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Research Article

Expenditure on Public Health in Andhra Pradesh (An Index of Human Resource Development)

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Abstract : It is recognized that health status is related to and determined by numerous factors- Per-capita income, way of life, marital status, housing, sanitation, water supply, infrastructure, social organization, structure of the economy, nutrition, education, health services provided by the government, political and administrative set-up, geography, climate, religious beliefs etc.

However, (1) the per capita income (2) expenditure on public health (3) the number of hospitals and (4) the bed strength per million populations in the hospitals are selected in this study to analyze the health status of the people in Andhra Pradesh. In the light of these objectives the data relating to the health indicators are collected from official source for the period from 1986-87 to 1999-2002.The movements in these health indicators stated are examined by fitting a trend equation Yt= a + bt for each of these three indicators during 1986-2002.

Keywords: Public Expenditure, Public health, per-capita income and infrastructure

Human resource development is directly related to the investment in education, health care, housing etc. “The challenge of development, in the broadest sense, is to improve the quality of life ---- a better quality of life generally calls for higher incomes” It encompasses better education, higher standards of health and nutrition, a cleaner environment etc. Health is an important constituent of well-being and foundation for prosperity and development of a country. It is a state of complete physical, mental and social well being of the individuals in a society. Nowadays, health has been recognized as a right of every citizen in many countries.

The historical experience of several nations revealed that better diets, housing and control of communicable diseases has raised the quality of life everywhere. The age standardized death rate in developed countries declined from 40 per thousand to 5 in the last two centuries. Life expectancy also increased from 50 years to 68 years. This is mainly due to important role played by the disease control measures and improvement in the nutrition levels as a result of rising living standards of population.

India is a signatory of Alma Ata declaration of 1978 which the goal of “Health for all by 2000 AD” i.e., an acceptable level of health for every body. Recently, India has been making impressive strides in this direction. The life expectancy at birth (years) increased from 60.3 during 1991-95 to 61.1 during 1993-97. The infant mortality rate per thousand declined from 72 to70 during the same periods.

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Development of Health status can be viewed only in the national context, but should also be seen in regional dimensions. Status exhibit marked differences in the health indices, availability and access as well as economic indices. Hence, the Ninth plan (1997-02) suggested that, all states may experiment and evolve appropriate mechanisms -- - - - - - - - - and see how the funds could be utilized locally to improve available facilities and quality of the health care provided. In this context, it is attempted in this study to analyze the issue of health status with the existing health care facilities available to the people of Andhra Pradesh state.

Purpose and objectives of the study:

A world health organization study group on "Measurement of levels of Health" pointed out that the comprehensive health indicators are (1) crude birth rate (2) death rate and (3) infant mortality rate.

It is recognized that health status is related to and determined by numerous factors-Per-capita income, way of life, marital status, housing, sanitation, water supply, infrastructure, social organization, structure of the economy, nutrition, education, health services provided by the government, political and administrative set-up, geography, climate, religious beliefs etc.

However, (1) the per capita income (2) expenditure on public health (3) the number of hospitals and (4) the bed strength per million population in the hospitals are selected in this study to analyze the health status of the people in Andhra Pradesh.

Objectives of the study:

The important objectives of this study are:

(1) To examine the trends in the indicators of health status.

(2) To analyze the trends in the determinants of health status and

(3) To estimate the effects of determinants of health on the indicators of health status namely

(a) birth rate (b) death rate and (c) infant mortality rate.

Methodology

In the light of the objectives mentioned above, the data relating to the health indicators are collected from official source for the period from 1986-87 to 1999-2002. The movements in these health indicators stated are examined by fitting a trend equation

$Yt = a + bt$ for each of these three indicators during 1986-2002.

Similarly, the data relating to the determinants of health status are collected from official sources for the period 1983-93 with 1980-81 base and for the period 1983-2002 with 1993-94 base. The movements in these determinants of health status are analyzed by fitting a trend equation mentioned above.

Assuming that the three indictors of health are influenced by the four determinants selected in this study, the selected variables are classified into:

Dependent Variables	**Independent Variables**
(Indicators of health status)	(Determinants of Health status)
1.Birth rate (y_1)	1. Per capital income (X_1)
2.Death rate (y_2)	2. Expenditure on public health (X_2)
3.Infant morality rate (y_3)	3. Number of Hospitals (X_3)
	4. Bed strength (X_4)

In order to estimate the effect of determinants of health status on each of the indicators of health status, a multiple regression of the following form is used:

$$Y = a+b_1 X_1 + b_2 X_2 +b_3 X_3 + b_4 X_4$$

Limitations:
It is acknowledged that separate data relating to the selected variables for rural and urban areas may provide a more clear and detailed understanding of the trends in health status in Andhra Pradesh. Similarly, data relating to the selected variables for longer period may present some more changes in their movement. Further, inclusion of data on the expenditure on medical services by the private sector and facilities extended in the urban areas may also reveal different trends in the health indicators.

Demographic features of Andhra Pradesh
According to 2001 census, with a population of 7.57 crs Andhra Pradesh accounts for 7.54 percent of total population of the country. The annual exponential growth rate of population on Andhra Pradesh during 1991-2001 is 2.01 percent against 2.14 percent for India. The density of population of the state per sq.km is 242 persons.

According to the 2001 census nearly 70.0 percent of the population in the state live in rural areas. The literacy rate is 54.74 percent against 65.38 percent for the country. The percentage of population aged 0-6 years to total population in Andhra Pradesh is 14.99 while the total workers as percentage to total population is 42.80.

The per capita gross state domestic product of Andhra Pradesh increased from 3.7 percent during 1980-81 to3.7 percent during 1996-97.The projected average annual per capita consumption expenditure in Andhra Pradesh in 1996-97 is Rs.4634.40 in rural areas and Rs.7483.20 in urban areas.

Health status in Andhra Pradesh:
The data on the indicators of health status in Andhra Pradesh during 1986-2002 are shown in table 1. During the period under study the birth rate declined significantly by 10.10 percent while the death rate also climbed down from 9.9 to 8.2 percent. Another significant feature of health status is a significant fall (16 births) in the incant mortality rate per 1000 live births. Expansion and extension of health facilities to improve their accessibility and availability yielded positive results.

However, a closer examination of the data reveals that urban-rural variations in the health status are significant. The higher rate of literacy, higher levels of per capita income, larger expenditure on public and private sectors contributed to an improvement in the health status in urban areas. On the other hand, lower rate of literacy, lower per capita income, inadequate network of community and primary health centers and sub-centers for providing health services, inadequate health care infrastructure the indifference of the government to appoint medical officers in rural areas resulted in a relatively lower health status in rural areas of Andhra Pradesh.

Table II presents the data relating to the determinants of health status in Andhra Pradesh during 1986-2000. It is seen that per capita income increased by 6 times while the expenditure on public health increased by more than 4 times during 1986-2000. This shows a positive

relationship between per capita income and expenditure on public health. However it is distressing to know that the number of hospitals remained the same while the bed strength per million population declined significantly during 1986-2000. Hence, one is inclined to conclude that the increase in the health status of Andhra Pradesh is, to a larger extent, due to the expansion and extension of medical facilities in the private sector. Of course, one cannot deny the fact that the literacy programmes, family welfare, women and child welfare programmes contributed for a decline in the birth rate and infant mortality rates in Andhra Pradesh.

Trends in the indicators of health status in Andhra Pradesh:

Table III presents the results obtained from the trend equations fitted to the data on the indicators of health status and determinants of health status in Andhra Pradesh during 1986-2002.

Birth rate (Y_1) declined at a rate of 32.82 percent per annum on an average while the infant mortality (Y_3) went down out an average annual rate of 7.57 percent. This can be attributed to the effective implementation of birth control programmes and women and child care programmes in Andhra Pradesh. A decline in the average annual death rate of 7.39 percent indicates the improvement in the medical and health facilities provided in the state.

The trend relating to the per capita income (X_1) is positive and significant at an annual average rate of Rs. 489.72. This upward movement in the per capita income indicates an improvement in the standard of living of the people in the state. Similarly, the expenditure on public health (X_2) showed an increasing trend at an annual average of Rs.485.32. This hike in the expenditure on public health indicates the commitment and determination of governmental efforts to improve the working expenses to provide medical facilities in the state.

Though the trend relatively to the number of hospitals (X_3) and bed strength (X_4) has been negative, their annual average decline is insignificant. This indicates the governmental inability to meet the (fixed) capital requirements of public health needs. This signals the fact that private sector has been instrumental in promoting the health status in Andhra Pradesh in the wake of liberalisation and Privatisation. These trends imply considerable improvement in health status in Andhra Pradesh 1986-2002.

In order to analyze the influence of the determinants of health status on the indicators of health status, each indicator of health status is regressed separately on all determinants of health status during the periods 1986-93 and 1993-2002 and the results are obtained.

a) Birth Rate (Y_1):

It is observed that increasing per capita income (X_1) and expenditure (X_2) on public health have pulled down the birth rate (Y_1) in Andhra Pradesh during 1986-93. In other words, birth rate varied inversely entire per capita income and expenditure on public health. This favourable trend in the birth rate may be due to an improvement in the standard of living including improved consumption, increased awareness to family planning programmes. Further, better Infrastructural and health services provided by increased expenditure on hospitals also have contributed to the fall in the birth rate. During 1993-2002 the expenditure on public health continued to pull down the birth rate.

(1986-93) $Y_1 = 69.9642 - 0.0001 (X_1) - 0.0018 (X_2) - 0.0104 (X_3)$

(period) (1.7152 (0.0039) (0.0044) (0.0259)

$R^2 = 0.8524$

(1993-02) $Y_1 = 122542 + 0.0001 (X_1) - 0.0005 (X_2) + 0.0064 (X_3)$

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(period) (0.1466) (0.0001) (0.0001) (0.0079)
$R^2 = 0.9928$
(Figures in the parentheses are t values)

b) Death Rate (Y_2)

Per capita income, expenditure on public health and the number of hospitals influenced the death rate negatively and resulted in a fall in the death better consumption. The increased Per capita income enabled the people to take disease Preventive measures. Further, the increasing expenditure on public health ensured better medical and health services to reduce the death rate. The number of hospitals also have contributed to a decline in the during1986-2000.

(1986-93) $Y_2 = -16.7010 - 0.0003 (X_1) + 0.0003 (X_2) - 0.0075 (X_3)$
(period) (0.1670) (0.0004) (0.0004) (0.0025)
$R^2 = 0.9928$
(1993-02) $Y_2 = 54.7170 - 0.0002 (X_1) - 0.0003 (X_2) - 0.0071 (X_3) - 0.0244 (X_4)$
(period) (0.1770) (0.0001) (0.0001) (0.0096) (0.0147)
$R^2 = 0.7515$
(Figures in the Parentheses are t values)

a) Infant Mortality Rate (Y_3)

Infant mortality rate has been influenced by per capita income, expenditure on public health and also buy the other two selected determinants. Apart from the improvements in the economic condition of the people and the expanded on public health, facilities including the number of hospitals and the bed strength per million population has been the important factors that reduced the infant mortality rate marginally in Andhra Pradesh during 1993-2002.

(1986-93) $Y_4 = 74.1790 - 0.0037 (X_1) + 0.0018 (X_2) - 0.0477 (X_3) + 0.2176 (X_4)$
(period) (4.8555) (0.0109) (0.0125) (0.0025) (0.5672)
$R^2 = 7409$
(1993-02) $Y_3 = 74.4870 - 0.0015 (X_1) - 0.0015 (X_2) - 0.0044 (X_3) - 0.0045 (X_4)$
(period) (1.4780) (0.0097) (0.0010) (0.0795) (0.1229)
$R^2 = 0.5972$
(Figures in the Parentheses are t values)

Findings of the Study:

The rapid decline in birth rate indicates the effectiveness of birth control programmes and family welfare efforts made by the Government in the last two decades. The decline in the death rate indicates the improved quality of health facilities that control the deaths from communicable diseases. However, the stagnant of marginally negative infant mortality rate during 1990-2000, particularly in rural areas, is a matter of greater concern that needs to addressed immediately.

In accordance with the growth of State Domestic Product of Andhra Pradesh the per capita income is increasing over a period leading to an increase in the expenditure on public health. However, the growth rates of the number of hospitals constructed and beds provided are not proportionate to the rate of the growth population.

The growth of per capita income of the people reflected in the overall improvement in the standard of living which includes improvement in food consumption, greater awareness for longer life, small family norm, and the availability of social overheads and health services pushed the birth rate downwards.

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The growth rate expenditure on public health and the number of hospitals did not succeed in reducing the birth rate particularly in the rural areas of Andhra Pradesh as their budget allocations are found proportionately inadequate, particularly:

Though per capita income influenced the death rate to decline, the rate of decline was not significant. Perhaps, the present level of per capita income is the minimum required to cause a decline in death rate. Hence, a higher rate of per capita income seems to be necessary to bring down the death rate considerably in future, particularly in the rural areas.

The influence of per capita income and number of hospitals in Andhra Pradesh on the infant mortality rate, though not significant, is debatable. As observed from Table 1 the infant mortality rate is high in rural areas, which implies that the availability of medical services are inadequate and unsatisfactory.

Suggestions

Family welfare programmes and birth control programmes are to be continued on a massive scale to keep the birth rate declining.

Large scale of availability of effective public health facilities in rural areas is important to raise the life expectancy.

Government shall modify its health policy to ensure medical services in rural areas by appointing and insisting the medical officers to work in the primary health centers on a regular basis.

Private corporate sector is to be encouraged to Provide health services, in rural areas at a reasonably subsidized cost.

Health insurance schemes are to be grounded in rural areas by the private sector managed health care units.

The proportion of expenditure on public health and provision of beds on the hospitals need to keep pace with the requirements of the growing population.

Women welfare schemes and nutritional programmes ate to be executed effectively to pull down the infant mortality rate, particularly in rural areas.

In order to promote the health status in Andhra Pradesh all public health Programmes including medical, water supply, sanitation, nutrition, child care, women development, family welfare etc. are to be implemented in the integrated manner.

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TABLE : I

Indicators of Health Status in Andhra Pradesh

Year	Birth Rate			Death Rate			Infant Mortality Rate		
	Rural	Urban	Combined	Rural	Urban	Combined	Rural	Urban	Combined
1986	32.4	28.7	31.6	10.7	7.1	09.9	87	59	82
1987	30.9	28.2	30.3	10.7	7.3	09.9	84	58	79
1988	27.6	26.3	27.4	10.9	7.4	10.2	89	63	83
1989	26.3	24.4	25.9	10.2	6.7	09.5	88	53	81
1990	26.6	25.1	26.3	09.7	6.8	09.1	73	56	70
1991	26.5	24.4	26.0	10.5	6.7	09.7	77	56	73
1992	25.1	22.3	24.5	10.1	6.0	09.2	78	42	71
1993	24.6	23.5	24.3	09.7	5.6	08.6	70	46	64
1994	24.1	22.9	23.8	09.0	6.5	08.3	69	52	65
1995	24.8	22.5	24.2	09.2	5.9	08.4	74	43	67
1996	23.5	20.6	22.8	09.2	5.9	08.4	73	38	65
1997	23.1	20.5	22.5	09.1	5.9	08.3	70	37	63
1998	22.8	20.9	22.4	09.7	6.0	08.8	75	38	66
1999	22.0	20.6	21.7	09.0	5.7	08.2	75	37	66
2000	22.0	20.6	21.7	09.0	5.7	08.2	75	37	66
2001	21.3	20.0	20.9	08.8	5.4	08.1	75	37	66
2002	21.0	21.0	20.6	08.5	5.2	08.0	75	37	66

Source : Government of Andhra Pradesh Economic Survey 2000-2002 pp. 162 & 163

TABLE – II

Determinants of Health Status in Andhra Pradesh

Year	Per Capita income at current prices (Rs)	Expenditure on Public Health (Rs in lakhs)	Number of Hospitals	Bed Strength Per Million. Population
1986-87	02394	03776	1983	502
1987-88	02869	04700	1994	501
1988-89	03584	05570	1910	495
1989-90	04054	05733	1996	492
1990-91	04728	06252	1998	491
1991-92	05556	07483	1915	483
1992-93	05718	08246	1878	465
1993-94	07442	09686	1947	485
1994-95	08763	11235	1951	479
1995-96	10018	10954	1988	466
1996-97	11224	13594	1990	447
1997-98	11683	14102	1987	459
1998-99	13865	14751	1983	451
1999-2000 (R)	14715	16599	1989	456
2000-01 (R)	15358	17842	1995	462
2001-02 (Q)	16251	18295	1997	465

NOTE: Figures of Per Capita income for the years 1987-88 to 1992-93 are at old series (Base: 1980-81) and far the years from 1993-94 to 1999-2002 are at New Series (1993-93 Base years)

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Source: Government of Andhra Pradesh Economic Survey 2000-2002 for col.2
Government of Andhra Pradesh Budget In Brief, For Various Years For col.3
Government of Andhra Pradesh Statistical Abstracts of A.P for Various Years
For col. nos 4 and 6

TABLE – III
Results of Trend Values (1986-2002)

Health Indicators

1. Birth rate (Y_1) = 25.26 – 0.32821 t
2. Death rate (Y_2) = 9.04 – 0.0739 t
3. Infant Mortality rate (Y_3) = 71.07 – 0.7571 t

Determinants of Health Indicators

1. Per Capita income (Y_1) = 7615.57 + 489.7252 t
2. Exp. On Health (Y_2) = 9477.21 + 485.3197 t
3. No of Hospitals (Y_3) = 1964.92 + 6.8846 t
4. Bed Strength (Y_4) = 376.57 – 2.1049 t

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