model to examined the impacts on health, nutrition, sanitation, education and welfare programmes. The finding revealed that the expenditure on theses social economic indicators positively impact on the life expectancy ratio, enrolment and income and thereby overall human development.

Ruzima. M and P. Veerachamy (2021) Examined how government expenditure influenced the human development using time series data from 1990 to 2018. Health investment contributed positively over the long run in contrast education expenditure indicates the adverse association in long run. Both sectors are generally weak or statistically insignificant in the short run. Per capita in GDP appears positively related but statistically not significant.

Brijesh. C and Purohit (2012) Highlights the persistent gap between rural and urban in terms of human development outcomes in India. They examined variations in health and economic development across different states in India used household survey for better understanding of the inequalities. This study identified the socio economic factors which leads to rural urban disparities in both less and advanced states.

Bidani, B., & Ravallion, M. (1997) Explored the relationship between the health, poverty public health expenditure by using cross country analysis of 35 countries. Findings highlighted that the economically disadvantage group experienced poor health as compared to the better off groups.

## **4. Objectives of the study**

- To analyse the association between government Health spending and human development indicator of life expectancy rate.
- To evaluate the influence of education expenditure on the Human Development Index.
- To investigate trend analysis of Health and Educational expenditure during 2000 - 2022 in India
- To recommend policy measures for improving effectiveness in social sector expenditure.

## **5. Methodology**

This study embraces the quantitative analysis design to scrutinize the relationship between the public expenditure on the Health, education and Human Development in India. This study is entirely based on the secondary time series data from the period of 2000 to 2022. Data on Government expenditure on the Health and Education are acquired from the World Bank. Data on HDI are obtained from the UNDP reports. In this study dependent variable is HDI and independent variables are public expenditure on health and education (percentage of GDP). To analyse the



data the trend line analysis was first used and correlation analysis is used to identify the direction and strength of variables. Ordinary Least Square (OLS) regression model was applied to estimate the impact of health and educational expenditure on HDI, and to test the significance level of the regression model the ANOVA test was applied. The regression model:

$$HDI_t = \beta_0 + \beta_1(\text{Edu. Expt}) + \beta_2(\text{Health. Expt}) + \varepsilon_t$$

Where:

$HDI_t$  = HDI in year t

$\text{Edu.Exp}_t$  = Education expenditure (% of GDP)

$\text{Health.Exp}_t$  = Health expenditure (% of GDP)

$\beta_0$  = Intercept term

$\beta_1, \beta_2$  = Coefficients of explanatory variables

$\varepsilon_t$  = Error term

### Hypotheses

Following hypotheses are formulated to analyse the statistical significant relationship between the public expenditure on health, education and HDI.

#### Null hypotheses:

$H_{01}$  There is no statistical significant between the health expenditure and HDI.

$H_{02}$  There is no statistical significant between the Education expenditure and HDI.

#### Alternative hypothesis

$H_{11}$  There is statistical significant between the health expenditure and HDI.

$H_{12}$  There is statistical significant between the Education expenditure and HDI.

### Analysis and Discussion

**Table 1 Public Expenditure on Education, Health and HDI**

| Year | Education Expenditure (Percentage of GDP) | Health Expenditure (Percentage of GDP) | HDI   |
|------|-------------------------------------------|----------------------------------------|-------|
| 2000 | 4.32                                      | 4.11                                   | 0.501 |
| 2001 | 4.26                                      | 4.34                                   | 0.511 |
| 2002 | 3.61                                      | 4.31                                   | 0.516 |
| 2003 | 3.61                                      | 4.08                                   | 0.529 |
| 2004 | 3.35                                      | 4.03                                   | 0.538 |
| 2005 | 3.19                                      | 3.86                                   | 0.547 |
| 2006 | 3.14                                      | 3.76                                   | 0.557 |



|      |       |       |        |
|------|-------|-------|--------|
| 2007 | 3.50  | 3.58  | 0.566  |
| 2008 | 3.50  | 3.59  | 0.574  |
| 2009 | 3.28  | 3.55  | 0.579  |
| 2010 | 3.38  | 3.34  | 0.590  |
| 2011 | 3.80  | 3.25  | 0.603  |
| 2012 | 4.08  | 3.33  | 0.609  |
| 2013 | 3.84  | 3.75  | 0.615  |
| 2014 | 3.90  | 3.62  | 0.625  |
| 2015 | 4.12  | 3.60  | 0.633  |
| 2016 | 4.26  | 3.50  | 0.644  |
| 2017 | 4.31  | 2.94  | 0.649  |
| 2018 | 4.38  | 2.86  | 0.648  |
| 2019 | 3.90  | 2.95  | 0.651  |
| 2020 | 4.04  | 3.34  | 0.652  |
| 2021 | 4.64  | 3.35  | 0.647  |
| 2022 | 4.10  | 3.31  | 0.676  |
| 2023 | 4.25* | 3.32* | 0.685* |

**Source: World Bank, UNDP HDI Report from 2000-2022**

**Note: \* shows the estimated value**

The table 1 represents the trend in public expenditure on health and education and HDI from the time period of 2000 - 2022. The HDI shows the steady improvement of HDI in the study period and there is a minor fluctuation indicates the sustained human development. It increases from 0.501 in 2000 to 0.676 in 2022 reveals that gradual increase in health, education and the income levels. Second the Health expenditure indicates that the gradual downward trend from 4 percent from yearly 2000s to 3 percent in latest certain year and 2020 onwards it was slightly increased. Third education expenditure variation shows the moderate trend it declined in 2000s and slightly increased and stable from 3 to 4 percent in several years and increased after 2015, it reached peak of 4.64 in 2021.

**Table 2 Regression Model**

| Model Summary |                   |          |                   |                            |
|---------------|-------------------|----------|-------------------|----------------------------|
| Model         | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1             | .872 <sup>a</sup> | .760     | .737              | .028245                    |

a. Predictors: (Constant), Health\_Exp, Edu\_Exp

Source: Computed from Table 1

The table 2 indicates that the regression equation gives the strong explanation of the variation in HDI. The R square value is 0.760 which indicates that 0.760 percent of the changes in the variable HDI are explained by the independent variables Public health expenditure and education expenditure. This suggests that public spending on social sector (Health and expenditure) pays an important role in influencing the HDI. The adjusted R square value is 0.737 strengthens the analysis and provides the more refined the explanatory variable and the model retains the substantial explanatory strength. The overall model indicates the strong level of goodness of fit which indicates the health and education expenditure are the important determinant of the HDI



**Table 3 ANOVA**

| ANOVA <sup>a</sup>                             |            |                |    |             |        |                   |
|------------------------------------------------|------------|----------------|----|-------------|--------|-------------------|
| Model                                          |            | Sum of Squares | Df | Mean Square | F      | Sig.              |
| 1                                              | Regression | .053           | 2  | .026        | 33.216 | .000 <sup>b</sup> |
|                                                | Residual   | .017           | 21 | .001        |        |                   |
|                                                | Total      | .070           | 23 |             |        |                   |
| a. Dependent Variable: HDI                     |            |                |    |             |        |                   |
| b. Predictors: (Constant), Health Exp, Edu Exp |            |                |    |             |        |                   |

Source: Computed from the Table 2

ANOVA table 3 represents the overall significance of the regression model. The sum of square of the regression is 0.053 indicates variations in HDI explained by the health and education expenditure. The sum of square of the residuals is 0.017 indicates that unexplained variations and the total variation is 0.070 for the entire study period. The F value is 33.216 and the p value is 0.000 (less than 0.05) shows statistically significant. The null hypotheses independent variable health expenditure and education expenditure have no effect on HDI are rejected.

**Table 4 Coefficients**

| Coefficients <sup>a</sup>  |            |                             |            |                           |        |      |
|----------------------------|------------|-----------------------------|------------|---------------------------|--------|------|
| Model                      |            | Unstandardized Coefficients |            | Standardized Coefficients | t      | Sig. |
|                            |            | B                           | Std. Error | Beta                      |        |      |
| 1                          | (Constant) | .838                        | .091       |                           | 9.186  | .000 |
|                            | Edu Exp    | .032                        | .015       | .250                      | 2.208  | .038 |
|                            | Health Exp | -.103                       | .015       | -.756                     | -6.670 | .000 |
| a. Dependent Variable: HDI |            |                             |            |                           |        |      |

Source: Computed from Table 3

Contribution of Each independent variable is explained by the coefficient table. The constant value 0.838 indicates the estimated level of HDI when both health and educational expenditure are zero is assumed. Health expenditure reveals the negative coefficient is -0.103 and significant is 0.000 indicates statistically strong and the negative sign may indicate the structural trend rather than a direct adverse effect.

## 6. Suggestions

### Progressive allocation to the social sectors

The Government needs to enhance the share of GDP allocation in the education and the health sectors. Substantial and adequate funding is necessary to improve the infrastructure, services, human capital formation and long term development.

### Center of attention of Quality along with Quantity

Increasing expenditure is not adequate. Greater stress need to be placed on enhancing the quality of education and healthcare services. Monitoring teacher training, learning outcomes, health care and primary health services need to be receive key attention.

### Build up strong primary healthcare system

Investment in primary health center especially in rural areas may reduce the regional disparities and ensure easy to access. Protective care and the early intervene program can lead to increase the productivity and life expectancy.

### Advance efficient utilization of funds

Transparency, effective financial management and accountability need to be strengthened and make sure the measurable outcome of produce from the allocated resources

### Turn down the regional inequalities

Special financial support must be spread and equally allocated especially the rural areas and the economically weaker states. Because of that we have increase our Human development indicators lack behind the national income.



### **Incorporated the measurable target with development planning**

Budgetary policies need to be aligned with clear and specific human development components and targets to track more significantly.

### **7. Conclusion :**

This study focused to examine the relationship between the public spending on social sectors including education expenditure and the health expenditure and the HDI from the period 2000 to 2022. The analysis spotlights that health and educational expenditure plays a meaningful role to determine the HDI (HDI). India experienced the steady growth improvement in the HDI which shows the life expectancy rate, educational attainments and overall standard of living reflecting the gradual progress. There is a fluctuation among the independent variable health expenditure and the educational expenditure. The finding indicates that government investment on education leads to increase the human development, and its impact on human is positive and gradually influenced by the implementation of the government. The Health expenditure reveals that the strong association between the HDI and the health expenditure and development outcomes emphasizes the efficient healthcare system, life expectancy and the well being. The overall evidence reveals that the economic growth is alone insufficient to ensure the human welfare and sustainable improvements. Systematic efficient allocation on public resources towards health and education is necessary for promoting inclusive growth and building human capabilities.

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