

Trend Analysis of Vital Statistics in India - A Key to Improve Quality of Health Care Services and Infrastructure

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ABSTRACT

Aim: The aim of this study is to assess the trends of vital statistics in India for improving the quality of health care services and infrastructure.

Materials and Methods: This study was carried out to improve the quality of health care services and infrastructure by analysing the trends of vital statistics in India. The data regarding vital statistics which includes birth rate, death rate, infant mortality rate, neonatal mortality rate and total fertility rate were obtained from the year 2011-2017 using electronic sources such as sample registration system, National health profile and NITI Aayog.

Results: The death rate found to be increased in various states and union territories of India. Over all the states and union territories in India Chhattisgarh, Madhya Pradesh, Odisha, Assam, Puducherry, Punjab and Uttar Pradesh has the highest death rate whereas the Nagaland, Chandigarh and Delhi has the lowest death rate. The rural areas of India have the highest number of mortality rate when compared to urban areas.

Conclusion: The government of India should pay more attention to the health care services and increase the health care expenditure of the public from the Gross Domestic Product (GDP) for the beneficiaries of people.

Keywords: Trend analysis, Vital statistics, India, Gross Domestic Product, Health care services, Infrastructure.

INTRODUCTION

India is one of the seventh largest country in the world which covers an area of 32, 87, 263 sq.km. It ranks second place with the highest number of populations over the world. As per Census 2011, the total population of India is 1210.8 million with a decadal growth rate of 17.7 per cent, where 31.14 per cent of the population lives in urban areas, the rest lives in rural areas. In the year 2017, the total number of populations is 1,316.9 million. Currently, the status of population in India is estimated as 1.37 billion or 1,369 millions with a growth rate of 1.08% ¹.

The good health and well-being are of utmost important than anything in the world and it plays a pivotal role in leading a better quality of life. Many factors influence health status and a country's ability to provide quality health services for its people. WHO provides a greater support in developing health care facilities and policies and it also supports the government for greater level of health investments in order to ensure that health prioritized overall anything ².

Vital statistics plays a crucial role in quantifying and indicating the health issues to ensure further improvement in the quality of health care facilities by providing a

cumulative data regarding birth rate, death rate, infant mortality rate, neonatal mortality rate and maternal mortality rate. It ensures the government to achieve public health goals by developing the standard health care facilities³.

The trend analysis of vital statistics helps the government and health care professionals to identify the exact root cause of the health-related problems and help them to rectify the issues by formulating policies for providing public health policies and social security to the public³.

However, no studies have been conducted based on the trend analysis of vital statistics for improving the quality of health care services and infrastructure. Considering the beneficiaries of vital statistics in health care management, it would be meaningful to analyze the history and trends of research conducted over the vital statistics. Hence in this study the data related to vital statistics between the years 2011-2017 were assessed using sample registration system with the aim of revealing trend analysis to improve the quality of

health care services and infrastructure in India.

MATERIALS AND METHODS

The study was conducted to evaluate the trend analysis of vital statistics in India from the year 2011-2017. The vital statistics parameters include birth rate, death rate, infant mortality rate, neonatal mortality rate and total fertility rate are assessed

The data were recruited from various electronic sources such as sample registration system (SRS), National health profile and NITI Aayog^{4, 5, 6, 7, 8}. The vital statistics from the various zones of India which includes north zone, west zone, east zone, south zone, central zone and north east zone were analyzed and the vital statistics from the rural and urban areas were tabulated accordingly from the year 2011-2017.

The inclusion criteria are only data from the year 2011- 2017 were obtained and only available data were collected. The data which are not clear and obvious are excluded from the study.

RESULT

TABLE 1: VITAL STATISTICS IN NORTH ZONE OF INDIA

STATES AND UNION TERRITORIES	PARAMETERS	2011	2012	2013	2014	2015	2016	2017
Jammu and Kashmir	Birth rate	16.5	16.2	16.0	*16.4	16.3	16.0	15.8
	Death rate	5.5	5.4	5.3	5.1	4.9	*5.0	4.8
	Infant mortality rate	41	39	37	34	26	24	23
	Neonatal mortality rate	32	30	29	26	20	18	17
	Total fertility rate	1.9	1.9	1.9	1.7	1.6	*1.7	1.6
Himachal Pradesh	Birth rate	16.5	16.2	16.0	16.4	16.3	16.0	15.8
	Death rate	6.7	6.7	6.7	6.7	6.6	*6.8	6.6
	Infant mortality rate	38	36	35	32	28	25	22
	Neonatal mortality rate	28	26	25	25	19	16	14
	Total fertility rate	1.8	1.7	1.7	1.7	1.7	1.7	1.6
Punjab	Birth rate	16.2	15.9	15.7	15.5	15.2	14.9	14.9
	Death rate	6.8	6.8	6.7	6.4	6.2	6.0	*7.0
	Infant mortality rate	30	28	26	24	23	21	21
	Neonatal mortality rate	24	17	16	14	13	13	13
	Total fertility rate	1.8	1.7	1.7	1.7	1.7	1.7	1.6
Uttarakhand	Birth rate	18.9	18.5	18.2	18.2	17.8	16.6	*17.3
	Death rate	6.2	6.1	6.1	6.0	6.4	*6.7	6.7
	Infant mortality rate	36	34	32	33	34	38	32
	Neonatal mortality rate	-	-	-	26	28	*30	24
	Total fertility rate	2.1	2.0	1.9	2.0	2.0	1.9	1.9
Uttar Pradesh	Birth rate	27.8	27.4	27.2	27.0	26.7	26.2	25.9
	Death rate	7.9	7.7	7.7	7.4	7.2	6.9	6.7
	Infant mortality rate	57	53	50	48	46	43	41
	Neonatal mortality rate	40	37	35	32	31	30	30
	Total fertility rate	3.4	3.3	3.1	3.2	3.1	3.1	3.0
Haryana	Birth rate	21.8	21.6	21.3	21.2	20.9	20.7	20.5
	Death rate	6.5	6.4	6.3	6.1	6.1	5.9	5.8
	Infant mortality rate	44	42	41	36	36	33	30
	Neonatal mortality rate	28	28	26	23	24	22	21
	Total fertility rate	2.3	2.3	2.2	2.3	2.2	2.3	2.2

Table 1 Continued...

Delhi	Birth rate	17.5	17.3	17.2	16.8	16.4	15.5	15.2
	Death rate	4.3	4.2	4.1	3.8	3.6	*4.0	3.7
	Infant mortality rate	28	25	24	20	18	18	16
	Neonatal mortality rate	18	16	16	13	14	12	14
	Total fertility rate	1.8	1.9	1.7	1.7	1.7	1.6	1.5
Chandigarh	Birth rate	15.0	14.8	14.7	14.3	13.7	*13.9	13.5
	Death rate	4.1	4.0	4.0	4.0	4.4	*4.5	4.5
	Infant mortality rate	20	20	20	23	21	14	14
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	1.6	1.6	1.5	-	-	-	-

NOTE: (*highest rate of the vital statistics parameter)

Table 1 shows about the trend analysis of vital statistics in north zone of India. The birth rate, death rate, infant mortality rate, neonatal mortality rate was found to be highest in Uttar Pradesh. The lowest birth rate was found in Punjab

whereas the death was lowest in Delhi. The total fertility rate was highest in Uttar Pradesh and it was lowest in Delhi and Himachal Pradesh among the north zone of India.

TABLE 2: VITAL STATISTICS IN EAST ZONE OF INDIA

STATES AND UNION TERRITORIES	PARAMETERS	2011	2012	2013	2014	2015	2016	2017
Bihar	Birth rate	27.7	27.7	27.6	25.9	26.3	*26.8	26.4
	Death rate	6.7	6.6	6.6	6.2	6.2	6.0	5.8
	Infant mortality rate	44	43	42	42	42	38	35
	Neonatal mortality rate	29	28	28	27	28	27	28
	Total fertility rate	3.6	3.5	3.4	3.2	3.2	*3.3	3.2
Odisha	Birth rate	20.1	19.9	19.6	19.4	19.2	18.6	18.3
	Death rate	8.5	8.5	8.4	7.9	7.6	*7.8	7.4
	Infant mortality rate	57	53	51	49	46	44	41
	Neonatal mortality rate	40	39	37	36	35	32	32
	Total fertility rate	2.2	2.1	2.1	2.1	2.0	2.0	1.9
Jharkhand	Birth rate	24.6	24.7	24.6	23.8	23.5	22.9	22.7
	Death rate	6.9	6.8	6.8	5.9	5.8	5.5	5.5
	Infant mortality rate	39	38	37	34	32	29	29
	Neonatal mortality rate	29	27	26	25	23	21	20
	Total fertility rate	2.9	2.8	2.7	2.8	2.7	2.6	2.5
West Bengal	Birth rate	16.3	16.1	16.0	15.6	15.5	15.4	15.2
	Death rate	6.2	6.3	6.4	6.1	5.9	5.8	5.8
	Infant mortality rate	32	32	31	28	26	25	24
	Neonatal mortality rate	22	22	21	19	18	17	17
	Total fertility rate	1.7	1.7	1.6	1.6	1.6	1.6	1.6

NOTE: (*highest rate of the vital statistics parameter)

Table 2 shows about the trend analysis of vital statistics in east zone of India. The birth rate and total fertility rate was found to be highest in Bihar whereas the death rate, infant mortality rate and neonatal mortality rate was found to be highest in Odisha. The west Bengal has the lowest birth rate, death rate, infant mortality rate, neonatal mortality rate when compared to the other states in eastern zone of India.

TABLE 3: VITAL STATISTICS IN WEST ZONE OF INDIA

STATES AND UNION TERRITORIES	PARAMETERS	2011	2012	2013	2014	2015	2016	2017
Rajasthan	Birth rate	26.2	25.9	25.6	25.0	24.8	24.3	24.1
	Death rate	6.7	6.6	6.5	6.4	6.3	6.1	6.0
	Infant mortality rate	52	49	47	46	43	41	38
	Neonatal mortality rate	37	35	32	32	30	28	27
	Total fertility rate	3.0	2.9	2.8	2.8	2.7	2.7	2.6
Gujarat	Birth rate	21.3	21.1	20.8	20.6	20.4	20.1	19.9
	Death rate	6.7	6.6	6.5	6.2	6.1	6.1	*6.2
	Infant mortality rate	41	38	36	35	33	30	30
	Neonatal mortality rate	30	28	26	24	23	21	21
	Total fertility rate	2.4	2.3	2.3	2.3	2.2	2.2	2.2
Goa	Birth rate	13.3	13.1	13.0	12.9	12.7	*12.9	12.5
	Death rate	6.7	6.6	6.6	6.6	6.4	*6.7	6.2
	Infant mortality rate	11	10	9	10	9	8	*9
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	1.4	1.4	1.4	-	-	-	-

Table 3 Continued...

Maharashtra	Birth rate	16.7	16.6	16.5	16.5	16.3	15.9	15.7
	Death rate	6.3	6.3	6.2	6.0	5.8	*5.9	5.7
	Infant mortality rate	25	25	24	22	21	19	19
	Neonatal mortality rate	18	18	17	16	15	13	13
	Total fertility rate	1.8	1.8	1.8	1.8	1.8	1.8	1.7
Dadra and Nagar Haveli	Birth rate	26.1	25.6	25.5	25.6	25.5	24.5	23.6
	Death rate	4.6	4.5	4.4	4.2	3.9	*4.0	*4.4
	Infant mortality rate	35	33	31	26	21	17	13
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	2.8	2.8	2.7	-	-	-	-
Daman and Diu	Birth rate	18.4	18.1	17.9	17.3	17.1	*24.0	20.2
	Death rate	4.9	4.8	4.9	4.6	*4.7	4.6	*4.7
	Infant mortality rate	22	22	20	18	18	*19	17
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	2.0	2.0	1.9	-	-	-	-

NOTE: (*highest rate of the vital statistics parameter)

Table 3 shows about the trend analysis of vital statistics in west zone of India. The birth rate, infant mortality rate, neonatal mortality rate and total fertility rate

was found to be highest in Rajasthan. The death rate was found to be highest in Gujarat whereas it was lowest in Dadra and Nagar Haveli.

TABLE 4: VITAL STATISTICS IN SOUTH ZONE OF INDIA

STATES AND UNION TERRITORIES	PARAMETERS	2011	2012	2013	2014	2015	2016	2017
Andhra Pradesh	Birth rate	17.5	17.5	17.4	17.0	16.8	16.4	16.2
	Death rate	7.5	7.4	7.3	7.3	7.1	6.8	*7.2
	Infant mortality rate	43	41	39	39	37	34	32
	Neonatal mortality rate	28	27	25	26	24	23	23
	Total fertility rate	1.8	1.8	1.8	1.8	1.7	1.7	1.6
Karnataka	Birth rate	18.8	18.5	18.3	18.1	17.9	17.6	17.4
	Death rate	7.1	7.1	7.0	6.8	6.6	*6.7	6.5
	Infant mortality rate	35	32	31	29	28	24	25
	Neonatal mortality rate	24	23	22	20	19	18	18
	Total fertility rate	1.9	1.9	1.9	1.8	1.8	1.8	1.7
Kerala	Birth rate	15.2	14.9	14.7	14.8	14.8	14.3	14.2
	Death rate	7.0	6.9	6.9	6.6	6.6	*7.6	6.8
	Infant mortality rate	12	12	12	12	12	10	10
	Neonatal mortality rate	7	7	6	6	6	6	5
	Total fertility rate	1.8	1.8	1.8	1.9	1.8	1.8	1.7
Tamil Nadu	Birth rate	15.9	15.7	15.6	15.4	15.2	15.0	14.9
	Death rate	7.4	7.4	7.3	7.0	6.7	6.4	*6.7
	Infant mortality rate	22	21	21	20	19	17	16
	Neonatal mortality rate	15	15	15	14	14	12	11
	Total fertility rate	1.7	1.7	1.7	1.7	1.6	1.6	1.6
Telangana	Birth rate	-	-	-	18.0	17.8	17.5	17.2
	Death rate	-	-	-	6.7	6.5	6.1	*6.6
	Infant mortality rate	-	-	-	35	34	31	29
	Neonatal mortality rate	-	-	-	25	23	21	20
	Total fertility rate	-	-	-	1.8	1.8	1.7	1.7
Lakshadweep	Birth rate	14.7	14.8	14.8	14.0	14.7	18.8	15.0
	Death rate	6.4	6.4	6.3	6.1	6.2	6.0	*6.5
	Infant mortality rate	24	24	24	20	20	19	*20
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	1.6	1.6	1.6	-	-	-	-
Puducherry	Birth rate	16.1	15.8	15.7	14.6	13.8	*13.9	13.2
	Death rate	7.2	7.1	7.0	6.6	6.8	*7.2	*7.3
	Infant mortality rate	22	19	17	14	11	10	*11
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	1.7	1.7	1.7	-	-	-	-
Andaman and Nicobar Island	Birth rate	15.1	15.0	14.6	14.7	12.0	11.7	11.4
	Death rate	4.6	4.6	4.6	4.6	5.0	*5.2	5.1
	Infant mortality rate	23	24	24	22	20	16	14
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	0.7	0.8	0.7	-	-	-	-

NOTE: (*highest rate of the vital statistics parameter)

Table 4 shows about the trend analysis of vital statistics in south zone of India. The birth rate was found to be highest in Telangana whereas the death rate was found to be highest in Puducherry. The death rate was found to be lowest in Andaman and Nicobar Island

TABLE 5: VITAL STATISTICS IN CENTRAL ZONE OF INDIA

STATES AND UNION TERRITORIES	PARAMETERS	2011	2012	2013	2014	2015	2016	2017
Madhya Pradesh	Birth rate	26.9	26.6	26.3	25.7	25.5	25.1	24.8
	Death rate	8.2	8.1	8.0	7.8	7.5	7.1	6.8
	Infant mortality rate	59	56	54	52	50	47	47
	Neonatal mortality rate	41	39	36	35	34	32	*33
	Total fertility rate	3.1	2.9	2.9	2.8	2.8	2.8	2.7
Chhattisgarh	Birth rate	24.9	24.5	24.4	23.4	23.2	22.8	22.7
	Death rate	7.9	7.9	7.9	7.7	7.5	7.4	*7.5
	Infant mortality rate	20	20	20	23	21	14	14
	Neonatal mortality rate	34	31	31	28	27	26	26
	Total fertility rate	2.7	2.7	2.6	2.6	2.5	2.5	2.4

NOTE: (*highest rate of the vital statistics parameter)

Table 5 shows about the trend analysis of vital statistics in central zone of India. The birth rate, infant mortality rate, neonatal mortality rate and total fertility rate was found to highest in Madhya Pradesh whereas the death rate was found to be highest in Chhattisgarh in the year 2017.

TABLE 6: VITAL STATISTICS IN NORTH EAST ZONE OF INDIA

STATES AND UNION TERRITORIES	PARAMETRES	2011	2012	2013	2014	2015	2016	2017
Assam	Birth rate	22.8	22.5	22.4	22.4	22.0	*21.7	21.2
	Death rate	8.0	7.9	7.8	7.2	7.1	6.7	6.5
	Infant mortality rate	55	55	54	49	47	44	44
	Neonatal mortality rate	30	29	27	26	25	23	22
	Total fertility rate	2.4	2.4	2.3	2.3	2.3	2.3	2.3
Sikkim	Birth rate	17.6	17.2	17.1	17.1	17.0	16.6	16.4
	Death rate	5.6	5.4	5.2	5.1	5.0	4.7	4.5
	Infant mortality rate	26	24	22	19	18	16	12
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	1.6	1.5	1.5	-	-	-	-
Nagaland	Birth rate	16.1	15.6	15.4	15.3	14.8	14.0	13.5
	Death rate	3.3	3.2	3.1	3.1	3.0	*4.5	3.6
	Infant mortality rate	21	18	18	14	12	12	7
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	1.7	1.6	1.6	-	-	-	-
Meghalaya	Birth rate	24.1	24.1	23.9	24.1	23.7	23.7	22.8
	Death rate	7.8	7.6	7.6	7.5	7.4	6.6	6.1
	Infant mortality rate	52	49	47	46	42	39	39
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	2.8	2.7	2.7	-	-	-	-
Manipur	Birth rate	14.4	14.6	14.7	14.6	14.4	12.9	*14.6
	Death rate	4.1	4.0	4.0	4.3	4.0	*4.5	*5.3
	Infant mortality rate	11	10	10	11	9	*11	*12
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	1.5	1.5	1.5	-	-	-	-
Mizoram	Birth rate	16.6	16.3	16.1	16.4	16.2	15.5	15.0
	Death rate	4.4	4.4	4.3	4.3	4.2	4.2	4.0
	Infant mortality rate	34	35	35	32	32	27	15
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	1.6	1.5	1.5	-	-	-	-
Tripura	Birth rate	14.3	13.9	13.7	14.9	14.7	13.7	13.0
	Death rate	5.0	4.8	4.7	4.7	5.2	*5.5	5.2
	Infant mortality rate	29	28	26	21	20	*24	*29
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	1.4	1.3	1.3	-	-	-	-
Arunachal Pradesh	Birth rate	19.8	19.4	19.3	19.2	18.8	*18.9	18.3
	Death rate	5.8	5.8	5.8	*6.6	6.0	*6.2	6.1
	Infant mortality rate	32	33	32	30	30	*36	*42
	Neonatal mortality rate	-	-	-	-	-	-	-
	Total fertility rate	-	-	-	-	-	-	-

NOTE: (*highest rate of the vital statistics parameter)

Table 6 shows about the trend analysis of vital statistics in north zone of India.

TABLE 7: YEAR-WISE DISTRIBUTION OF VITAL STATISTICS IN RURAL AND URBAN AREAS

VITAL STATISTICS	RURAL							URBAN						
	2011	2012	2013	2014	2015	2016	2017	2011	2012	2013	2014	2015	2016	2017
Birth rate	23.3	23.1	22.9	22.4	22.4	22.1	*21.8	17.6	17.4	17.3	17.4	17.3	17.0	16.8
Death rate	7.6	7.6	7.5	7.3	7.1	6.9	6.9	5.7	5.6	5.6	5.5	5.4	5.4	5.3
Infant mortality rate	48	46	44	43	41	38	37	29	28	27	26	25	23	23
Neonatal mortality rate	34	33	31	30	29	27	27	17	16	15	15	15	14	14
Total fertility rate	2.6	2.6	2.5	2.5	2.5	2.5	2.4	1.8	1.8	1.8	1.8	1.8	1.8	1.7

NOTE: (*highest rate of the vital statistics parameter)

Table 7 shows about the year-wise distribution of vital statistics in urban and rural areas of India. The mortality rate, birth rate and total fertility rate was found to be highest in rural areas when compared to urban areas.

TABLE 8: HEALTH CARE EXPENDITURE OF INDIA FROM GROSS DOMESTIC PRODUCT (GDP)

S.NO.	YEAR	GDP OF INDIA	HEALTH EXPENDITURE FROM GDP
1.	2011	1.82 lakh crores USD	1.19%
2.	2012	1.83 lakh crores USD	1.2%
3.	2013	1.86 lakh crores USD	1.2%
4.	2014	2.04 lakh crores USD	1.3%
5.	2015	2.1 lakh crores USD	1.3%
6.	2016	2.27 lakh crores USD	1.4%
7.	2017	2.6 lakh crores USD	1.4%

Table 8 shows about the health care expenditure of India from Gross Domestic Product.

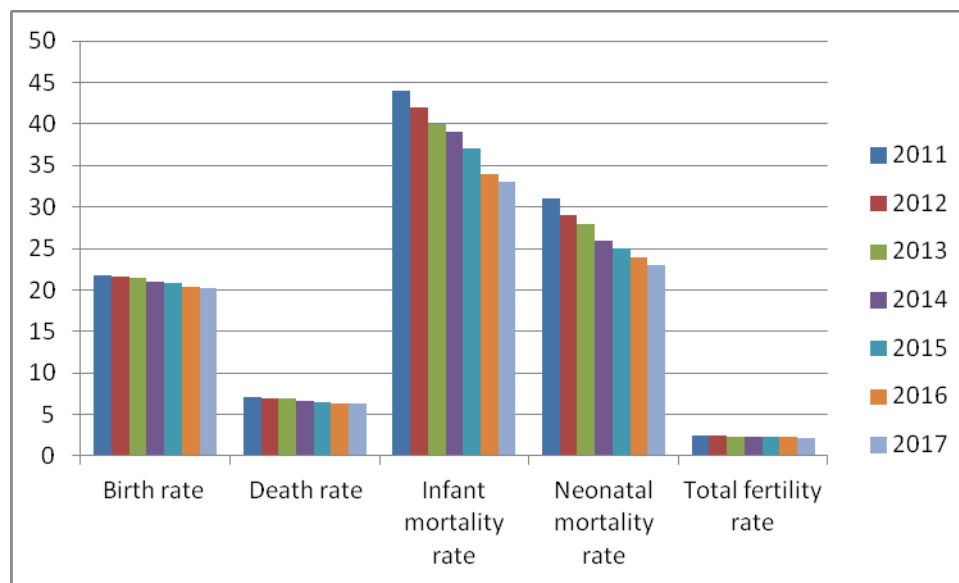


Fig 1: Year-wise distribution of vital statistics in India

DISCUSSION

The vital statistics is one of the best sources in determining the health care policy and services to be implemented for the welfare of people. The trend analysis of the vital statistics helps the government to provide proper health care programs and planning of public health policies. Hence this present study focused on the trend

analysis of vital statistics in India to enhance the quality of health care services in India.

The north zone of India is Jammu and Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Uttar Pradesh, Haryana, Delhi and Chandigarh. Of that the birth rate, death rate, infant mortality rate, neonatal mortality rate was found to be highest in Uttar

Pradesh. The lowest birth rate was found in Punjab whereas the death was lowest in Delhi. The total fertility rate was highest in Uttar Pradesh and it was lowest in Delhi and Himachal Pradesh among the north zone of India.

The death rate drastically increases in Punjab in the year 2017 this was due to the drug over dosage. Most of the death occurs in Punjab due to the consumption of the overdose of morphine especially in rural areas ⁹. To avoid this comprehensive action against drug abuse should be implemented by the government. Dengue fever and cancer is also a major concern for the increased death rate Punjab. This was due to the lack of coordination between local health authorities and the district administration.

The death rate was found to be increased in Jammu and Kashmir in the year 2016. The malnutrition, poor sanitary facilities and violence are the most common cause for increased death rate in Jammu and Kashmir ¹⁰. The government should take appropriate measures and should implement the proper health care facilities and policies for the beneficiaries of the public. The death rate in Himachal Pradesh was found to be increased in the year 2016 when compared to previous year. The malnutrition is the major concern for the increased death rate in Himachal Pradesh. The death rate and neonatal mortality rate gradually increases in Delhi from the year 2015. Heart diseases and iron deficiency anaemia are the major cause for increased death rate in Delhi. This was due to the improper health care services and infrastructure.

The infant mortality rate and death rate was found to be increasing in Uttarakhand and Chandigarh from the year 2015. The insufficient medical facilities were the major root cause for this problem. The shortage of medical manpower in rural and hilly areas causes increase death rate in these states. The government must appoint more doctors in these areas to overcome this situation.

The east zone of India is Bihar, Odisha, Jharkhand and West Bengal. The birth rate and total fertility rate was found to be highest in Bihar whereas the death rate, infant mortality rate and neonatal mortality rate was found to be highest in Odisha. The west Bengal has the lowest birth rate, death rate, infant mortality rate, neonatal mortality rate when compared to the other states in eastern zone of India. The Health & Family Welfare Department of the State Government has been vested with the responsibility of maintaining and developing the health care system in West Bengal. 80% of health care services are provided at no cost in this state. This shows the best quality of health care services and the implementation of health care policies in West Bengal ¹¹.

The neonatal mortality rate gradually increases in Bihar from the year 2015. The neonatal tetanus, pneumonia and meningitis are the major cause of neonatal deaths in Bihar. This can be overcome by ensuring the good quality of health care in both private and public sector with an increasing involvement in the universal health coverage agenda of the Government of India ¹². The death rate was found to be increased in Odisha in the year 2016. This was due to improper health care facilities and manpower in this state.

The west zone of India is Rajasthan, Gujarat, Dadra and Nagar Haveli, Daman and Diu, Maharashtra and Goa. The birth rate, infant mortality rate, neonatal mortality rate and total fertility rate was found to be highest in Rajasthan. The death rate was found to be highest in Gujarat whereas it was lowest in Dadra and Nagar Haveli. Goa shows gradually decrease in mortality rates when compared to other states and union territories this was due to the best medical facilities and the implementation of various advanced programmes in hospitals and thereby providing major health care services in rural areas.

The southern zone of India is Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Telangana, Lakshadweep,

Puducherry and Andaman and Nicobar Island. The birth rate was found to be highest in Telangana whereas the death rate was found to be highest in Puducherry. The death rate was found to be lowest in Andaman and Nicobar Island when compared to southern zone of India but the death rate in this state gradually increases from the year 2015. The flu and viral fever are the major cause for the increasing death rate in this region. The government should ensure the health education awareness programs and should develop the health care policies to overcome this condition.

The death rate found to be increase in Tamilnadu in the year 2017. The increased number of deaths occurs due to diabetes, kidney and ischemic heart diseases. The chronic kidney disease is the major cause of increased death rate in this state. The most common risk factor for this disease is increased smoking and alcohol consumption. Tamilnadu is only state that has more number peoples with chronic kidney disease when compared to other state the reason behind this might be due to poor quality and increasing number of alcohol retail shops. Considering the welfare of people, the government of Tamilnadu should take appropriate action in reducing the number of alcohol shops and also ensure proper measure in screening the lifestyle disorders of the people^{13,14}. The death rate and infant mortality rate gradually increases in Lakshadweep from the year 2015. The death rate and infant mortality rate was drastically increased in Puducherry in the year 2017. This is due to the poor infrastructure of the hospitals and lack of manpower in rural areas. The death rate found to be increased in Kerala in the year 2016 due to cardiac problems¹³.

The central zone of India is Madhya Pradesh and Chhattisgarh. The birth rate, infant mortality rate, neonatal mortality rate and total fertility rate was found to highest in Madhya Pradesh whereas the death rate was found to be highest in Chhattisgarh in the year 2017. Table 6 shows about the trend analysis of vital statistics north east

zone in India. The north east zone is Assam, Sikkim, Nagaland, Meghalaya, Manipur, Mizoram, Tripura and Arunachal Pradesh. The death rate was found to be gradually increased in Nagaland, Manipur and Tripura from the year 2016. The government should take proper appropriate measures in providing the good quality of the health care services to the public. In Arunachal Pradesh, the death rate was found to be increased in the year 2014 and 2017 whereas the infant mortality rate found to be increased from the year 2016. The government should take appropriate measures and should appoint more doctors in rural areas.

The mortality rate, birth rate and total fertility rate was found to be highest in rural areas when compared to urban areas. This indicates that the health care infrastructure was inadequate in rural areas. The government of India should enhance the hospitals facilities in these areas and more doctors should be appointed in primary health centres to obtain beneficiaries for the public. Over all the states and union territories in India Chhattisgarh, Madhya Pradesh, Odisha, Assam, Puducherry, Punjab and Uttar Pradesh have the highest death rate due to inadequate health care facilities and derivation of primary health care infrastructure whereas the Nagaland, Chandigarh and Delhi has the lowest death rate. The infant mortality rate was found to highest in Madhya Pradesh, Assam and Odisha whereas it was lowest in Goa, Manipur and Kerala. The neonatal mortality rate was found to be highest in Madhya Pradesh and Chhattisgarh whereas it was lowest in Kerala, Tamilnadu and Maharashtra. The lowest infant mortality was found in Kerala and Goa. This is because the government has a good quality of services at all health level and focused on the prevention and control of diseases. In Kerala the Primary health centres are converted into family health centres to deliver the effective family centred health services. Goa has the best health and medical care facilities over all states of

India and the majority of health care facilities were available in the rural areas.

The India shows an enormous increase in GDP from the year 2011 but still lacks in attaining the good quality of health. This is because the government spends only a minimum amount for health care. Currently, India ranks fifth place over the entire world in GDP but still there is no improvement in the welfare of people. As we all know that the health is wealth and it is prioritized more than anything in the world hence the government should focus on health care services and increase the health expenditure in the upcoming year for the beneficiaries of people.

The limitations of this study are only data were obtained from the year 2011-2017. Many data are missing only available data were collected. The current data were not available for the study.

CONCLUSION

This study will be very useful for the government to plan and develop health care policies in order to improve the health care services in India. Although India ranks fifth place in GDP the government is investing more amount of GDP in various sectors but no measures have been taken to improve the health expenditure. As health of the people prioritized first in the world instead of spending amount in other sectors such as defence forces the government of India can minimize the amount in these sectors and should invest more amount of GDP for health to attain maximum beneficiaries of the people. Since the mortality rates were higher in rural areas the government of India should pay more attention to improve the health care facilities in rural areas by investing more amount of GDP for health care in the forthcoming year for the welfare of people.

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