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Poverty and Health in Uttar Pradesh: Issue and Challenges

Minhaz Husain

Assistant Professor (Guest Faculty) Department of Economics, KMC-UAF University, Lucknow & Research scholar, Department of Economics, University of Lucknow, Lucknow (India)

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***Corresponding Author**
Email: minhaz.husain@gmail.com

ABSTRACT

Poverty and health have a two-way relationship. Poverty increases the vulnerability of and sickness affects their income leading to poverty. This paper investigates the relationship between health and poverty in India and Uttar Pradesh. The study tests the following major hypothesis: There is significant relationship between Malaria, Tuberculosis and Poverty. The study is based on secondary data available from a plethora of government publication. Among the importance sources are publication of National Family Health Survey (NFHS) 1, 2, 3, and 4, National Health Profile, Sample Registration System, Planning Commission, RBI Bulletin National Health Account Cell etc. Apart from official publication a wide range of literature is available on the subject and has been made use of in collecting and analyzing data.

1. Introduction

The losses of human life on account of pre mature deaths from fatal and non-fatal disease have been a matter of concern in India and particularly in Uttar Pradesh. Studies conducted on the subject have revealed that communicable and non-communicable diseases, malnutrition and pre natal complications have been major reasons for sudden loss of human life. The other notable diseases which lead to loss of life are related to reproduction. Morbidity results from the diseases like malaria, tuberculosis, leprosy, AIDS, blindness, diarrhea etc. The normal life conditions are also threatened by diabetes, blood pressure and coronary diseases. On the whole, non-fatal diseases, communicable diseases, lifestyle diseases and pre-natal complications have put serious challenge to the healthy life and human development. In view of morbidity challenges faced by the people in our state particular the poor people who are large in number provided logical base to study the status of different communicable and non-communicable diseases in human life in the state of Uttar Pradesh. Kumar et al (2008), in their studies, examined the fact that in the last sixty years there had been an improvement in health facilities and as a consequences of these there had been a decline in the birth rate and the death rate and in the infant mortality rate. However, these improvements were not very inspiring. The government measures are quite disheartening both in terms of infrastructure and health indicators. It has created vast opportunities for the private sector to earn. However, health facilities have become more difficult for those who cannot afford to pay the high changes levied by private hospitals as the income is low. Duggal (1997) has analyzed health care budgets in the changing economy dominated by liberalization and privatization. He points out that expenditure on social health budget as a whole is falling while the state is gradually abdicating its responsibility in the health care sector. This has affected the poorest sections of society as cutbacks are on commodity purchases such as drugs, instruments and other consumables. The increase in the prices and the reduction in the public budget had led to reduction in the live hood standards of poorest sections of society.

2. Tuberculosis

The Number of person affected by disease of tuberculosis per one lakh of persons in major states and at the aggregate level from 1991-92 to 2015-16 has been shown in table 1. The NFHS-1 had reported that 467 persons per one lakh of population were affected by tuberculosis during 1991-92. The number of such person increased to 544 in 1998-99. During 2005-06 number of tuberculosis affected persons declined to 445. The number of such person further declined to 316. In this way an increase in 16 percent in the cases of tuberculosis was found in 1998-99 over 1991-92. But it subsequently years as presented in table 6.1 there was decline of 18 percent and 29 percent in the tuberculosis affected person during 2005-06 and 2015-16 respectively over previous years. Thus, at all India level the declining trend in the number of persons affected by tuberculosis was evident as reported by the National Family and Health Surveys.

Table-1: Number of Person per 100,000 of Population with Tuberculosis in Major States and India: 1991-92 to 2015-16

States	NFHS-I (1991-92)	NFHS-II (1998-99)	NFHS-III (2005-06)	NFHS-IV (2015-16)	CAGR
Andhra Pradesh	407	592	449	320	-1
Assam	638	710	654	311	-2.95
Madhya Pradesh	435	602	353	224	-2.73
Bihar	595	989	797	661	0.44
Gujarat	308	438	538	181	-2.19
Haryana	327	538	340	234	-1.38

Karnataka	136	269	141	180	1.17
Kerala	586	526	275	374	-1.85
Maharashtra	293	282	321	245	-0.74
Orissa	555	833	418	338	-2.05
Punjab	238	207	201	156	-1.74
Rajasthan	724	397	371	222	-4.81
Tamil Nadu	703	479	508	360	-2.75
Uttar Pradesh	560	551	450	346	-1.99
West Bengal	357	492	605	356	-0.01
India	**467**	**544**	**445**	**316**	**-1.61**

Source: NFHS-I, II, III, IV

3. Cases of Tuberculosis in Uttar Pradesh

The status of major states in terms of number of persons per lakh of population affected by tuberculosis, as reported of all four NFHSs was presented in table 2 to find out the status of Uttar Pradesh in comparison with other states in this regard. The ranking was done on the scale of 1 to 15 were rank 1 has been given to a state which has lowest cases of tuberculosis per lakh of its population while rank 15 has been signed to the state which has highest number of person with tuberculosis per lakh of its population. On this basis, state of Uttar Pradesh was found on 10th position in NFHS-I, II and III while in the NFHS-IV reported that Uttar Pradesh scaled up its position to 11th rank. It implies that every state tried to reduce the cases of tuberculosis including the Uttar Pradesh but the effort of Uttar Pradesh could not succeed much to place the state on better position in this regard.

The Compound Annual Growth Rate (CAGR) in the number of person affected by tuberculosis as showed table-2 indicated that CAGR in Uttar Pradesh was better (-1.99 percent) compared with the national average (-1.61 percent). The state of Uttar Pradesh performed well compared with many states like Andhra Pradesh, Bihar, Haryana, Karnataka, Maharashtra, Punjab, and West Bengal. But Uttar Pradesh lagged behind some other state like Gujarat, Orissa, Rajasthan, and Tamil Nadu as these state had better negative CAGR of the persons affected by tuberculosis compared with state of Uttar Pradesh. Therefore, Uttar Pradesh needs to intensify affords to eradicate tuberculosis among its population in coming year

Table-2: Ranking and CAGR of States in terms of cases of Tuberculosis

State	NFHS-I (1991-92)	NFHS-II (1998-99)	NFHS-III (2005-06)	NFHS-IV (2015-16)	CAGR
Andhra Pradesh	7	11	9	9	-1
Assam	13	13	14	8	-2.95
Madhya Pradesh	8	12	6	5	-2.73
Bihar	12	15	15	15	0.44
Gujarat	4	5	12	3	-2.19
Haryana	5	9	5	6	-1.38
Karnataka	1	2	1	2	1.17
Kerala	11	8	3	14	-1.85
Maharashtra	3	3	4	7	-0.74
Orissa	9	14	8	10	-2.05
Punjab	2	1	2	1	-1.74
Rajasthan	15	4	7	4	-4.81
Tamil Nadu	14	6	11	13	-2.75
Uttar Pradesh	10	10	10	11	-1.99
West Bengal	6	7	13	12	-0.01
India	467	544	445	316	**-1.61**

Note: Rank 1 denotes lowest cases and rank 15 denotes highest cases.
Source: NFHS-I, II, III, IV.

4. Malaria Cases in India

Malaria is a life-threatening mosquito-borne blood disease caused by a Plasmodium parasite. Malaria is a serious and sometimes fatal disease caused by a parasite that infects a type of mosquito which feeds on humans. Once an infected mosquito bites a human, the parasites multiply in the host's

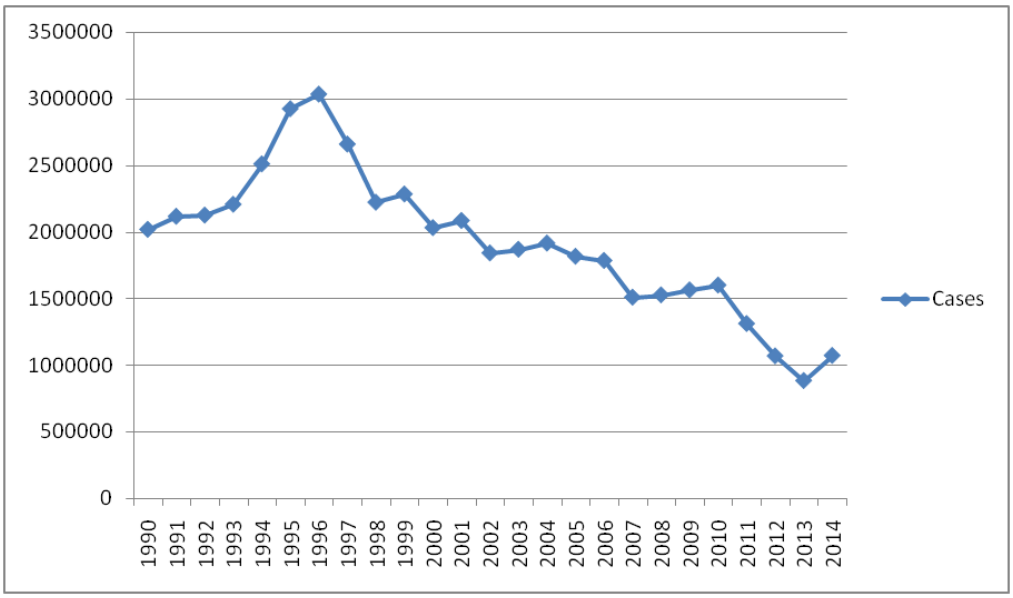
liver before infecting and destroying their red blood cells. People who get malaria are usually very sick with symptoms such as high fevers, shaking chills, and flu-like illness. Number of cases of Malaria in our country from 1990-91 to 2014-15 has been shown in table 3. The annual percentage change in the cases of malaria and over all compound annual growth rate (CAGR) during the period has also been calculated. The table showed an erratic pattern in the cases of malaria during the reference period. There were years when number of cases reported increased than the previous year. In the year of 2014 cases of Malaria increased by around 81 percent and than the previous year 2013. There were some years when noticeable decline in cases of Malaria was reported from the previous year. During the year 2011-12 at all India level reduction in cases of Malaria was by around 21 percent. During the entire period, CAGR in the reduction of Malaria cases were only by around was 3 percent. In this way pattern indicated that decline in cases of Malaria at all India level over the years has been unsustainable.

Table 3: Number of Malaria Cases in India: 1990 to 2014

Year	Causes	Annual Growth Rate
1990	2018783	-
1991	2117460	4.6
1992	2125826	0.4
1993	2207431	3.7
1994	2511353	12.1
1995	2926197	14.1
1996	3035588	3.6
1997	2660057	-14.1
1998	2222748	-19.6
1999	2284713	2.7
2000	2031790	-12.4
2001	2085484	2.6
2002	1842019	-13.2
2003	1869403	1.4
2004	1915363	2.3
2005	1816569	-5.4
2006	1785129	-1.8
2007	1508927	-18.3
2008	1526210	1.2
2009	1563574	2.4
2010	1599986	2.3
2011	1310656	-22.0
2012	1067824	-22.8
2013	881730	-21.1
2014	1070513	17.6
	CAGR (-2.61)	

Source: Ministry of Health and Family Welfare, Govt. of India**.**

Figure 2: Malaria cases in India: 1990 to 2014



5. Malaria Cases in Uttar Pradesh

Malaria cases in Uttar Pradesh from the year 2004 to 2014 have been presented in table 4. The table revealed that the state in Uttar Pradesh similar pattern in the reduction of Malaria cases during the reference period was observed similar to that found at the all India level. In Uttar Pradesh in the year 2005, 2008, 2010 and 2013 cases of malaria increased than the previous years. The maximum annual decline of 68 percent was found in the year 2009 over 2008 in Uttar Pradesh. During the years of 2006, 2007, 2011, 2012 and 2014 decline in cases of malaria was in the range of 10 to 20 percent. In 2013 cases of malaria increased by 2 percent over 2012 in Uttar Pradesh.

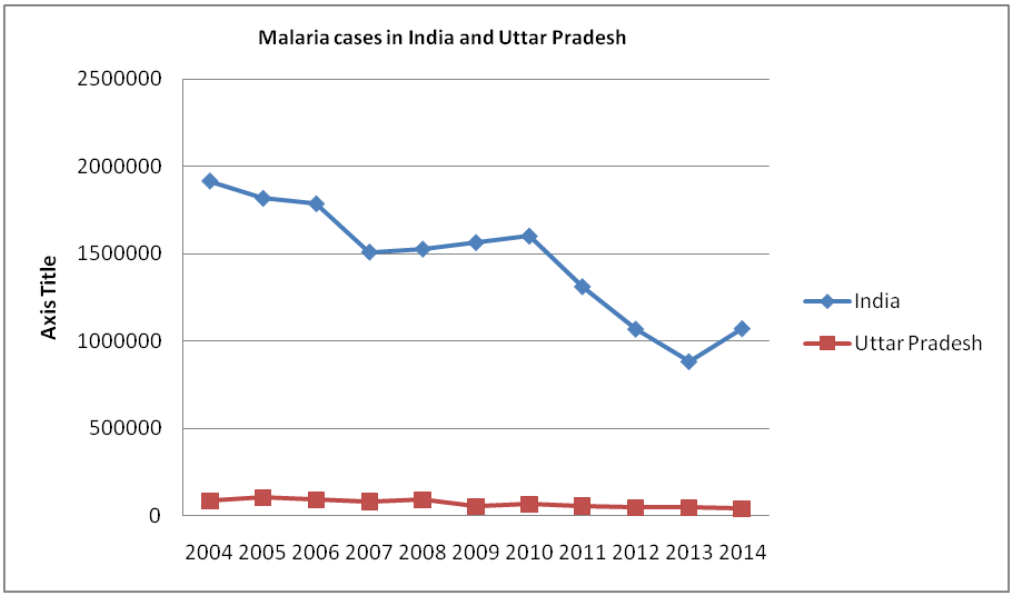
Thus, it appeared that the effort to eradicate malaria in the state of Uttar Pradesh was inconsistent over the years.

Table 4: Number of Malaria cases in India and Uttar Pradesh 2004 to 2014

Year	India		Uttar Pradesh	
	Causes	Annual Growth Rate	Causes	Annual Growth Rate
2004	1915363	2.3	87022	-
2005	1816569	-5.4	105303	17.3
2006	1785129	-1.8	91566	-15.0
2007	1508927	-18.3	82538	-10.9
2008	1526210	1.2	93383	11.6
2009	1563574	2.4	55437	-68.4
2010	1599986	2.3	67687	18.0
2011	1310656	-22.0	56968	-18.8
2012	1067824	-22.8	47400	-20.1
2013	881730	-21.1	48346	1.9
2014	1070513	17.6	41612	-16.1
	CAGR= -		CAGR= -7.11	

Source: Ministry of Health and Family Welfare, Govt. of India

Figure 2: Number of Malaria cases in India and Uttar Pradesh: 2004 to 2014



Source: Ministry of Health and Family Welfare, Govt. of India

6. Cases of Cancer in India

Cancer can start almost anywhere in the human body, which is made up of trillions of cells. Normally, human cells grow and divide to form new cells as the body needs them. When cells grow old or become damaged, they die, and new cells take their place. When cancer develops, however, this orderly process breaks down. As cells become more and more abnormal, old or damaged cells survive when they should die, and new cells form when they are not needed. These extra cells can divide without stopping and may form growths called tumors. Cancer cells are also often able to evade the immune system, a network of organs, tissues, and specialized cells that protects the body from infections and other conditions. Although the immune system normally removes damaged or abnormal cells from the body, some cancer cells are able to "hide" from the immune system. Cancer cases were found to be rising in India in as in the year 2009 more than 10 lakh cases of cancer were reported which increased to more than 17 lakh during the year 2016. During this period at all India level cancer cases had risen on year to year basis accept in 2011 when number of cancer cases declined very nominally by 0.2 per cent in 2013. Then there was increase in cancer cases as by this year cases of cancer grew by 17 per cent over the previous year at all India level. The annual compound growth rate in cancer cases at all India level during the period 2009 to 2018 was by 5.26 per cent.

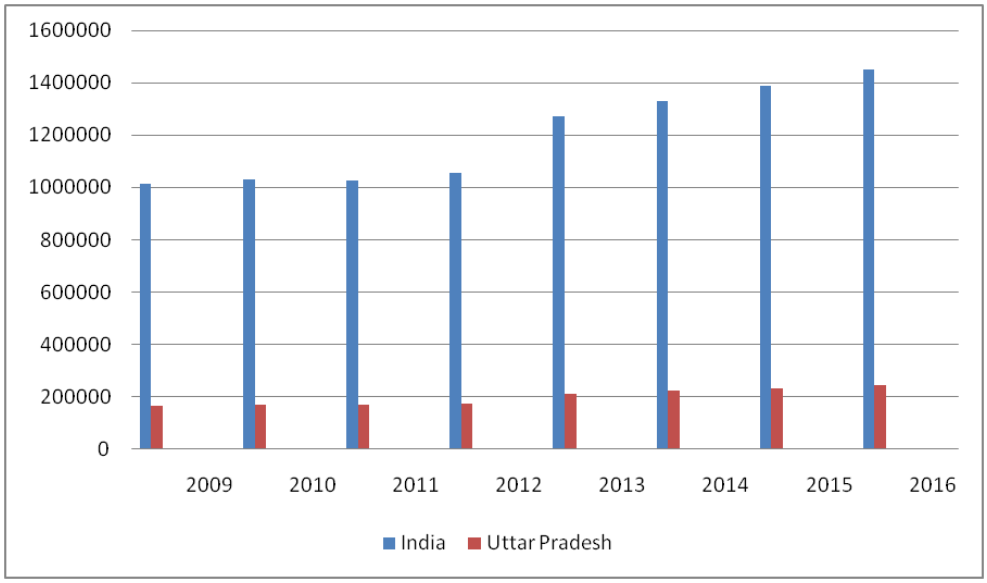
Table 5: Number of Cancer cases in India and Uttar Pradesh: 2009 to 2018

Year	India	Annual Growth Rate	Uttar Pradesh	Annual Growth Rate
2009	1014010	-	166327	-
2010	1031166	1.6	169419	1.8

2011	1028506	-0.2	170013	0.3
2012	1057204	2.7	175404	3.0
2013	1270781	16.8	212075	17.3
2014	1328229	4.5	222615	4.7
2015	1388397	4.5	233659	4.7
2016	1451417	4.5	245231	4.7
2017	1517426	4.5	257353	4.9
2018	1586571	4.7	270053	4.9
	CAGR (5.26)		CAGR (5.70)	

Source: Ministry of Health and Family Welfare, Govt. of India

Figure-3: Number of Cancer cases in India and Uttar Pradesh: 2009 to 2016



Source: Ministry of Health and Family Welfare, Govt. of India

7. Cancer Cases in Uttar Pradesh

In the state of Uttar Pradesh cases of cancer reported from 2009 to 2016 showed increasing trends during the period. In 2009 more than 1.6 lakh cases of cancer were reported which went on to increase during subsequent years to reach to 2.45 lakh cases in the year 2016. It was evident that during this year 2013 cases of cancer increased by 17 per cent over 2012. The CAGR was also 8.7 per cent during the entire period. In this way rising cancer cases in Uttar Pradesh were higher compared with national average. In table 6.7, the number of cancer cases in India and Uttar Pradesh reported in 2009 to 2018 has been presented.

8. Impact of Poverty on Tuberculosis

The second variable taken up for analysis is Tuberculosis. Tuberculosis is dependent variable and Poverty is independent variable. The analysis taken into account time series data spread over 11 years from 2001-02 to 2011-12. We may express a null hypothesis along with alternative hypothesis as follow:

H_0**:** There is no significant relationship between Tuberculosis and Poverty

H_1: There is significant relationship between Tuberculosis and Poverty

The data related to Tuberculosis and Poverty in Uttar Pradesh given in table-6, some important regression values between Tuberculosis and Poverty in the state of Uttar Pradesh which are found through SPSS package are as follows:

Tuberculosis = α + β_1 Poverty + u

Where Tuberculosis is dependent variable and Poverty is independent variable.

Effect of Poverty on Tuberculosis: Regression Result

Intercept	Coefficient	R	R^2
279244 (145.3)	195.6 (3.2)	.73	.54

Interpretation: Here, calculated value of 'T' for the constant value of the equation (α) and Poverty coefficient (β_1), is higher than tabulated value of 't' (2.20) which indicates null hypothesis (H_0) is rejected and alternative hypothesis (H_1) is accepted. We can say this relationship between Poverty and is no Tuberculosis t significant at 5% level of confidence.

Analysis on the basis of result of Correlation and Regression between about the relationship Tuberculosis and Poverty

Over the period of study holding the 1 percent increase in Poverty led on the average to about at 195.6 percent increase in tuberculosis.

From a purely statistical viewpoint the estimated regression line fit the data quite well. The R^2 value of .54 means that about 54 percent of the variation in the (log of) Tuberculosis is explained by the (log of) Poverty.

9. Impact of Poverty on Malaria

The second variable taken up for analysis is Malaria. Malaria is dependent variable and Poverty is independent variable. The analysis taken into account time series data spread over 11 years from 2001-02 to 2011-12. We may express a null hypothesis along with alternative hypothesis as follow:

H_0**:** There is no significant relationship between Malaria and Poverty

H_1: There is significant relationship between Malaria and Poverty

The data related to Malaria and Poverty in Uttar Pradesh given in table 6. Some important regression values between Malaria and Poverty in the state of Uttar Pradesh which are found through SPSS package are as follows:

Malaria = $\alpha + \beta_1$ Poverty + u

Where Malaria is dependent variable and Poverty is independent variable.

Effect of Poverty on Malaria: Regression Result

Intercept	Coefficient	R	R^2
51940 (2.4)	795.2 (1.2)	.36	.13

Interpretation: Here, calculated value of 'T' for the constant value of the equation (α) is higher than tabulated value of 't' (2.20) which indicates null hypothesis (H_0) is rejected and alternative hypothesis (H_1) is accepted. But in case of Poverty coefficient (β_1) is less than tabulated value of 't'(2.20) which indicates null hypothesis (H_0) is accepted and alternative hypothesis (H_1) is rejected We can say this relationship between Poverty and Malaria is not significant at 5% level of confidence.

Analysis on the basis of result of Correlation and Regression between about the relationship Malaria and Poverty

Over the period of study holding the 1 percent increase in Poverty led on the average to about at 795.2 percent increase in Malaria.

From a purely statistical viewpoint the estimated regression line fit the data quite well. The R^2 value of .13 means that about 13 percent of the variation in the (log of) Malaria is explained by the (log of) Poverty.

Effect of Malaria and Tuberculosis on Poverty: Regression Result

H_0**:** There is no significant relationship between Malaria, Tuberculosis and Poverty

H_1: There is significant relationship between Malaria, Tuberculosis and Poverty

The data related to Malaria, Tuberculosis and Poverty in Uttar Pradesh given in Table 6. Some important regression values between Malaria, Tuberculosis and Poverty in the state of Uttar Pradesh which are found through SPSS package are as follows:

(Poverty = $\alpha + \beta_1$ Malaria+ β_2 Tuberculosis + u)

Where Poverty is dependent variable and Malaria, Tuberculosis is independent variable.

Intercept	Coefficient		R	R^2
	Malaria	Tuberculosis		
-711 (-2.7)	.8.0 (.71)	.003 (2.8)	.75	.58

Interpretation: Here, calculated value of 'T' for the constant value of the equation (α) and in case of Malaria coefficient (β_1), are less than tabulated value of 't' (2.20). Thus, the null hypothesis (H_0) is accepted and alternative hypothesis (H_1) is rejected. But in case of Tuberculosis coefficient (β2**)** are greater than tabulated value of 't' (2.20) which indicates null hypothesis (H_0) is rejected and alternative hypothesis (H_1). We can say this relationship between PCPHE, Tuberculosis and Poverty is not significant at 5% level of confidence.

Analysis on the basis of result of Correlation and Regression between about the relationship of PCPHE, Tuberculosis and Poverty

Over the period of study holding the Tuberculosis constant a 1 percent increase in Malaria led on the average to about at .8 percent increase in Poverty. Similarly holding the Malaria is constant a 1 percent increase in Tuberculosis led on the average .003 percent increase in the Poverty.

From a purely statistical viewpoint the estimated regression line fit the data quite well. The R^2 value of .58 means that about 58 percent of the variation in the (log of) Poverty is explained by the (log of) Malaria and Tuberculosis.

Table 6 Tuberculosis, Malaria and Poverty in Uttar Pradesh: 2001-2011

Year	Tuberculosis	Headcount Ratio Poverty (%)*	Malaria
2001	288502	42.95	94524
2002	287854	42.26	90199
2003	287206	41.58	101411
2004	286557	40.90	85868
2005	285909	36.14	17537
2006	285261	31.38	91566
2007	284613	26.62	82538
2008	283965	21.86	93383
2009	283317	17.10	55437
2010	277245	15.55	64604
2011	285884	14.00	56968

Source: Planning Commission, SRS, RBI Bulletin
*Interpolation analysis for missing value (SPSS)

10. Conclusion

The communicable and non-communicable diseases, malnutrition, prenatal complications and diseases like Malaria, Tuberculosis, and Cancer etc have put serious challenges to the healthy life and human development. In the above analysis, incidence of various communicable and non-communicable diseases in the state of Uttar Pradesh was analyzed. The analysis in this chapter is based on the data published by National Family Health Surveys (NFHSs). Tuberculosis has posed a serious morbidity challenge in all major state of the country including Uttar Pradesh as National Family Health Survey (NFHS) data from 1991-92 to 2015-16 has shown. The NFHS-I had reported 467 cases of Tuberculosis per lakh of population in the year 1991-92 and such number of person increased to 544 in 1998-99. However number of tuberculosis affected persons was declined in subsequently years till 2015-16. Thus, at the national level declining trend in number of cases of Tuberculosis per lakh of population was evident. It is to be noted here that in the state of Uttar Pradesh, NFHS-I reported that there were 560 cases of Tuberculosis which continuously declined to 346 in 2015-16, showing a Compound Annual Growth Rate (CAGR) of -1.99 per cent which was a bit higher than national average CAGR of -1.26 per cent. The analysis has indicated that cases of Tuberculosis per lakh of population among males and females of rural areas as compared with males and females in rural areas in Uttar Pradesh. The incidence of Tuberculosis was found was higher in old age person both in rural and urban areas but in urban area larger number of cases were found among working population compared with rural areas. It is good to found from the data that most of Tuberculosis cases were treated in rural and urban areas but marginally lesser per cent of patients in urban area received treatment compared with their counterparts of rural area in Uttar Pradesh. The case of malaria has been rising sometimes and declining sometimes during the period 1990 to 2014. In the year 2014 malaria cases had increased by around 18 per cent than previous year of 2013. During the period of 2011-12, Malaria cases were reduced by around 20 per cent over 2010-11. The overall pattern of malaria cases indicated that decline in such case was unsustainable at all India level during 1990 to 2014. In the state of Uttar Pradesh, similar erratic pattern in the reduction of Malaria cases was found in the year 2005, 2008, 2010, and 2013 when number of cases increased over the previous years. During the year of 2006, 2007, 2011, 2012 and 2014 there was decline in Malaria cases over previous year. This indicated that in the state of Uttar Pradesh effort needed to irradiate. Malaria had been inconsistent over the year. The analysis showed that cancer cases were rising in India. In the year 2009, Ministry of Health and Family Welfare (MOHFW), Government of India (GOI) had reported that there were more than 10 lakh cases of Cancer in India which increased to around 15 lakh in the year 2016. In the year 2013, Cancer cases increased to around 17 percent over 2012 at all India level. In Uttar Pradesh, data showed that the cases of Cancer were increasing from around 1.6 lakh in 2009 to 2.44 lakh in 2016. The pattern in the growth of Cancer cases in Uttar Pradesh was found to be quite similar to the pattern observed at all India level. In Uttar Pradesh, a high jump in cases of Cancer was noticed during 2013 which was also found at all India level. The CAGR in the increase of Cancer cases in Uttar Pradesh was found higher (5.70 percent) compared with all India CAGR (5.26 percent) during the period of 2009 to 2016.

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