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An Analysis of Health Status in Tamil Nadu

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Abstract

Health services are an important indicator to understand the healthcare delivery provisions and mechanisms in the State and are subdivided into three categories viz. primary, secondary and tertiary health care systems. Nutritional status is one of the indicators of the overall well being of population and human resources development. Malnutrition is the cumulative effect of factors like poverty, inadequate access to food, illiteracy, large size of families, poor environmental sanitation, lack of basic minimal health care, lack of personal hygiene, lack of easy access to adequate safe drinking water and lack of awareness. In this study eighteen determinants, namely number of Primary Health Centers, population per bed ratio, number of doctors and nurses in primary health centre, population per doctor ratio, female literacy rate, per capita food availability, PHC per million population, per capita income at current prices, public health expenditure, literacy rate, employment in organized sector, provision of drinking water villages covered, couple protection rate, fertility rate, sex ratio, density of population, beds and hospitals are taken as determinants of health status in Tamil Nadu. The study period is 15 years from 2002-03 to 2016-17. The first objective of the present study, namely, to study the levels of health in the study area is based entirely on secondary statistics.

Keywords: *Health, Indicators, Life Expectancy.*

Introduction

Good health is an essential pre-requisite which contributes significantly both to the improvement in labour productivity and human resource development. Considerable achievements have been made in Tamil Nadu in health indicators like life expectancy at birth, infant mortality rate and maternal mortality rate. Among the major States Tamil Nadu ranks 'fourth highest' in terms of life expectancy at birth, 'second lowest' next only to Kerala in terms of infant mortality rate and birth rate, 'third lowest' in terms of maternal mortality rate and 'tenth lowest' in terms of death rate. Small pox, polio and guinea worm have been eradicated. Life Expectancy at Birth indicates the average number of years that a newborn is expected to live if current mortality rates continue to apply.[1] with the improvements in the prevention and control of major childhood infectious diseases, nutritional status, housing condition and modern medical care resulted in an increase in life expectancy in the State.

Health Care Institutions in Tamil Nadu: Health services are an important indicator to understand the healthcare delivery provisions and mechanisms in the State and are subdivided into three categories viz. primary, secondary and tertiary health care systems. The Primary Healthcare System consists of Primary Health Centre (PHCs) and Health Sub-Centre (HSCs). Secondary healthcare system comprises of District Head Quarters Hospitals, Taluk Hospitals, Women and Children Hospitals, Dispensaries, Mobile Medical Units, Police Hospitals and Non-Taluk Hospitals etc., Tertiary healthcare system covers multi-specialty hospitals[2]. In addition to Government efforts, the private sector is also contributing to the provision of Health Care Services. In the absence of data relating to private sector health services, an attempt has been made to assess only the efficacy of Government healthcare system.

Indian System of Medicine: Indian System of Medicine (ISM) encompasses not only Siddha, Ayurveda, Yoga and Naturopathy but also Unani and Homoeopathy systems. The increasing cost of medicine in Modern System and the incidence of toxicity with

associated side effects have once again highlighted the need importance and relevance of traditional system of medicine in the world

Nutrition: Nutritional status is one of the indicators of the overall well being of population and human resources development. Malnutrition is the cumulative effect of factors like poverty, inadequate access to food, illiteracy, large size of families, poor environmental sanitation, lack of basic minimal health care, lack of personal hygiene, lack of easy access to adequate safe drinking water and lack of awareness.[3] The manifestations of malnutrition could be seen in the prevalence of specific nutrient-deficiency disorders such as protein-energy malnutrition, anemia night blindness, goitre, susceptibility to a number of infectious diseases, low birth weight of children, high IMR and MMR, lack of resistance to illnesses among mothers and children, growth retardation (both physical and mental) and stunting among toddlers.

Trends in Indicators of Health: In the present study four health variables, namely, life expectancy at birth, birth rate, death rate and Infant mortality Rate are used for measuring the levels of health status in Tamil Nadu. These health variables are known as health indicators. The health indicators are influenced by many determinants. In this study eighteen determinants, namely number of Primary Health Centers, population per bed ratio, number of doctors and nurses in primary health centre, population per doctor ratio, female literacy rate, per capita food availability, PHC per million population, per capita income at current prices, public health expenditure, literacy rate, employment in organized sector, provision of drinking water villages covered, couple protection rate, fertility rate, sex ratio, density of population, beds and hospitals are taken as determinants of health status in Tamil Nadu. The study period is 15 years from 2002-03 to 2016-17. The first objective of the present study, namely, to study the levels of health in the study area is based entirely on secondary statistics. They are collected from various statistical reports, published by Government of Tamil Nadu, Directorate of Medical and Rural Services, Chennai, Directorate of Public Health and Preventive Medicine, Chennai, Directorate of Family Welfare, Chennai Department of Economics and Statistics, Chennai Joint Directorate of Health and Medical Services, School Health Programme mainly emphasizes on providing comprehensive healthcare services to all students studying in Government and Government aided schools. Under this programme care has been taken to identify heart diseases, eye disorders, nutritional disorders, skin diseases and dental problems.[4] The students those indentified with problems and need of higher medical treatment are referred to higher medical institution.

Objectives of the Study:

1. To analyze the health status in Tamil Nadu.
2. To examine the health care expenditure in Tamil Nadu.

Staement of the Problem: Tamil Nadu has performed well in health sector when compared with other states in India. Tamil Nadu is the leading state in implementing various government health programmes as per the observations made by UNICF AND WHO. The studies on health status in Tamil Nadu show the rosy picture of the health status in the state are based on aggregates and they conceal rather than reveal the inequalities that exist in the health conditions in the state.

Tools of Analysis:

- Simple Regression Model
- Method of Least Squares
- Multiple Regression Model

Indicators of Heath in Tamil Nadu: Table 1 reveals various data related to life expectancy, birth rate, death rate and infant mortality rate in Tamil Nadu for the period from 2002-03 to 2016-17.

Table 1: Indicators of Health in Tamil Nadu for the Period from 2002-03 to 2016-17

Year	Life Expectancy	Birth Rate	Death Rate	IMR
2002-03	64.09	20.3	8.0	54
2003-04	64.10	19.5	8.0	53
2004-05	64.14	19.0	8.0	53
2005-06	64.29	19.2	8.5	53
2006-07	65.31	19.3	8.0	52
2007-08	65.41	19.3	7.9	51
2008-09	65.09	19.1	7.6	49
2009-10	65.11	18.5	7.7	44
2010-11	65.15	18.3	7.6	43
2011-12	66.22	17.1	7.5	41
2012-13	67.11	16.5	7.4	37
2013-14	67.21	16.2	7.5	37
2014-15	67.31	15.8	7.2	35
2015-16	67.75	16.0	7.4	31
2016-17	67.98	16.3	7.6	28

Source: Directorate of Medical and Rural Services, Chennai.

Table 2: The Results of Trends in the Indicators of Health in Tamil Nadu for the Period from 2002-03 to 2016-17

Sl. No.	Health Indicators	Coefficients		R^2
		a	b	
1.	Life Expectancy at birth	63.3587	0.661* (11.948)	0.917
2.	Birth rate	20.6152	-0.3235* (-10.269)	0.890
3.	Death rate	8.2123	-0.0607* (-4.998)	0.657
4.	Infant Mortality Rate	66.7430	-1.1034* (-4.257)*	0.582

Source: Computed from secondary data.

From Table 2 the trend and the annual rate of change of four health indicators have been observed. Life expectancy at birth has registered an increasing trend and its annual rate of changes is, 0.661. The birth rate, death rate and infant mortality rate have shown a declining trend, with the annual rate of changes being-0.3235,-0.0607 and-1.1034 respectively. All these rates are significant statistically.

Table 3: Health Determinants in Tamil Nadu for the Period from 2002-03 to 2016-17

Year	Number of PHCs + HSCs	Population per Bed ratio	Number of Doctors + Nurses	Population per Doctor Ratio	Female Literacy Rate	Per capita food availability (in Kgs)
2002-03	10106	1926	22262	20511	55.41	143.00
2003-04	10102	1954	23354	20698	56.77	167.20
2004-05	10099	1977	22416	20784	58.12	107.40
2005-06	10090	1995	22470	20853	59.48	114.90
2006-07	10091	2031	22504	20978	60.84	133.00
2007-08	10096	2015	22608	21010	62.20	126.50
2008-09	10099	2017	22664	21018	63.36	135.00
2009-10	10100	2018	22700	21025	64.55	146.60
2010-11	10103	2019	22761	21034	65.31	147.21
2011-12	10106	2021	22799	21045	67.91	149.24
2012-13	10109	2023	22816	21051	68.21	150.15
2013-14	10110	2025	22861	21063	68.31	151.21
2014-15	10113	2027	22893	21065	68.43	152.14
2015-16	10115	2079	22909	21068	68.54	152.31
2016-17	10117	2030	22968	21069	68.91	152.43

Source: 'Tamil Nadu–An Economic Appraisal'

Table 4: Results of Trends in Health Determinants in Tamil Nadu State for the Period from 2002-03 to 2016-17

Sl. No	Determinants of Health	Coefficients		R^2
		a	b	
1.	PHCs and HSCs (X_1)	10092.79	1.3678* (4.051)	0.558
2.	Population per bed ratio (X_2)	1957.95	6.5642* (5.086)	0.666
3.	Doctors and Nurses (X_3)	22514.16	27.2714* (1.859)	0.210
4.	Population per doctor ratio(X_4)	20703.58	30.986* (5.412)*	0.693
5.	Female literacy rate (X_5)	55.543	1.026* (15.192)	0.947

Sl. No	Determinants of Health	Coefficients		R^2
		a	b	
6.	Per capita food availability (X_6)	128.893	1.624 (1.862)	0.210
7.	PHC per million population (X_7)	0.040	0.0047* (15.958)	0.951
8.	Per capita income (X_8)	10033.58	698.16* (5.768)	0.719
9.	Public Health expenditure (X_9)	23581.867	2712.008* (7.983)	0.830
10.	Literacy rate (X_{10})	64.972	1.005* (37.601)	0.991
11.	Employment in organized Sector (X_{11})	-39012.68	7814.92 (1.740)	0.1889
12.	Provision of drinking water–Villages Covered (X_{12})	8258.590	829.167* (19.027)	0.9653
13.	Couple protection rate (X_{13})	50.03009	1.0298* (31.394)	0.9869
14.	Fertility rate (X_{14})	2.20381	-0.0371* (-8.925)	0.8596
15.	Sex rate (X_{15})	978.971	1.053* (13.939)	0.9372
16.	Density of population (X_{16})	451.780	2.4357* (7.443)*	0.8099
17.	Beds (X_{17})	30155.304	62.903* (6.1427)	0.7437
18.	Hospitals (X_{18})	307.628	1.0714* (7.368)*	0.8068

Source: Computed from secondary data.

Determinants of Health in Tamil Nadu: From the Table 4 it has been revealed that in terms of determinants in Tamil Nadu, all the determinants were significant except one determinant namely per capita food availability which has not recorded any significant trend. All others have shown significant and positive trends except PHC per million populations and the fertility rate which are favorable to improve the health status. Among the 18 selected determinants, 15 determinants have significant and positive trends. Per capita income at current prices, public health expenditure, and provision of drinking water villages covered, have shown the highest growth rate; whereas female literacy rate, literacy rate, couple protection rate, sex ratio and number of hospitals have shown the lowest growth rate. The growth rate of other determinants was moderate during the study period in the state. The favorable and unfavorable monsoons during the study period resulted in fluctuations in food production and output. This was the reason for insignificant and negative trend in per capita food availability in the state. Secondly, PHC per million populations was statistically significant and its growth was marginally negative. Thirdly the fertility rate had also negative trend which exhibited the awareness of people in small family norms. Per capita income at current prices in the state had increased from Rs.7352 to Rs.18314 that is, a two fold increase during the study period.[5]

Determinants of Health Status: In this section, an attempt has been made to analyze the influence of the determinants on the health indicators, in the study area from 2002-03 to 2016-17, using secondary data collected for Tamil Nadu State. Four important health indicators are selected to evaluate the health status. They are (i) life expectancy at birth, (ii) birth rate, (iii) death rate and (iv) infant mortality rate. Secondary data were collected for the selected 18 health determinants. Several

combinations of determinants were tried, taking into consideration, the interrelation among the determinants and suitable models were arrived at. Hence out of 18 determinants, only 10 health determinants are used for the purpose of analysis.

To analyze the influence of first six determinants on health status namely life expectancy and birth rate in the study area, a multiple regression model of the following formula has been used.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + U$$

It is estimated by the method of least squares separately for Tamil Nadu. The study period is about 15 years from 2002-03 to 2016-17. The computed results are in the Table 4 for life expectancy.

Table 5: Results of Multiple Regression Analysis for Tamil Nadu Life Expectancy at Birth

Variables	Parameter Estimates Tamil Nadu
Intercept	0.781
X_1	-2.941* (-3.110)
X_2	0.048 (0.101)
X_3	1.214 (1.018)
X_4	0.162 (0.311)
X_5	0.241 (1.041)
X_6	-5.271 (-0.816)
R_2	0.939
No. of observations	15

Source: Computed from secondary data.

From Table-5 it has been inferred that the number of PHCs and HSCs was significant and influencing the life expectancy at birth at state level. The number of PHCs and HSCs, the number of doctors and nurses, and per capita food availability were significant with marked influence on the life expectancy at birth at District level.

Conclusion

There is much that other states can learn from Tamil Nadu's public health system. Tamil Nadu's system is replicable in other states because its administrative foundations are similar to those of most other states.[6] As in other states, Tamil Nadu's health department is headed by an IAS officer and staffed at state and district levels by medical officers. While the general problems affecting a state bureaucracy do affect Tamil Nadu's health department, the very existence of a specialized cadre with a clear, focused mandate, means that it is much better placed to protect public health than a more generalized and many of the health targets are still remained unachieved.

Ethical Clearance: Completed

Source of Funding: Self

Conflict of Interest: Nil

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