AN ANALYSIS OF HEALTH STATUS AND HEALTH EXPENDITURE OF THE UNION TERRITORIES IN INDIA

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Abstract : *The current study is an attempt to analyse the health status and health expenditure of the Union Territories in India. Secondary data is collected on the health status and health expenditure of all Union Territories from different government reports and analysed based on descriptive analytical technique. Also, to analyse the relation between health status and health expenditure, a multiple regression model is used. The dependent variable in the model is considered as Infant Mortality rate to represent health status and the independent variable are health expenditure, primary health centre and community health centre for the year 2014. The result of the study shows that there are shortages in manpower in different positions in the Union Territories. The result of the regression shows that coefficient of health expenditure at a value of 1.085 shows that one unit increase in health expenditure causes a decline in Infant mortality rate by 1.085, one unit increase in the primary health centre with lead to reduction in IMR by 0.092 and value of 1.133 shows that one unit increase in sub centre reduces the Infant mortality rate by 1.133. From the results it is clear that increase in public expenditure, number of primary health centre, community health centre will improve the health status..*

Index Terms **– Health status, health expenditure, Union Territories.**

I. INTRODUCTION

Improving health sector in an economy is very crucial for the economic and social development of the country in question. Healthy workforce means efficient human capital and hence rises individual's productivity. This would automatically enhance a country's economic growth. To have economic development and social development a country for example can invest in huge amount in improving infrastructure, roads, railways etc. but most important aspect of developing infrastructure of the country lies on the manpower and human capital. So, investment should be made first in improving health status of human resource so that the workforce shall be engaged in developing other sectors of the economy. Good health would reduce days of absence of worker's; improve their capacity, ability to work and most importantly, their economic productivity. According to Lopez-Casanovas et al (2005) good health helps to forge improved levels of education by increasing levels of schooling and scholastic performance.

Health service delivery in India is characterized by a three-tier system. At the lowest level are ***the sub centers***, only paramedical staff is available in these sub centers. Then, the ***primary health centre*** infrastructure provides the first level of contact between the population and health care providers. Realizing its importance in the delivery of health services, the centre, states and several government agencies simultaneously started creating primary health care infrastructure and manpower. All Primary Health Centre (PHCs) provide outpatient services; a majority has four to six in-patient beds. According to the norms they have one medical officer, 14 Para-medical and other supporting staff. At the national level there are more than an adequate number of PHCs and doctors posted at PHCs but the distribution across states is uneven; there are no functional PHCs in many remote areas in dire need of health care. Lastly, ***Community Health Centre (CHC)*** is the first referral unit (FRU) for four PHCs offering specialist care. According to the norms each CHC should have at least 30 beds, one operation theatre, X-ray machine, labour room and laboratory facilities and is to be staffed at least by four specialists i.e. a surgeon, a physician, a gynaecologist and a pediatrician supported by 21 paramedical and other staff. The sub divisional hospitals and district level hospitals constitute the higher tiers. In principle, the sub centres, primary health centres, and community health centres are required to handle the preventative aspects of health care, institutionalize deliveries, treat minor diseases, and act as referral centres. The subdivision and district level hospitals would then treat major ailments as referral hospitals. However, in practice this has not been the case, as the sub-division and district-level hospitals deal with all aspects of health care (Rao et al working paper 2012).

II. OBECTIVE OF THE STUDY

i) To examine the current health status at Union Territories in India.

ii) To analyse the trends and patterns of public health care expenditure at Union Territory level.

III. DATA AND METHODOLOGY

The current study is based on the secondary data collected on health status and health expenditure in all the Union Territories. The health status indicated by the birth rate, death rate, natural growth rate and infant mortality rate for the year 2014. Also, number of primary heath centre, sub centre and community health centre from Sixth five-year plan to twelfth five-year plan, Shortfall in health male workers, ANM's, specialist doctors in primary health centre and sub centre are analysed using descriptive statistical technique. Health expenditure is indicated by public health expenditure, expenditure on Medical and Public health from year 2010-11 to 2013-14. Further, multiple regression model is framed to analyse the relation between the health status and health expenditure, the dependent variable taken as Infant mortality rate and three independent variables are health expenditure, primary health centre and community health centre.

3.1 Health Status in Union Territories

The health status in the Union Territories has been shown using secondary data from different government reports and are depicted in tables.

Table 3.1: Estimated Birth Rate, Death Rate, Natural Growth Rate And Infant Mortality Rate, 2014

UNION TERRITORES	BIRTH RATE			DEATH RATE			NATURAL GROWTH RATE			INFANT MORTALITY RATE		
	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban	Total	Rural	Urban
Andaman & Nicobar Islands	14.7	14.9	14.5	4.6	5.2	3.8	10.1	9.6	10.7	22	26	14
Chandigarh	14.3	19.9	14.2	4	3.6	4	10.3	16.3	10.2	23	20	23
Dadra & Nagar Haveli	25.6	21.4	29.4	4.2	4.7	3.7	21.4	16.7	25.7	26	32	15
Daman & Diu	17.3	17.4	17.3	4.6	4.7	4.6	12.7	12.7	12.7	18	15	20
Delhi	16.8	18.1	16.7	3.8	4.4	3.8	12.9	13.8	12.9	20	31	20
Lakshadweep	14	17.6	12	6.1	7	5.9	7.9	10.6	7.1	20	23	17
Puducherry	14.6	15.2	14.3	6.6	7.9	6	8	7.3	8.3	14	18	12

Source: Sample Registration System Bulletin, 2014

Table 3.1 shows the estimated birth rate, death rate, natural growth rate and infant mortality rate for the year 2012 to 2014 (SRS considers three years of data for the Union Territories.). From the table, it can be understood that Dadra & Nagar Haveli has the highest birth rate at 25.6 in total and 29.4 in urban compared to all other UT's whereas Lakshadweep stands at least with 14 in total and 12 in Urban area. Other than that Andaman and Nicobar Islands, Chandigarh and Puducherry stands at 14.7, 14.3 and 14.6 in total.

In terms of Death rate, Puducherry and Lakshadweep stands highest at 7.9 and 7 in urban whereas in Andaman and Nicobar the death rate is more in rural area at 5.2. Again, Dadra and Nagar Haveli shows highest natural growth rate at 21.4 and Puducherry has the lowest at 8. Infant mortality rate is highest in Dadra and Nagar Haveli at 24 followed by Chandigarh and Andaman and Nicobar Islands at 23 and 22.

Table 3.2: Death Rate by Sex and Residence, 2014

Union Territories	TOTAL			RURAL			URBAN		
	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
Andaman & Nicobar Islands	4.6	5.1	4.2	5.2	5.9	4.5	3.8	4	3.6
Chandigarh	4.0	4.7	3.2	3.6	4.5	2.3	4	4.7	3.2
Dadra & Nagar Haveli	4.2	4.2	4.2	3.7	5.2	4.1	3.7	3.3	4.1

Table 3.3: UT-wise Number of Primary Health Centre

S. No.	UT	Sixth Plan [1981-85]	Seventh Plan [1985-90]	Eighth Plan [1992-97]	Ninth Plan [1997-2002]	Tenth Plan [2002-2007]	Eleventh Plan [2007-2012]	Twelfth Plan (as on March 2015) [2012-2017]
1	A& N Islands	6	14	17	18	20	22	22
2	Chandigarh	0	0	0	0	0	0	0
3	D & N Haveli	3	5	6	6	6	6	7
4	Daman & Diu	2	2	3	3	3	3	3
5	Delhi	8	8	8	8	8	5	5
6	Lakshadweep	4	4	4	4	4	4	4
7	Puducherry	**14**	**22**	**39**	**39**	**39**	**24**	**24**
	All India Total	**9,115**	**18,671**	**22,149**	**22,875**	**22,370**	**24049**	**25308**

Daman & Diu	4.6	4.6	4.6	4.7	4.8	4.7	4.6	4.6	4.6
Delhi	3.8	4.3	3.4	4.4	4.8	3.8	3.8	4.2	3.4
Lakshadweep	6.1	6.2	6	7	6.4	7.6	5.9	6.1	5.6
Puducherry	6.6	7.2	6	7.9	9.2	6.7	6	6.4	5.7

Source: Sample Registration System Bulletin, 2014

Table 3.2 above represents the death rate by sex and residence of the Union Territories for the year 2012 to 2014 (SRS takes into account three years of data for the Union Territories). The table shows that among the union territories, Puducherry has the highest death rate of Male at 7.2 in total and 9.2 in rural followed by Lakshadweep where the death rate of Female is highest in rural area at 7.6. Andaman and Nicobar Islands and Damn and Diu follows next where the death rate of male population is more than the female I rural areas at 5.9 and 5.2.

Source: Rural Health Statistics 2014-15

Table 3.3 shows the number of PHC in the union territories, where there are no Primary health centre at Chandigarh and Puducherry has highest number of PHC at 14, 22,29,33,24 from Sixth till Eleventh plan.

Table 3.4: UT-Wise Number of Subcentre

S. No.	UT	Sixth Plan [1981-85]	Seventh Plan [1985-90]	Eighth Plan [1992-97]	Ninth Plan [1997-2002]	Tenth Plan [2002-2007]	Eleventh Plan [2007-2012]	Twelfth Plan (as on March 2015) [2012-2017]
1	A& N Islands	32	84	96	100	108	119	122
2	Chandigarh	12	12	12	13	12	16	16
3	D & N Haveli	19	34	34	36	38	50	56
4	Daman & Diu	14	14	21	21	21	26	26
5	Delhi	42	42	42	42	41	41	27
6	Lakshadweep	14	14	14	14	14	14	14
7	Puducherry	73	73	80	80	77	51	54
	Total	**84376**	**130165**	**136258**	**137311**	**145272**	**148366**	**153655**

Source: Rural Health Statistics 2014-15

Above table 3.4 depicts the UT-wise number of sub Centres. Among the UT, again Puducherry has sub centre with 73 during Sixth plan, 80 during Eighth, which reduced to 54 during twelfth plan. Whereas, Lakshadweep has 14 throughout the sixth plan till twelfth plan and Andaman and Nicobar Islands has shown increasing trend in the number of sub centre from 32 in the sixth plan till 122 in the twelfth plan.

Table 3.5: UT-Wise Number of Community Health Centre

S. No.	UT	Sixth Plan [1981-85]	Seventh Plan [1985-90]	Eighth Plan [1992-97]	Ninth Plan [1997-2002]	Tenth Plan [2002-2007]	Eleventh Plan [2007-2012]	Twelfth Plan (as on March 2015) [2012-2017]
1	A& N Islands	0	3	4	4	4	4	4
2	Chandigarh	1	1	1	1	2	2	2
3	D & N Haveli	0	0	0	1	1	1	1
4	Daman & Diu	0	0	1	1	1	2	2
5	Delhi	0	0	0	0	0	0	0
6	Lakshadweep	1	1	3	3	3	3	3
7	Puducherry	1	3	4	4	4	4	3
	Total	**761**	**1910**	**2633**	**3054**	**4045**	**4833**	**5396**

Source: Rural Health Statistics 2014-15

Table 3.5 represents the Community health centre for all the Union Territories from Sixth five year plan till Twelfth five year plan. From the table it can be seen that there has not been much increase in the number of community health centre over the five year plans. For all the Union Territories it is 2, 3 or 4 numbers of CHC.

Below table 3.6 represent the number of health assistant (male) at PHCs and Sub centre in Union Territories. Percentage shortfall at all India level than it was required was 61.3percentage and 63.8 percentage at PHCs and Sub Centre as on 31st March 2015. Puducherry shows 41.6percentage surplus in the number of health assistant (male) than it was required whereas Chandigarh shows no requirement of the same and other Union Territories shows 100 percentage shortfall in the number of health assistant (male) in position. At Sub Centres, Lakshadweep has fulfilled its requirement whereas Andaman and Nicobar shows 63.1percentage shortfall, Chandigarh at 87.5percentage, Dadra and Nagar Haveli at 83.9percentage, Daman and Diu shows 15.4percentage shortfall, Delhi and Puducherry shows 100percentage shortfall than it was required.

Table 3.6 : UT- Wise Shortfall in Health Assistant [Male] at PHCs And Sub Centre

S. No.	State/UT	Health Assistant (Male) at PHCs (As on 31st March, 2015)					Health Assistant (Male) at Sub Centre (As on 31st March, 2015)				
		Required [R]	Sanctioned [S]	In Position [P]	Vacant [S-P]	Shortfall [R-P]	Required [R]	Sanctioned [S]	In Position [P]	Vacant [S-P]	Shortfall [R-P]
1	A& N Islands	22	0	0	0	22	122	45	45	0	77
2	Chandigarh	0	0	0	0	0	16	16	2	14	14
3	D & N Haveli	7	0	0	0	7	56	9	9	0	47
4	Daman & Diu	3	2	2	0	1	26	24	22	2	4
5	Delhi	5	0	0	0	5	27	0	0	0	27
6	Lakshadweep	4	0	0	0	4	14	14	14	0	0
7	Puducherry	24	34	34	0	*	54	0	0	0	54

	All India	**25308**	**23505**	**12646**	**11019**	**15513**	**153655**	**93002**	**55657**	**37888**	**98027**

Source: Rural Health Statistics, 2014-15

TABLE 3.7: Number of Subcenters without ANMs or/and Health Workers [M]

S. No.	UT	(As on 31st March, 2015)			
		Sub Centers Functioning	Without HW[F]/ANMs	Without HW [M]	Without Both
1	A& N Islands	122	3	74	0
2	Chandigarh	16	0	14	0
3	D & N Haveli	56	0	47	0
4	Daman & Diu	26	0	3	0
5	Delhi	27	0	27	0
6	Lakshadweep	14	0	0	0
7	Puducherry	54	0	54	0
	All India	**153655**	**8138**	**71433**	**5053**

Source: Rural Health Statistics 2014-15

The above table 3.7 shows that 5.3percentage of the Sub Centres were without a Female Health Worker / ANM and 46.5percentage Sub Centres were without a Male Health Worker. 3.3percentage Sub Centres were without both Female Health Worker / ANM as well as Male Health Worker at all India level. Among the Union Territories, Andaman and Nicobar Islands shows 2.5 percentage of Sub Centres without female health workers (ANMs) and 60.7percentage without Male health workers. Whereas, Delhi and Puducherry shows 100percentage without male health worker, Chandigarh, Dadra and Nagar Haveli and Daman and Diu shows 8.5percentage, 83.9percentage, and 11.5percentage Sub Centre without male health workers as on March 31st 2015.

Table 3.8: UT-Wise Total Specialists at CHCs

S. No.	State/UT	[Surgeons, OB&GY, Physicians & Pediatricians]					[Surgeons, OB&GY, Physicians & Pediatricians]				
		Required	Sanctioned	In Position	Vacant	Shortfall	Required	Sanctioned	In Position	Vacant	Shortfall
		[R]	[S]	[P]	[S-P]	[R-P]	[R]	[	[P]	[S-P]	[R-P]
1	A& N Islands	16	12	0	12	16	16	9	0	9	16
2	Chandigarh	4	4	4	0	0	8	11	27	*	*
3	D & N Haveli	4	2	2	0	2	4	0	2	*	2
4	Daman & Diu	4	0	0	0	4	8	2	1	1	7
5	Delhi	0	0	0	0	0	0	0	0	0	0
6	Lakshadweep	12	0	0	0	12	12	0	0	0	12
7	Puducherry	16	4	6	*	10	12	2	3	*	9
	All India	**13384**	**7582**	**3550**	**3538**	**6110**	**21584**	**11661**	**4078**	**7881**	**17525**

Source: Rural Health Statistics 2014-15

The above table 3.8 represents the number surgeons, obstetricians & gynaecologists, physicians and paediatricians all together in the Union Territories for the year 2005 and 2015. Out of the total requirement at all India level percentage shortage in the specialist at CHCs was 45.7percentage and 81.2percentage during year 2005 and 2015. Among the Union Territories, Andaman and Nicobar Islands, Daman and Diu and Lakshadweep shows 100percentage shortage in the number of specialist as per the requirement whereas, Puducherry shows 62.5percentage and 75percentage shortage in year 2005 and 2015 and Dadra and Nagar Haveli faced 50percentage shortage in both the time period.

3.2 Health Expenditure at Union Territories Level in India

In this section the health expenditure at union territories level is discussed. Also, public health expenditure on medical, public health and family welfare are discussed below.

TABLE 3.9: Public Expenditure in Health by Union Territories

Union Territories	2009-10 (Actual)	2010-11 (Actual)	2011-12 (Actual)	2012-13 (Actual)	2013-14 (Actual)	2014-15 (RE)	2015-16 (BE)
A & N Islands	0.29	0.24	0.25	0.27	0.25	0.19	0.21
Chandigarh	0.39	0.38	0.30	0.31	0.32	0.26	0.31
Dadra & Nagar Haveli	0.06	0.05	0.06	0.08	0.08	0.08	0.07
Daman & Diu	0.04	0.04	0.05	0.06	0.05	0.04	0.05
Delhi	4.31	4.39	4.21	3.75	3.84	3.63	3.66
Lakshadweep	0.06	0.05	0.06	0.06	0.06	0.04	0.05
Puducherry	0.60	0.54	0.54	0.41	0.45	0.38	0.45
All India	**5.74**	**5.69**	**5.48**	**4.94**	**5.05**	**4.63**	**4.79**

Source: Ministry of Health and Family Welfare 2013-2014 2015-2016

Table 3.9 depicts public expenditure on health by Union Territories. Among the Daman & Diu had the lowest public health expenditure at 0.04 in 2009-10 followed by Lakshadweep at 0.06. Overall the public health expenditure shows unequal distribution by states and union territories which is a matter of concern.

Source: Ministry of Health and Family Welfare 2013-2014 2015-2016

Table 3.10: Public Health Expenditure on Medical and Public Health and Family Welfare

Union Territories	2010-11 (Actual)					2011-12 (Actual)				
	Revenue		Capital		Total (Revenue & Capital)	Revenue		Capital		Total (Revenue & Capital)
	Medical & Public Health	Family Welfare	Medical & Public Health	Family Welfare		Medical & Public Health	Family Welfare	Medical & Public Health	Family Welfare	
Andaman & Nicobar	0.26	0	0.38	0	0.24	0.30	-	0.25	-	0.26
Chandigarh	0.42	0	0.68	0	0.39	0.34	-	0.39	-	0.30
Dadra & Nagar	0.06	0	0.09	0	0.05	0.05	-	0.31	-	0.07
Daman & Diu	0.04	0	0.16	0	0.04	0.04	-	0.27	-	0.06
Delhi	5.30	0.56	4.02	0	4.58	5.17	0.40	3.35	-	4.40
Lakshadweep	0.05	0	0.16	0	0.05	0.05	-	0.20	-	0.06
Puducherry	0.68	0.08	0.23	0	0.56	0.65	0.08	0.47	-	0.51
Total	**6.80**	**0.64**	**4.41**	**0**	**5.20**	**5.87**	**0.48**	**4.02**	**0**	**4.97**

CONTD.. Table 3.10: Public Health Expenditure on Medical and Public Health and Family Welfare (in000)

Union Territories	2012-13 (Actual)					2013-14 (Actual)				
	Revenue		Capital		Total (Revenue & Capital)	Revenue		Capital		Total (Revenue & Capital)
	Medical & Public Health	Family Welfare	Medical & Public Health	Family Welfare		Medical & Public Health	Family Welfare	Medical & Public Health	Family Welfare	
Andaman & Nicobar	0.31	-	0.36	-	0.27	0.30	-	0.18	-	0.25
Chandigarh	0.34	-	0.56	-	0.31	0.35	-	0.39	-	0.31
Dadra & Nagar	0.07	-	0.30	-	0.08	0.08	-	0.23	-	0.08
Daman & Diu	0.05	-	0.26	-	0.06	0.06	-	0.10	-	0.05
Delhi	4.53	0.84	3.68	-	3.94	4.29	0.63	4.50	-	3.82
Lakshadweep	0.07	-	0.08	-	0.06	0.06	-	0.08	-	0.06
Puducherry	0.54	0.07	0.08	-	0.42	0.58	0.07	0.13	-	0.44
Total	**5.90**	**0.91**	**5.32**	**0**	**5.14**	**5.72**	**0.70**	**5.60**	**0**	**5.01**

From the above table 3.10 the public health expenditure on medical and medical welfare at revenue and capital has been depicted. It can be seen from the table that public health expenditure has been low among all the Union territories except for Delhi. But expenditure on family welfare are not allocated for the union territories. However, the public health expenditure for all the union territories have similar trend which accounts low in comparison to the 14 major states.

IV. RESULTS AND DISCUSSION

4.1 Interlinkage between Health Status and Health Expenditure

To analyse the health status and health expenditure at Union Territory level, a multiple regression model is used. The dependent variable considered in this model in Infant mortality rate and the independent variables are health expenditure, primary health centre and community health centre for the base year 2014.

The multiple regression model considered in the study is:

$$Y=B_0 + B_1X_1 + B_2X_2 + B_3X_3 + e$$

Where,

Y= Dependent variable, Infant mortality rate

B_0 = Constant or intercept in the model

B_1 B_2 and B_3 = Slope of coefficients

X_1 = Health expenditure

X_2 = Primary Health centre

X_3 = Community Health Centre

e = Residuals

Infant mortality rate is an indicator of health status which is influenced by many factors. The influence of factors like health expenditure, primary health centre and community health centre are considered in this model. From the results, it is clear that the model is a good fit at 95 percent confidence level with a significance value of 81 percent.

Infant Mortality Rate = 24.49965 -1.08522 X_1 – 0.09247 X_2 – 1.13378 X_3

The result show that three variables included in the function namely, health expenditure, primary health centres and number of sub centres in the Union Territories account for 24 percent variation in Infant mortality rate as revealed by the Coefficient of determination (R^2) at a value of 0.243. Further, the coefficient of health expenditure at a value of 1.085 shows that one unit increase in health expenditure causes a

decline in Infant mortality rate by 1.085. Also, the coefficient representing primary health centre shows that at one unit increase in the primary health centre with lead to reduction in IMR by 0.092. The coefficient representing the Community health centre is also negative and value of 1.133 shows that one unit increase in sub centre reduces the Infant mortality rate by 1.133. It is evident from the results that increase in health expenditure and health infrastructure will improve the health status. With the decline in Infant mortality rate, there is improvement in health status.

V. CONCLUSION

This study focuses on the health status and health expenditure in Union Territories in India. The heath status of the people of the Union territories are measured using the infant mortality rate, death rate, natural growth rate. Also, a country or state's health infrastructure must be strengthen to prove health services to it's population. Accessibility is an important factor to provide health for all. This study considered the primary health centre, sub centres and community health centres as the pillars of providing health services to the people in need therefore, descriptive analytical technique is used to represent the number of health centres in all the Union Territories from Sixth five year plan till Twelfth five year plan. The results shows improvement in the number of health centres over a period of time. Health expenditure is an important indicator for providing good health to the people. This study analysed the health expenditure purely based on the public health expenditure and expenditure on health on medical and pubic health since 2010 till 2014 year.

Further, multiple regression model is used to analyse the interlinkage between the health status and health expenditure which shows that with every unit increase in health expenditure the infant mortality rate will decline to a certain rate. Also, with every unit increase in Primary health care and Community health care there will be decline in Infant mortality rate. Therefore, it is evident that the health expenditure at Centre and State must be increased to improve the health status and reduce the Infant mortality rate.

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