State of Health and Nutrition in Andhra Pradesh

Working Paper - WP 43/2001 (1-28)

THE INSTITUTE OF HEALTH SYSTEMS

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Printed in Hyderabad, 2001

IHS Library Cataloguing-in-Publication Data

State of Health and Nutrition in Andhra Pradesh: 1st Edition\ Prasanta Mahapatra, Samatha Reddy

Includes bibliographic references

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Draft Paper **State of Health and Nutrition in AP**

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Introduction

During the last few decades there is a considerable improvement in the health status of the population in the State. Smallpox was eradicated. There are no reported cases of Guinea Worm diseases since 1997. The prevalence of Leprosy was reduced from 124 per 10000 Population in the year l983 to 5.6 per 10000 population by October 2000. Polio cases have gone down from 50 in 1995 to nil cases in the year 2000. The life expectancy at birth has gone up from 45.6 in 1970 to 62.6 in 1998. The mortality due to infectious and communicable diseases like Cholera, Gastro-enteritis, Diphtheria, Tetanus etc., has also registered a considerable decline. The infant mortality rate has gone down from 113 per 1000 live births in 1971 to 66 per 1000 live birth in 1998. The maternal mortality rate has declined from 3.8 in 1993 to 1.54 in 1997-98. The morbidity (sickness) in the community is dominated by communicable diseases. The major sickness continues to be due to Malaria, T.B., Diarrhoeal diseases and Acute Respiratory diseases, followed by malnutrition. Due to epidemiological transition taking place in the state, there is now a marked increase in the incidence of Non-Communicable Diseases such as Cardiovasular ailments, Cancer, and Diabetes.

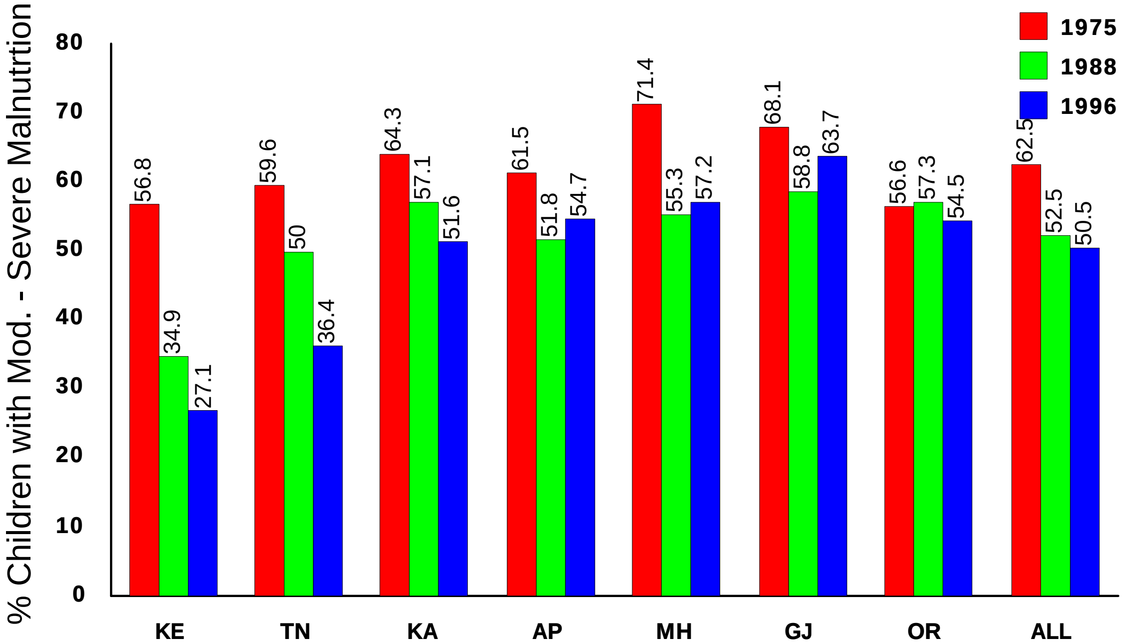
Conventional Indicators of population health status:

The World Health Organisation (1981) identified five broad indicators to measure health status of a population. These include; (a) nutritional status of children, (b) infant mortality rate (IMR) (c) under five child mortality, i.e. mortality below five years age, (d) life expectancy, and (e) maternal mortality rate (MMR). IMR, under five child mortality, and life expectancy represent various aspects of general mortality. If we group these together, the health status indicators listed above reduce to three sets, namely; (a) nutritional status, (b) general mortality, and (c) maternal mortality. Health status of the state is described here using these three group of indicators.

A. Nutritional status:

Nutritional status is a positive health indicators (WHO, 1981 p32). There are many ways to measure nutritional status. Among these, the weight-for-age status of the preschool children, is considered to be the most sensitive indicator of community nutrition. For adults the body mass index (BMI) is considered more appropriate. The National Nutrition Monitoring Bureau (NNMB) at the National Institute of Nutrition, Hyderabad assesses nutrition situation in the country on a continuous basis. NNMB measures nutrition status in 10 states including Andhra Pradesh. Statistics and data regarding nutritional status of AP and other states has been culled out from periodic reports of the NNMB.

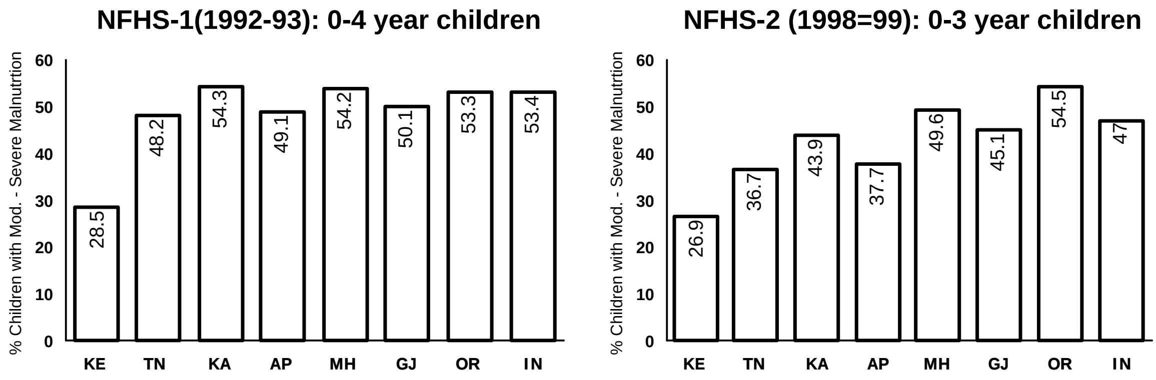
Figure-1: Malnutrition among preschool children in AP and other states.



[1] Source: Based on Weight-for-age data from NNMB Repeat Surveys 1975-79, 88-90, and 96-97.

The NNMB has so far conducted one reference and two repeat surveys to assess changes in nutritional status of population in the study states. The reference survey took place in 1975-79 and the two repeat surveys took place during 1988-90 and 1996-97. Figure-1 shows time trend of moderate to severe malnutrition prevalence among preschool children in different states, based on weight-for-age. The figure shows three bars for each state coloured red, green and blue from left to right. Each bar represents the percentage of preschool children with moderate to severe malnutrition based on weight-for-age measurements. Figures at the top of each bar give the exact percentage for respective repeat survey period. The bars shown above ALL represents the average for the states included in the survey. Many big states like UP and Bihar are not represented in the NNMB monitoring system. Hence it will not be accurate to think of the combined estimate for All NNMB states as the country estimate. In AP, as in most other NNMB states, there has been an improvement in nutritional status over the years. Kerala and Tamil Nadu show substantial and consistent improvement in nutritional status of preschool children. Karnataka has also shown consistent decline in prevalence of malnutrition.

Figure-2: Under nourishment in preschool children according to NFHS.

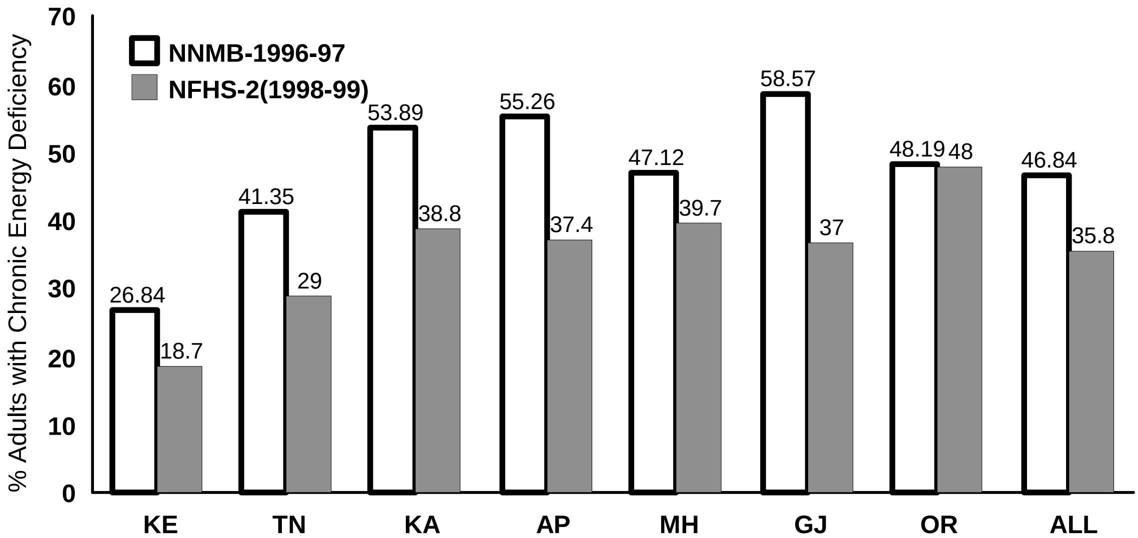


[1] Source: Data for the NFHS-1 chart is from IIPS (1995) Table-10.10 p286, and for the NFHS-2 chart is from IIPS(2000) table-7.17 p270.

The National Family and Health Surveys (NFHS) provide an independent estimate of prevalence of malnutrition among preschool children. Two NFHS have been conducted in the country so far. Andhra Pradesh has been covered in NFHS-1 (IIPS, 1995) during 1992-93, as well as in NFHS-2 (IIPS, 2000) conducted during 1997-98. Unfortunately the two NFHS reports present wieght-for-age data for slightly different age groups. NFHS-1 presented data for children aged 4 years and younger, and NFHS-2 has presented for children in 0-3 years age group. So it will not be proper to compare the percentages from the two surveys. However, the data is good enough to compare relative position of different states. Figure-2 compares the prevalence of moderate to severe under nourishment in AP and other states according to the two NFHS surveys. The first NFHS survey (left chart) shows that Kerala had the lowest prevalence of under nourishment and all other NNMB states including Andhra Pradesh had a higher but similar prevalence of malnutrition. The second NFHS survey shows that the states have some what differentiated probably on account of differences in interventions and programme implementation in the interregnum. According to NFHS-2 Kerala continued to show the lowest prevalence of malnutrition. Tamil Nadu and Andhra Pradesh show similar levels of malnutrition (36-68%). Karnataka showed a slightly higher level of malnutrition compared to AP. States like Maharashtra and Orissa had much higher levels of malnutrition among preschool children.

Body mass index (BMI) is an indicator of energy deficiency or obesity in adults. BMI is computed from weight and height measurements. BMI for any person is the ratio of weight in kilograms to the square of the height in metres. Normal range for BMI is between 18.5 kg/m^2 to 25 kg/m^2. Persons with BMI less than 18.5 kg/m^2 are considered to suffer from chronic energy deficiency (CED) and those with BMI greater than 25 kg/m^2 are the obese. We have BMI data from two sources, namely the NNMB repeat survey 1997 and the NFHS-2 survey in 1998-99. Figure-3 shows that chronic energy deficiency among adults of AP was comparatively higher than the average for all NNMB states. Kerala and Tamil Nadu are much better placed. Karnataka shows similar levels of chronic energy deficiency among adults. The NFHS-2 data show considerably better picture for all states, except Orissa. The comparative picture between AP and Kerala or Tamil Nadu remains the same, with the later two states showing much lower prevalence of chronic energy deficiency.

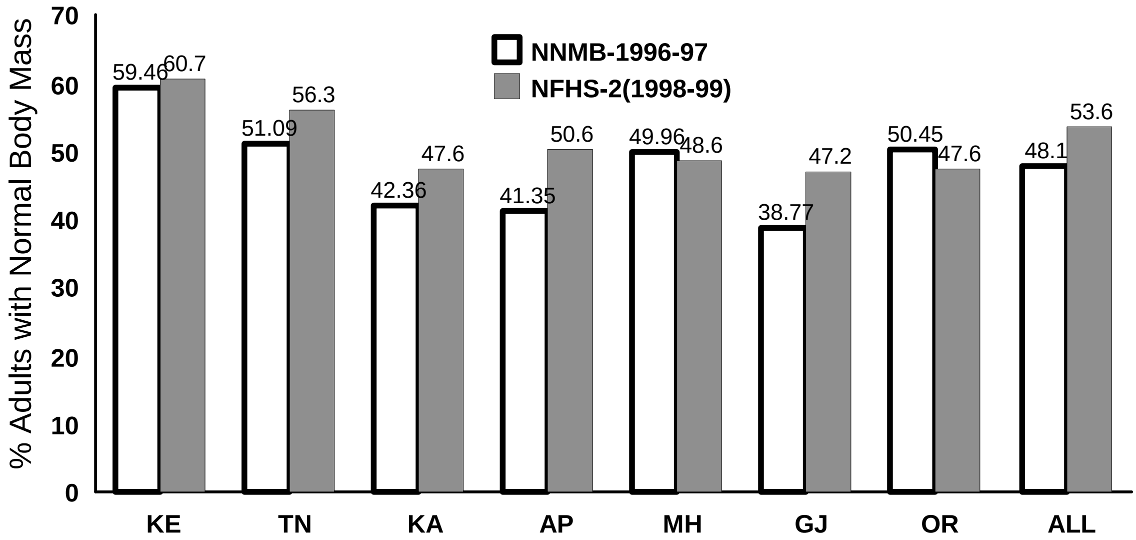
Figure-3: Chronic Energy Deficiency (CED) in adults of AP and other states, 1996-97, 1998-99



[1] Source: Based on Body mass index (BMI) data from NNMB Repeat Survey 1996-97 and NFHS-2 (IIPS, 2000)

Another way to look at adult nutrition is to view the percentage of people whose body mass falls in the normal range. Figure-4 shows the comparative picture for all NNMB states. Only about 40% of adults in AP had normal body mass around the period 1996-97. The NFHS-2 data show a slightly better picture for AP. Too little and too much of body mass are cause for concern. Less than normal body mass signified chronic energy deficiency, i.e. lack of access to food. More than normal body mass means obesity. The proportion of people with normal body mass can be low if either the prevalence of chronic energy deficiency or obesity is high or both are simultaneously high. For example, about 14% people in Kerala are obese. In Tamil Nadu about 8% people are obese. Compared to these two states, prevalence of obesity in AP is negligible (3%). Thus the low figure of persons with normal body mass, in AP, is clearly attributable to energy deficiency.

Figure-4: Adults with normal body mass in AP and other states, 1996-97, 1998-99.

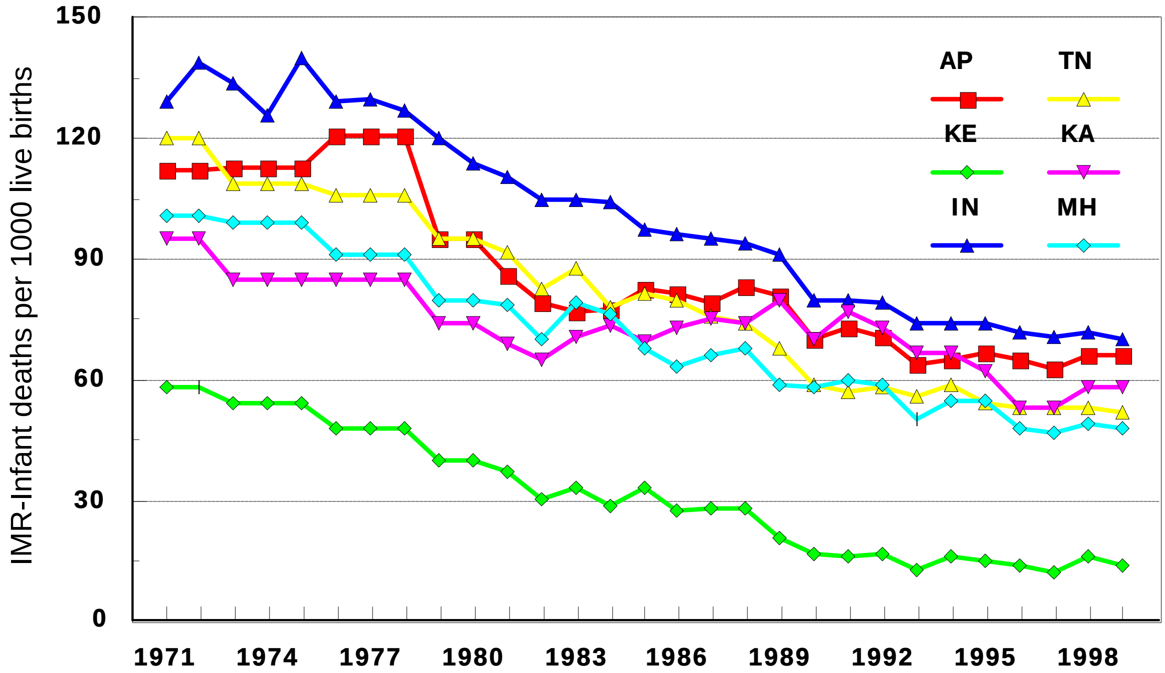


[1] Source: Based on Body mass index (BMI) data from NNMB Repeat Survey 1996-97. State of Health and Family welfare in AP

B. General mortality level (IMR, Child mortality, and Life Expectancy):

The Infant Mortality Rate (IMR) is calculated as the number of infant deaths under one year age per 1000 live births. IMR is not only an indicator of the health status of infants, but also of the whole population and their socio-economic conditions. In addition, IMR is a sensitive indicator of the availability, utilisation and effectiveness of health care, particularly perinatal care (WHO,1981 p34).

Figure-5: Infant mortality trend in AP and other states 1970s-1990s

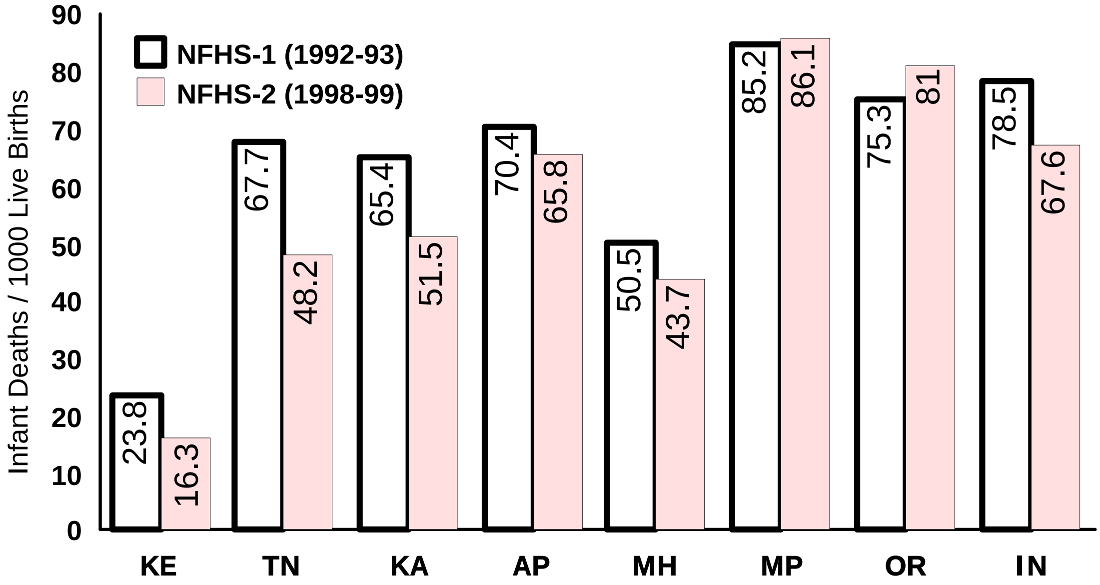


[1]Source: SRS Annual Reports. For some years, mostly during the 1970s, SRS statistics was not available. In these cases, preceding year SRS statistics state has been adopted.

The IMR of the state registered a consistent decline from 110-120 in 1970s to 66-70 in 1990s (Figure-5). The All India (blue line in fig.-5) estimate of IMR was about 130 during the 1970s and declined to about 70-80 during the 1990s. The reduction of IMR in AP (red line in fig.-5) has been keeping pace with the national trend. However performance of the state has been much less than that of Kerala (green line in fig.-5), and Tamil Nadu (yellow line in fig-5). Kerala started with a lower level of IMR during the 1970s and has experienced consistent improvements over time. Tamil Nadu started with a level of IMR similar to AP. The trend of IMR improvement in Tamil Nadu is better than AP. Both states started with similar levels of IMR in 1970s and improved the same more or less similarly during the 1980s. During 1990s, Tamil Nadu continued its improvements in IMR but Andhra Pradesh appears to have slowed down, resulting in a gap of about 10 infant deaths per 1000 live births between the two states. Though AP has performed reasonably well in reducing IMR, it has definitely not been able to exploit the full potential available to it. One particular concern is the slow down in reduction of IMR in the state, during the 1990s.

The NFHS surveys in 1992-93 and 1998-99 provide an independent estimate of IMR and its trend. Figure-6 shows IMR from the two NFHS surveys. The trend and comparative position of AP to other south Indian states is same as can be inferred from the SRS data presented earlier in Figure-5. IMR in AP is slightly lower than the national average and is higher than other south Indian states. The decline in IMR between NFHS 1 and 2 is more marked for Kerala, Tamil Nadu, and Karnataka.

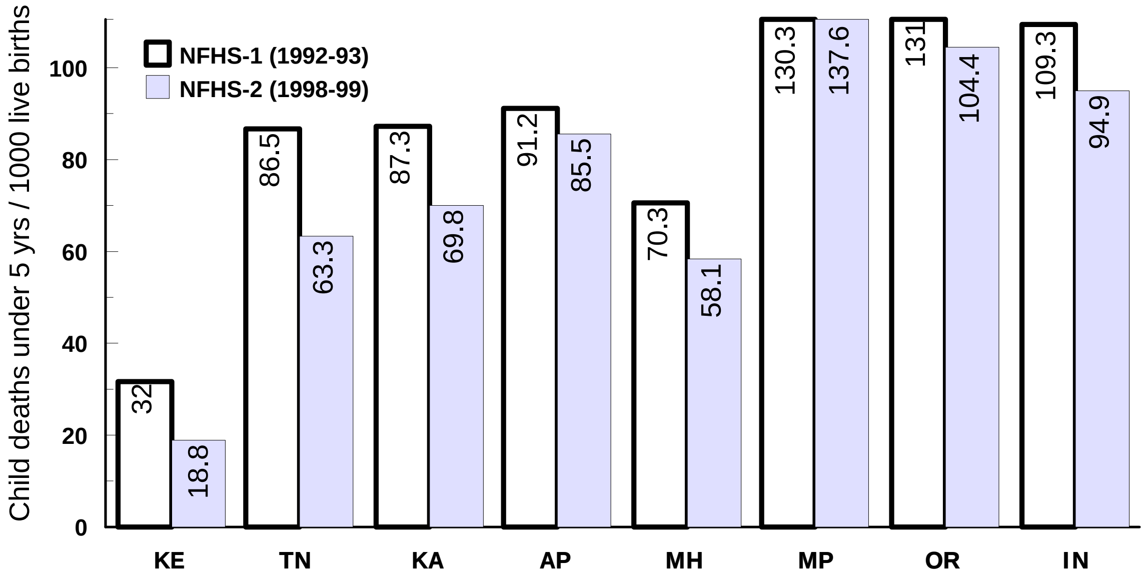
Figure-6: IMR trend in AP and other states according to NFHS-1&2



[1] Source: NFHS-1data from IIPS(1995) Table-8.8 p221; NFHS-2 data from IIPS(2000) Table-6.6 p194

Figure-7 shows under five mortality for AP and other states according to NFHS 1 in 1992-93 and NFHS-2 in 1998-99. Andhra Pradesh shows slightly higher mortality for children under five years, compared to Tamil Nadu and Karnataka. The decline in under five mortality between the two NFHS survey periods was less for Andhra Pradesh in comparison to other south Indian states like Kerala, Tamil Nadu and Karnataka.

Figure-7: Under five mortality in AP and other states according to NFHS-1&2



[1] Source: NFHS-1data from IIPS(1995) Table-8.8 p221; NFHS-2 data from IIPS(2000) Table-6.6 p194

Life expectancy is an indicator of socioeconomic development in general and long-term survival (WHO, 1981). Life expectancy of a population at a given age is the average years of life lived by those reaching that age. For example life expectancy at birth of 60 years means that all children taking birth in the population can on an average expect to live for 60 years. Life expectancy at birth is highly influenced by the IMR, particularly if it is at a high level.

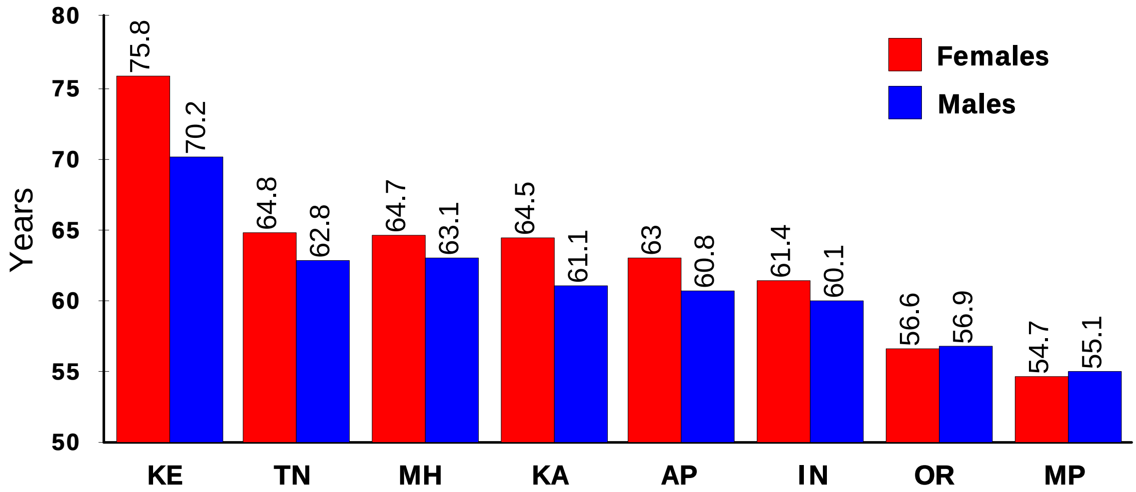
Table-1 Life Expectancy at Birth of Andhra Pradesh, India and Kerala

Period	AP	Kerala	India
1951-61	36.9	48.3	41.2
1961-71	44.4	48.8	47.7
1971-81	55.7	65	54.4
1989-92	60.6	72	59.4
1992-96	62	73	60.7

[1] Source: Based on SRS mortality data

Table-1 shows estimates of life expectancy for Andhra Pradesh, Kerala and India at different points of time. Though expectation of life at birth was low in the state during 50s, by 70s it was slightly better than the national average, suggesting a significant improvement in the health status of people. There after life expectancy at birth in AP has remained slightly above the national average. Figure-8 shows female and male life expectancy estimates for AP and other states, for the period 1992-96. Life expectancy in AP is slightly better than the all India average, but is the lowest among the south Indian states. Life expectancy at birth is the best in Kerala, and better than AP in Tamil Nadu, Karnataka, and Maharashtra.

Figure-8: Life expectancy at birth in AP and other states, 1992-96



[1] Source: Based on SRS mortality statistics

C. Maternal mortality:

Precise estimates of maternal mortality rate (MMR) in Andhra Pradesh is not available. The NFHS did collect data to estimate maternal mortality rates. Both NFHS-1&2 give MMR estimates at the national level. All India estimate of MMR ranges from 400 to 500 deaths per 100000 live births (IIPS, 2000 p196). Mahapatra (2000) studied cause of death pattern in Andhra Pradesh and estimated that about 0.8% of female deaths in rural areas were due to maternal causes. This would imply that MMR in AP may be around 200 per 100000 live births. Estimates by programme implementation agencies of the state estimate that the Maternal Mortality rate has declined from 3.8 in 1993 to 1.54 in 1997-98.

D. Summary measures of population health and the burden of disease in Andhra Pradesh:

With epidemiologic transition from communicable diseases to non communicable and degenerative disease, measurement of non fatal outcomes assumes importance. Summary measures of population health are designed to incorporate mortality experience of a population with the level of morbidity in a single number. These can either be measures of healthy life expectancy like the disability adjusted life expectancy (DALE) or health gaps like the disability adjusted life years (DALY) lost due to disease. Simply put, DALYs are calculated with respect to a reference standard life expectancy. The AP burden of disease study uses a standard life expectancy at birth of 80 years for males and 82.5 years for females, similar to the standard used by the World Development Report 1993, and the World Health Reports. The population looses 40 Years of Life (YLL) on account of a male dying at the age of 40 years. Suppose for sake of public health analysis, we view the quality of life of a person living with a disease say tuberculosis to be 0.8. In other words we are assigning a disability of 0.2 for this condition. If a person is suffering from tuberculosis and has to live with the disease for say 10 years, we count 10 * 0.2 = 2 years of life lived by this person with disability (YLD). DALY is computed by calculating the YLD component and YLL component and adding them up together. The YLL component of DALY represents premature mortality and the YLD component represents disability / morbidity in the population. The World Bank's World Development Report, 1993 titled "Investing in health" used the disability adjusted life years (DALY) measure to estimate burden of disease in different parts of the world. The World Health Organisation started using summary measures like the DALY and DALE starting with the World Health Report 1999. In Andhra Pradesh, Mahapatra (2000) has estimated the burden of disease in the state during the 1990s using similar methodology. In the following paragraphs, an overview of the burden of disease in AP during the 1990s, is presented, using estimates from the AP Burden of disease study (Mahapatra, 2000). In this study disease burden was measured using DALYs.

Table-2 shows ten leading causes of burden in rural and urban areas of the state. Six leading causes are common to both the areas. These are: (a) lower respiratory infections, (b) diarrhoea, (c) low birth weight, (d) ischaemic heart disease, (e) falls and (g) tuberculosis. Poor nutrition, lack of safe drinking water and sanitation are common risk factors for three of these, namely lower respiratory infection, diarrhoea, and low birth weight. Four of these (a, b, c, and g) are already included in various public health and disease control programs of the state. The results obtained here reinforces the desirability of those programs.

Table-2 Leading causes of disease burden (DALY) in rural and urban AP

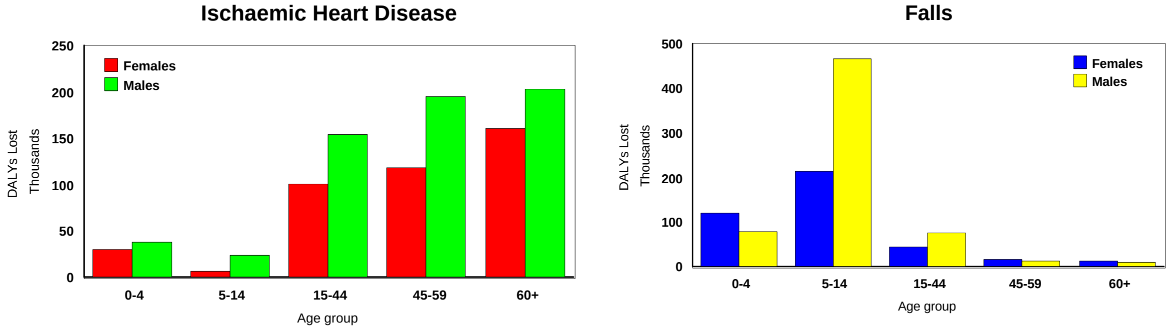
Rural: Cause	%	Urban: Cause	%
Lower respiratory infections	8.4	Falls	6.91
Diarrhoeal diseases	6.94	Low birth weight	6.32
Low birth weight	6.8	Lower respiratory infections	5.98
Ischaemic heart disease	6.09	Tuberculosis	5.34
Falls	5.45	Diarrhoeal diseases	4.00

Self-inflicted injury	4.24	Ischaemic heart disease	3.77
Tuberculosis	4.1	Fires	3.47
Cerebrovascular disease	2.56	Birth asphyxia or trauma	3.21
Bacterial meningitis	2.39	Road accidents	2.96
Epilepsy	2.24	Unipolar major depression	2.91
Road accidents	2.15		

[1] Source: Mahapatra, 2000; The Burden of Disease in Andhra Pradesh ,1990s. Table-6.1

It will be useful to look at the age pattern of the next two top causes of disease burden, namely ischaemic heart disease (IHD) and falls. Figure 9 shows the age distribution of DALYs lost due to these two conditions.

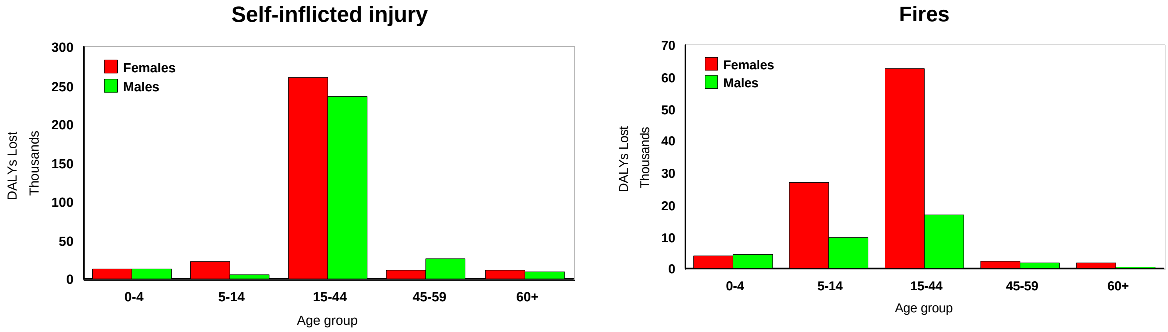
Figure 9: Age distribution of DALYs lost on account of IHD and Falls



[1] Source: Mahapatra, 2000; The Burden of Disease in Andhra Pradesh ,1990s. Figure 6.3

The burden on account of ischaemic heart disease occurs at older age groups. The age distribution of DALYs lost on account of falls is just the opposite. Most of the falls appear to occur at younger age groups. Children age group of 5 to 14 years are most vulnerable. Unfortunately, there is no initiative yet to study the causes of fall in children and how they can be prevented. Regarding ischaemic heart disease, a fairly large capacity of curative treatment of cardiac diseases have been developed in the state, mostly in the private sectors, and to some extent in the public sector. Attention on issue of lifestyle, and training of doctors in medical management of myocardial infarction are areas where some state intervention may be called for.

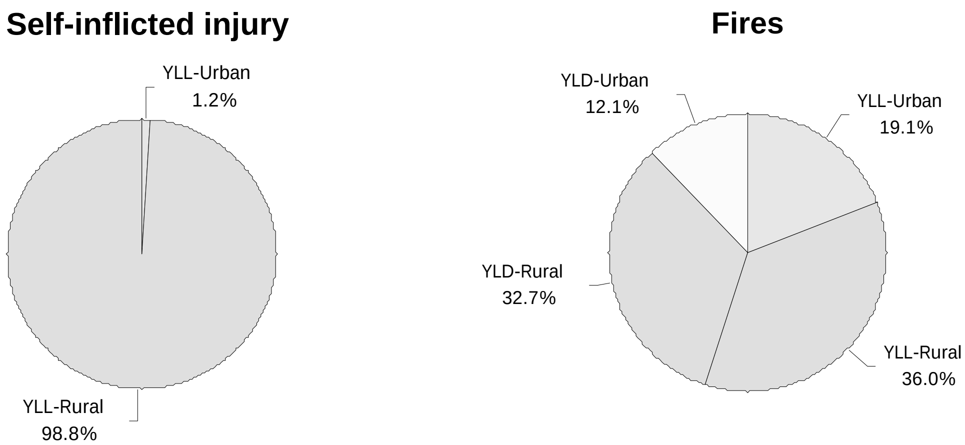
Figure 10: Age sex distribution of DALYs lost on account of suicide and fires



[1] Source: Mahapatra, 2000; The Burden of Disease in Andhra Pradesh ,1990s. Figure 6.4

Among the leading causes of burden unique to the rural area, self-inflicted injury deserves attention. Figure 2 shows the age distribution. Clearly almost all of these deaths are in the adult age group 15 to 44 years. Figure 11 shows the rural, urban, YLL and YLD break up of the DALYs lost due to self-inflicted injuries and fires.

Figure 11: Rural-Urban and YLL-YLD break up of DALYs lost on account of suicide and fires.

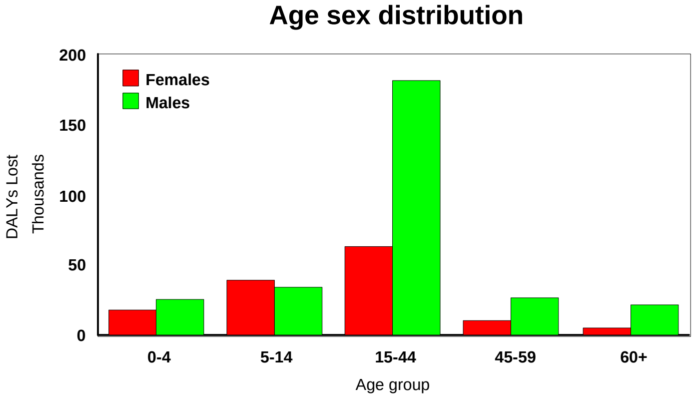


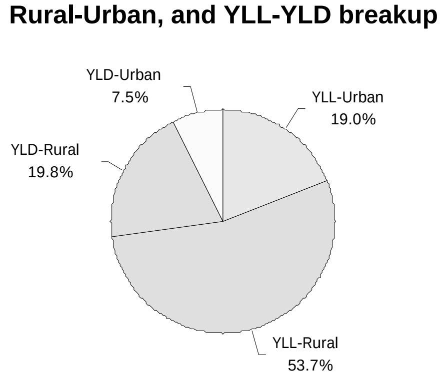
[1] Source: Mahapatra, 2000; The Burden of Disease in Andhra Pradesh ,1990s. Figure 6.5

The DALYs lost due to self-inflicted injury are simply deaths due to suicide and most of it is in rural areas. The age distribution of burden due to fires is similar to age distribution for self-inflicted injuries. DALYs lost on account of fire accidents are mostly among adults and young children. The difference between the age-sex pattern of burden due to fires in urban areas and suicide in rural areas is in the gender distribution. Incidence of self inflicted injuries in rural areas appears to be nearly equal for females and males. In urban areas, females are the major victims of fire accidents. Although fires showed up in the ten leading causes of burden in urban areas, the problem is just as prevalent as in rural areas. As seen in

Figure 11 (right plot), the bulk of the disease burden attributable to fires is in the rural areas. This is simply due to the large population in the rural areas. Fires have caused both premature mortality and disability.

Figure 12: DALYs lost due to road traffic accidents





[1] Source: Mahapatra, 2000; The Burden of Disease in Andhra Pradesh ,1990s. Figure 6.6

Road accidents are another cause for concern, rampant in both urban and rural areas. Although road accidents did not show up within the ten leading causes for rural areas, it happens to be the eleventh cause of burden in rural areas. Victims here are mostly in adults in age group 15-44, although all other age groups do suffer some burden due to road accidents. More males are affected.

In urban areas, birth asphyxia and trauma are among the ten leading causes of DALYs. Most of this burden is on account of premature mortality. Appearance of the burden due to birth asphyxia and trauma in the urban areas, instead of the whole state, could be due to location of hospitals and nursing homes. Birth asphyxia and trauma are most probably reported from hospitals and nursing homes, most of which are located in urban areas. These would include cases from both rural and urban areas, since hospitals in urban areas do serve surrounding rural hinterlands. Hence, it would be reasonable to say that birth asphyxia and birth trauma is an important cause of disease burden for the whole state. This finding has important implications for policy regarding development of infrastructure for institutional deliveries and also for the quality of maternity services provided by hospitals and nursing homes.

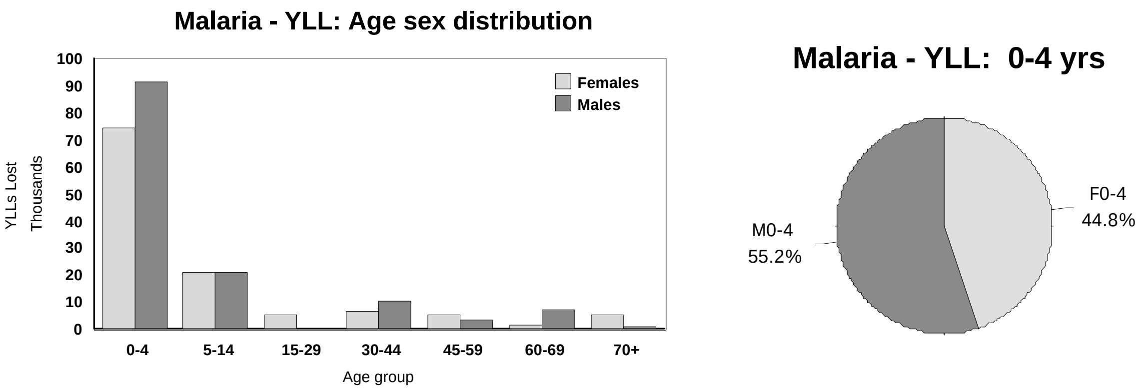
Table 3 Leading causes of premature mortality (YLL) in AP

Rural: Cause	%	Urban: Cause	%
Lower respiratory infections	11.43	Low birth weight	9.74
Diarrhoeal diseases	9.26	Lower respiratory infections	9.4
Low birth weight	9.01	Tuberculosis	7.86
Ischaemic heart disease	8.49	Ischaemic heart disease	6.18
Self-inflicted injury	6.00	Diarrhoeal diseases	5.84
Tuberculosis	5.12	Birth asphyxia or trauma	4.17
Cerebrovascular disease	3.25	Road accidents	3.59
Bacterial meningitis	3.22	Fires	3.58
Cirrhosis of the liver	2.63	Cerebrovascular disease	3
Malaria	2.47		
Road traffic accidents	2.22		

[1] Source: Mahapatra, 2000; The Burden of Disease in Andhra Pradesh ,1990s. Table-6.2

Table 3 shows the leading causes of burden due to premature mortality. Most of the leading causes of overall disease burden, for example, lower respiratory infections, diarrhoeal diseases, low birth weight, tuberculosis, etc are repeated here. In addition, malaria appears as a leading cause of mortality in rural areas. Most of the premature mortality due to malaria occurs in infancy and early childhood (Figure 13).

Figure 13: Age distribution of premature mortality due to malaria in rural areas.



[1] Source: Mahapatra, 2000; The Burden of Disease in Andhra Pradesh ,1990s. Figure 6.7

Table-4: Leading causes of disability (YLD) in Andhra Pradesh

Rural: Cause	%	Urban: Cause	%
Falls	16.43	Falls	16.22
Unipolar major depression	6.66	Unipolar major depression	7.14
Epilepsy	5.64	Epilepsy	5.85
Cataracts	3.65	Schizophrenia	3.37
Fires	3.26	Fires	3.32
Schizophrenia	3.00	Cataracts	2.98
Protein-energy malnutrition	2.66	Lymphatic filariasis	2.53
Lymphatic filariasis	2.39	Protein-energy malnutrition	2.45
Obsessive-compulsive disorders	2.23	Obsessive-compulsive disorders	2.4
Chlamydia	2.16	Chlamydia	2.37
Abortion	2.11	Abortion	2.32

[1] Source: Mahapatra, 2000; The Burden of Disease in Andhra Pradesh ,1990s. Table-6.3

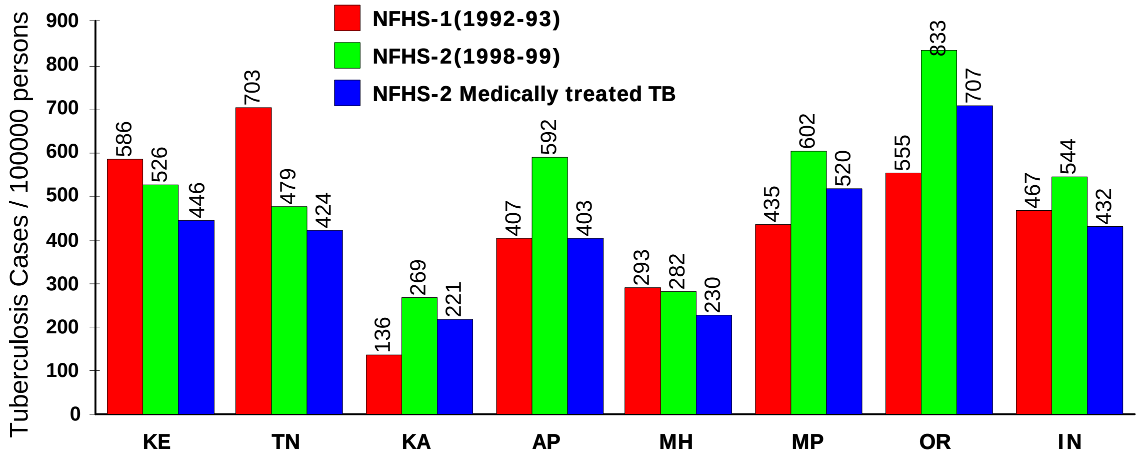
Table 4 shows leading causes of disability in the state. Falls and fires are among the leading causes of disability. This reflects the fact that falls and fires not only cause loss of life, but also produce a lot of disability. Protein energy malnutrition is a major cause of disability. The burden is on account of developmental disability suffered by children due to poor nutrition. Unipolar major depression is yet another leading cause of disability to be viewed along with the fact that suicide is a leading cause of premature mortality. Cataract blindness, for which a control program is under implementation, is also among the leading causes of disability.

E. Selected Morbidity Indicators:

1. Tuberculosis

The NFHS included questions for the head of household to find out existence of any of the identified major morbidity conditions. Tuberculosis was included in both the surveys. Prevalence of tuberculosis in Andhra Pradesh appears to have slightly increased between the two surveys. The question about medically treated tuberculosis would give a more accurate estimate. Since the NFHS-1 did not have such a question, we can not compare between the two surveys using this parameter. However, the prevalence of medically treated tuberculosis at the time of NFHS-2 was similar to the prevalence of perceived tuberculosis at the time of NFHS-1. That would mean that the real prevalence of tuberculosis has definitely gone up slightly between 1992-93 and 1998-99.

Figure-14: Tuberculosis prevalence in AP and other states, 1992-93 and 98-99

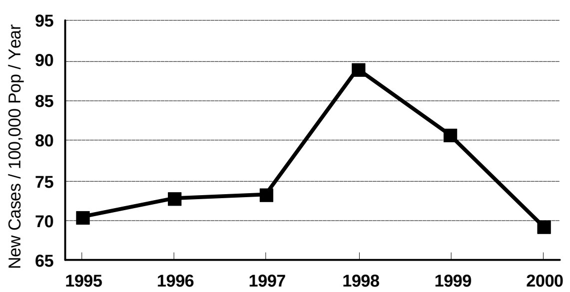


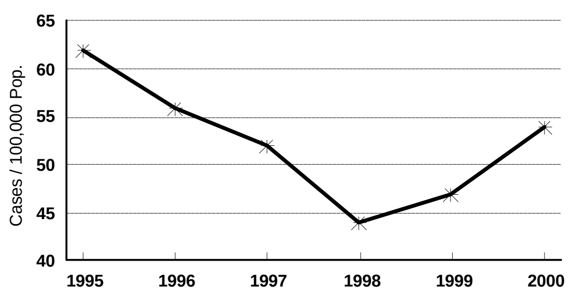
1 Source:NFHS-1 data from IIPS(1995) Table-8.2 p205;NFHS-2 Data from IIPS(2000) Table:6.8 p202

2. Leprosy

Andhra Pradesh is a known endemic area of leprosy. Prevalence of leprosy has been brought down from 133 per 10,000 in 1961 to 124 /10,000 in 1983, 56 /10,000 in 2000.

Figure-15: Recent trend of Leprosy incidence and prevalence in AP

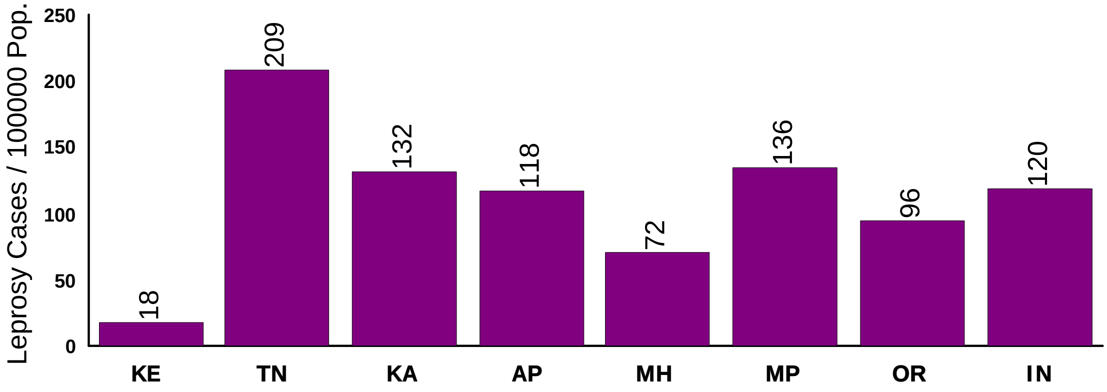




1 Source: Directorate of Health, Government of AP.

Figure-15 shows recent trends in incidence and prevalence of leprosy in the state. There was slight spurt in leprosy cases during the years 1998, and 1999. The incidence has reverted to its low position there after. The prevalence figures shows a general decline except for a spurt in the last two years, contributed by the increased incidence in previous two years. The close similarity of prevalence and incidence figures suggest that the programme for treatment of leprosy is quite effective, resulting in quick cure. As a result the duration of suffering from leprosy by those who get the infection, appears to be low.

Figure-16: Leprosy prevalence in Andhra Pradesh, other states and all India.



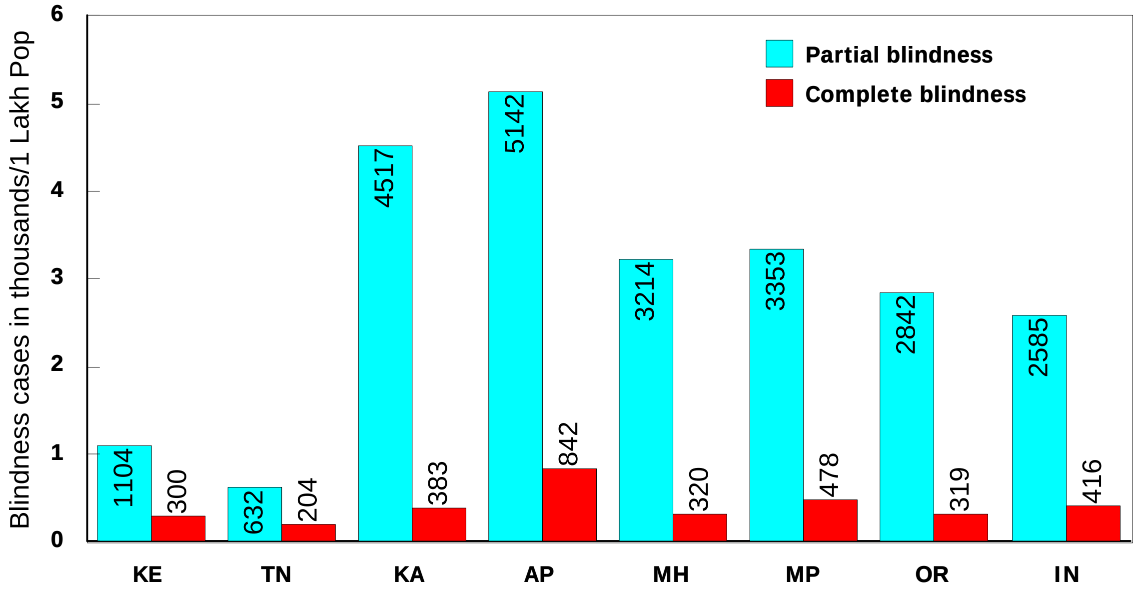
[1] Source:NFHS-1 data from IIPS(1995) Table-8.2 p205;

The NFHS-1 included a question on leprosy. In NFHS-2 the question on leprosy was dropped to accommodate questions on other conditions. Figure-16 plots data from NFHS-1, and provides us with a comparative picture between AP and its neighbouring states. Prevalence of leprosy is quite low compared to the neighbouring states of Tamil Nadu, Karnataka, and Madhya Pradesh. Maharashtra has significantly lower prevalence and Orissa has slightly lower prevalence of leprosy. Overall the performance of Leprosy control programme in the state appears to have been very good.

3. Blindness

The NFHS-1 asked a question about blindness. As seen below, prevalence of both partial and complete blindness is more in AP and Karnataka compared to other neighbouring states. The National blindness control programme under implementation in the state seeks to reduce the prevalence of blindness.

Figure-17:Blindness cases in AP and other states, 1992-93

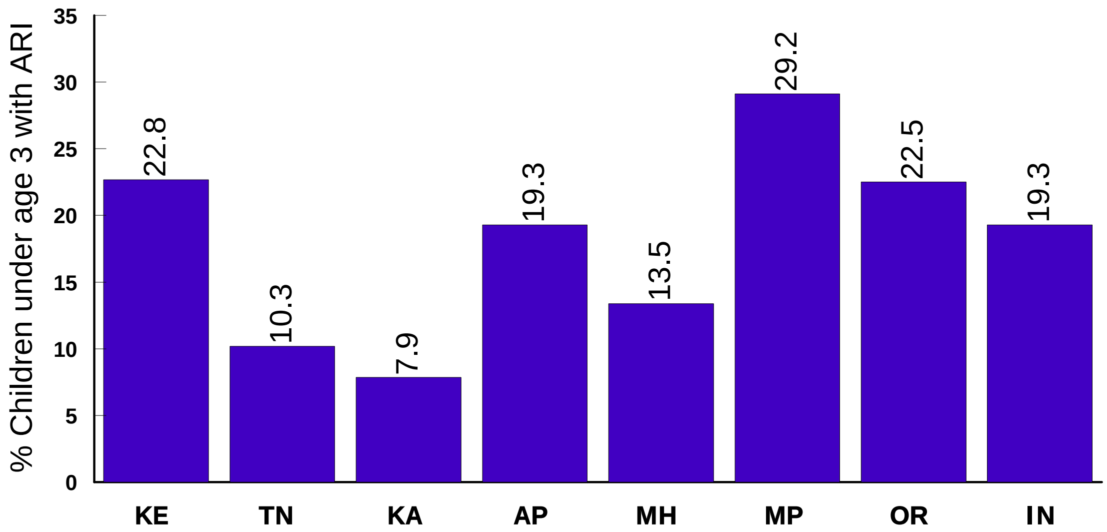


[1] Source:NFHS-1 data from IIPS(1995) Table-8.2 p205

4. ARI (Pneumonia)

Acute respiratory infections is an important childhood morbidity. Point prevalence of ARI in AP was lower compared to Kerala, Madhya Pradesh and Orissa. Other neighbouring states like Tamil Nadu, Karnataka and Maharashtra had lower point prevalence of ARI.

Figure-18: Acute Respiratory Infection (Pneumonia) cases among children upto 3 year age in AP and other states, 1998-99

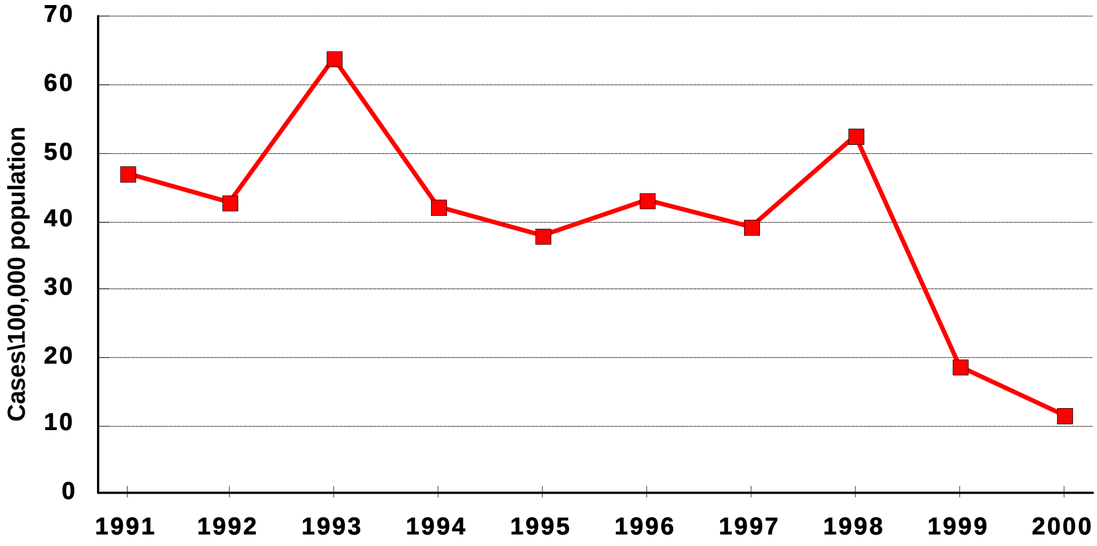


[1] Source:NFHS-2 Data from IIPS(2000) Table:6.8 p202

5. Diarrhoea

The figure below shows gastroenteritis incidence in the state over the past decade (1991 - 2000). There is a gradual decrease in incidence except for the spurt of incidence in years 1993 and again in 1998.

Figure-19: Gastroenteritis Incidence in Andhra Pradesh, 1991-2000



The following figures shows district wise gastroenteritis incidence for the past decade. Six districts fall under high incidence districts, seven in medium incidence and ten districts in low incidence districts.

Figure-20: Gastroenteritis High Incidence Districts, 1991-2000

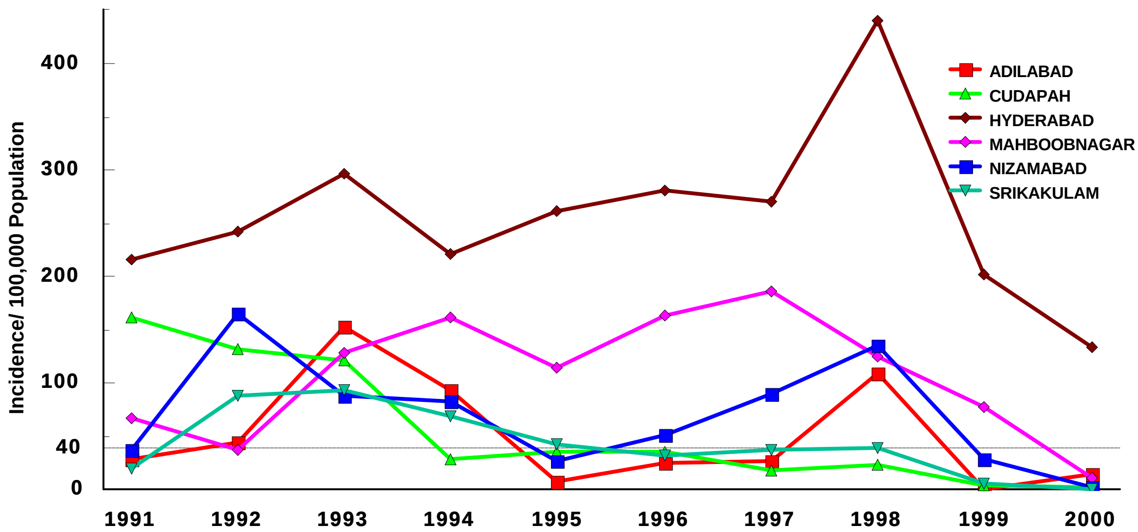


Figure-21: Gastroenteritis Medium Incidence Districts, 1991-2000

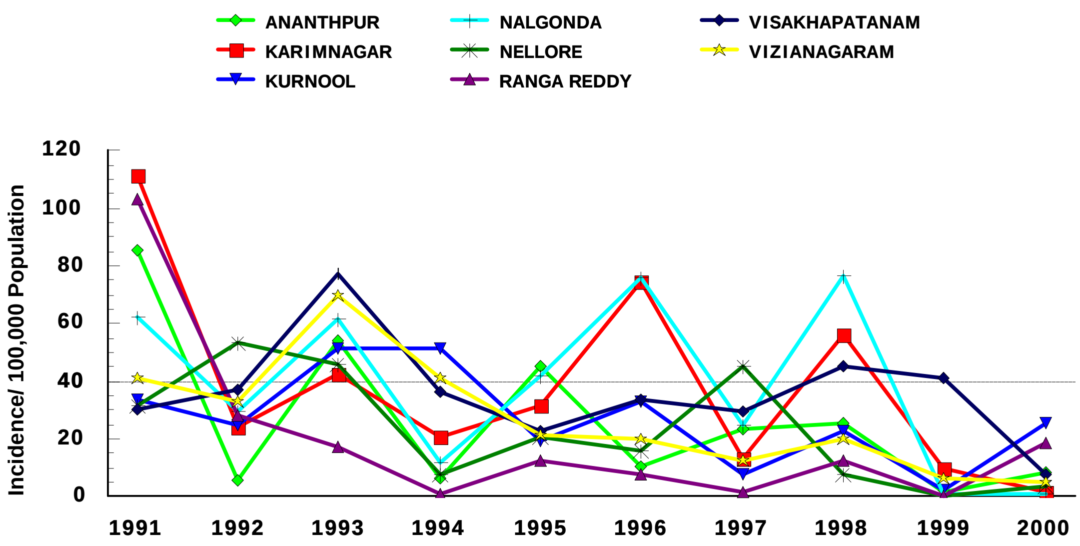
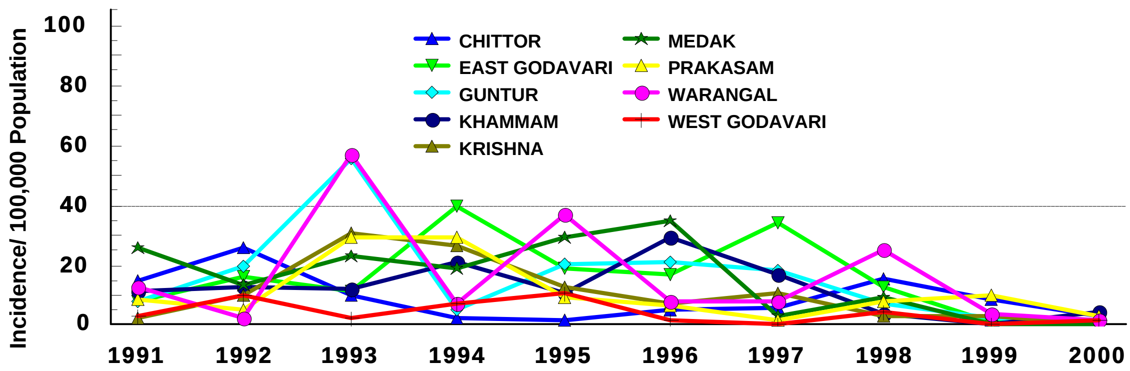
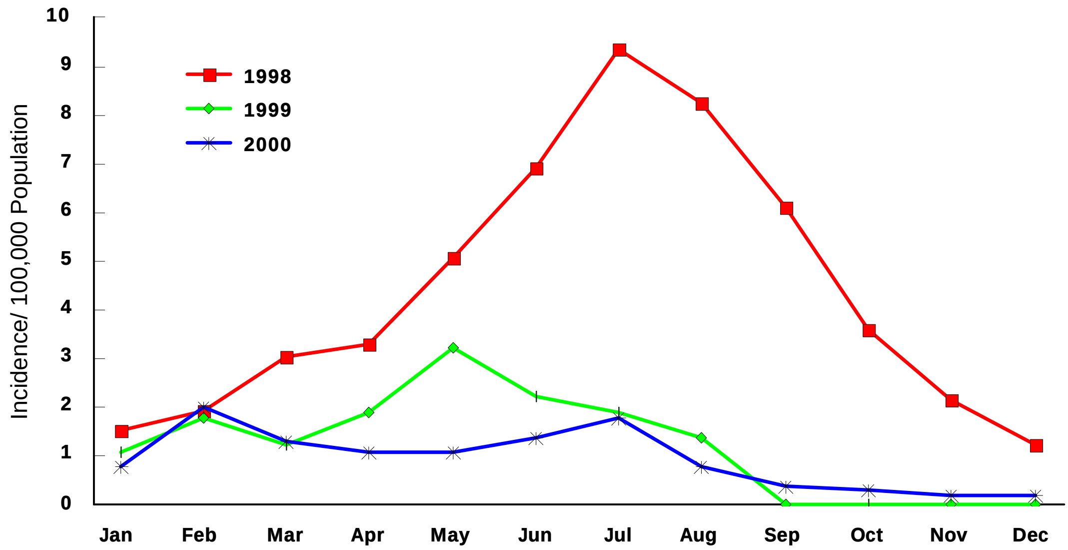


Figure-22: Gastroenteritis Low Incidence Districts, 1991-2000



Knowledge of seasonal trends of gastroenteritis is essential for mobilisation of public health officials and effective prevention of epidemics. Unfortunately, seasonal data on incidence of gastroenteritis was not being collected regularly. Recently the Directorate of health has started collecting seasonal data on GE incidence. Currently GE incidence reports are expected every month. We have monthly data for three years, namely 1998, 1999 and 2000. Figure- 23 shows the seasonal trends for these three years. As expected GE incidence is seen to be higher between April to September months. The level of GE incidence was much higher in 1998. It came down significantly during 1999. But the seasonal pattern of excess cases during summer and rainy season is evident from the incidence data for the three years. In 1998 peak month of GE cases was July i.e. rainy season. During 1999 the peak month was May i.e. summer. But for 2000 the peak month was February. The summer peaks of 1999 and 2000 are less than the summer level of cases in 1998. It is possible that there was no change in environmental factors operating in summer months. Lack of the rainy season peak in 1999 would suggest the environmental factors that generally operate in rainy season might have been controlled in 1999. Overall level of GE incidence was lower in the year 2000. A small peak of incidence was seen in February and another in July. The summer months had relatively higher incidence than the other months. Gathering such seasonal information over a long period of time and by district and cities would help in more detailed analysis and help formulation of more effective preventive policies. Hence public health officials at all levels should gather and report GE statistics at regular intervals. These data should be analysed by month and preferably by week trends compared with previous years. Study of these trends should be supplemented with qualitative comparisons of changes in environment and plausible hypotheses should be developed to guide current strategy for prevention.

Figure-23 Seasonality of Gastroenteritis in Andhra Pradesh 1998 -2000

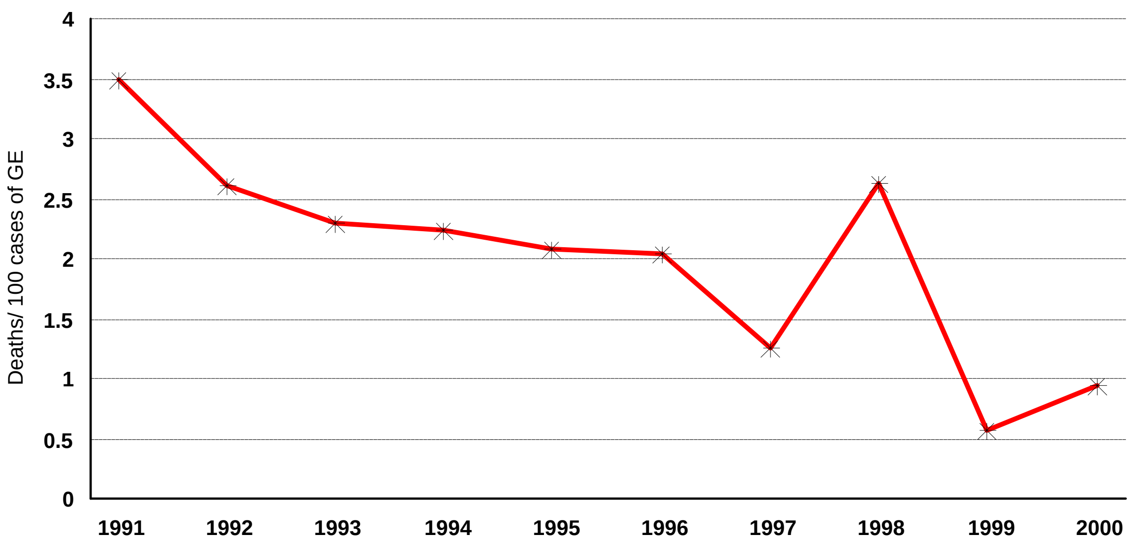


Case fatality rate tells us how effective is the management of gastroenteritis once it occurs. In other words CFR tells us how successful is the household in recognising gastroenteritis and giving oral rehydration, how successful are our health workers in early management of gastroenteritis and how well our hospital teams are doing in management of severe gastroenteritis cases. Since we have very highly effective technology to manage gastroenteritis cases, the case fatality should be low. The sheet anchor of gastroenteritis management is giving fluids at home, oral rehydration solution, and management of fluid balance in hospitals.

There is a decline in GE incidence and related case fatality in the last two years. This decline in case fatality rate would suggest that health education efforts to promote oral rehydration and hospital management of gastroenteritis cases is having some impact. However, the absolute level of CFR, even after the recent reduction is not acceptable. As mentioned earlier gastroenteritis is a treatable condition. With appropriate management, almost every gastroenteritis patient should recover. But we are still left with a case fatality of about 1%. In other words 1 out of every 100 gastroenteritis patients is dying. Quite clearly, the health education efforts need to be further intensified, health worker skills in early management of diarrhoea needs to improve and hospitals must strictly follow practice guidelines.

There was an increase in case fatality in 1998. This again suggests that we have not been able to consolidate skills for effective management of gastroenteritis at different levels.

Figure-24: Gastroenteritis Case Fatality Rate in AP, 1991-2000

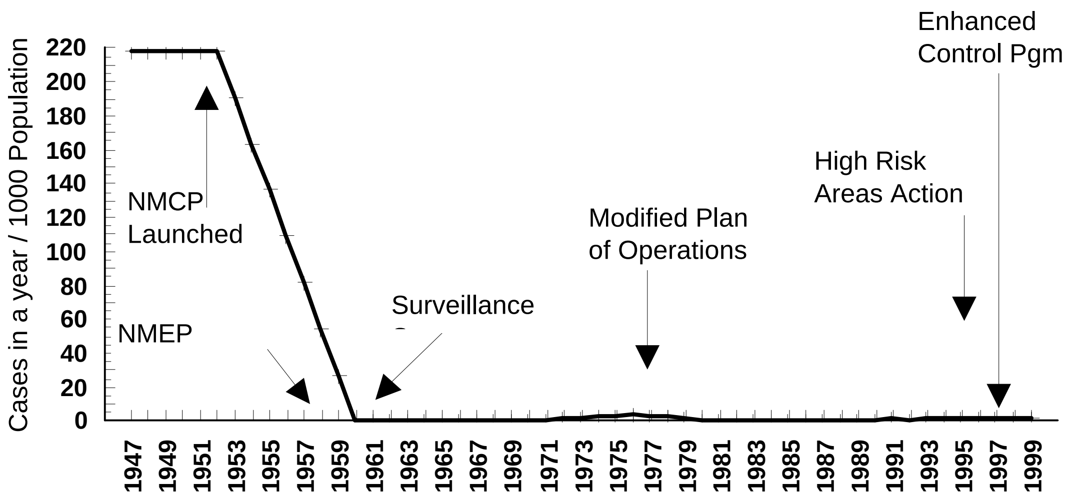


6. Malaria

Till the 1940s, Malaria was rampant in the state as in most other parts of the country. The annual incidence of malaria was around 220 / 1000 population up until 1953 when the National Malaria Control Programme (NMCP) was introduced. There was a dramatic and continuous decline in incidence of malaria after introduction of the NMCP. Encouraged by the success of the control programme, the National Malaria Eradication Programme was introduced in 1958. Unfortunately, exact data on incidence of malaria is not available for this period. Malaria surveillance system was introduced in 1961. So annual parasite index, i.e. malaria incidence, data is available from 1961. By 1961, Malaria incidence had come down to about 0.27 / 1000 population. Based on historical account of the success of NMCP, a linear decline in incidence is assumed for the period 1953 to 1960. What ever may have been the pattern of decline in this period, malaria incidence reduced very dramatically by more than 99% of its level prior to introduction of the NMCP. Figure- 25 shows trend of malaria incidence for over 50 years. As will be seen later, the state is experiencing a resurgence of malaria. However, when viewed in comparison to the high incidence in the 1940s and early 1950s, the significant gains in control of malaria become obvious.

Figure-25 also locates the time of introduction of major interventions to control malaria in the country. The NMCP was introduced in 1953, followed by the NMEP in 1958. A National malaria control programme (NMCP) was launched in April, 1953. Spraying of DDT to control the mosquitoes was adopted. Country wide incidence of malaria came down from 75 million cases in 1952 to 2 million cases per year in 1958. The National malaria eradication programme (NMEP) was launched in the state since 1958. NMEP sought to abolish the human reservoir of malaria parasite and thereby eradicate the disease. The eradication strategy consisted of residual insecticidal spray, active case detection with treatment. The country wide incidence reduced to 0.1 million cases by 1965-66 with no deaths. There was a resurgence of malaria during mid seventies. Responding to this, a modified plan of operations (MPO) was introduced in 1977. Main components of this strategy include selective insecticidal spray in high risk areas, establishment of drug distribution centres (DDCs) and fever treatment depots (FTDs). In 1995 high risk areas action plan was introduced in order to minimise use of insecticides and to focus insecticidal spraying only in high risk areas. In 1997 the enhanced control programme was introduced in certain high risk tracts like the Tribal areas.

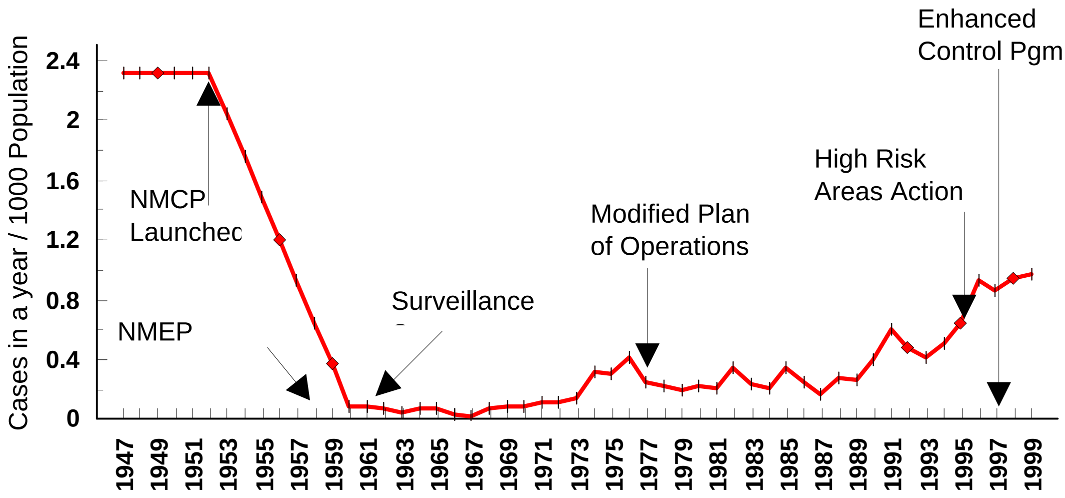
Figure-25: Long term trend of malaria incidence in Andhra Pradesh



[1] Source: API estimate for 1947-52 is based on estimated malaria cases in whole of India and population in 1947. API for the period 1953-60 is based on linear interpolation using malaria incidence just prior to introduction of NMCP and first surveillance data in 1961. Data for the years 1961-95 and after is based on surveillance data collected and reported by the Malaria programme authorities and published in Sharma, Sharma, and Dhillon 1996. Data for the years 1996 and after has been collected from the AP Directorate of Health - Malaria Programme Office.

Falciparum malaria is more severe and is usually responsible for most of the deaths due to this disease. Hence an understanding of the trend in incidence of falciparum malaria is useful. Figure 26 shows long term trend of falciparum malaria. After introduction of the surveillance programme in 1961, specific data about the annual falciparum index is available. This information is based on species of malaria parasite determined by examination of blood slides. Data is available for the period between 1953 to 1960. Although specific information about incidence falciparum malaria before 1953 is not available, we have data about deaths due to malaria. Since falciparum malaria is known to cause most deaths due to malaria, the pre 1953 incidence is estimated from information about the number of deaths due to malaria. In other words the pre 1953 falciparum incidence shown in Figure-26 is an underestimate, since we know that all falciparum cases do not lead to death.

Figure-26: Falciparum malaria trend in AP, 1947-2000.

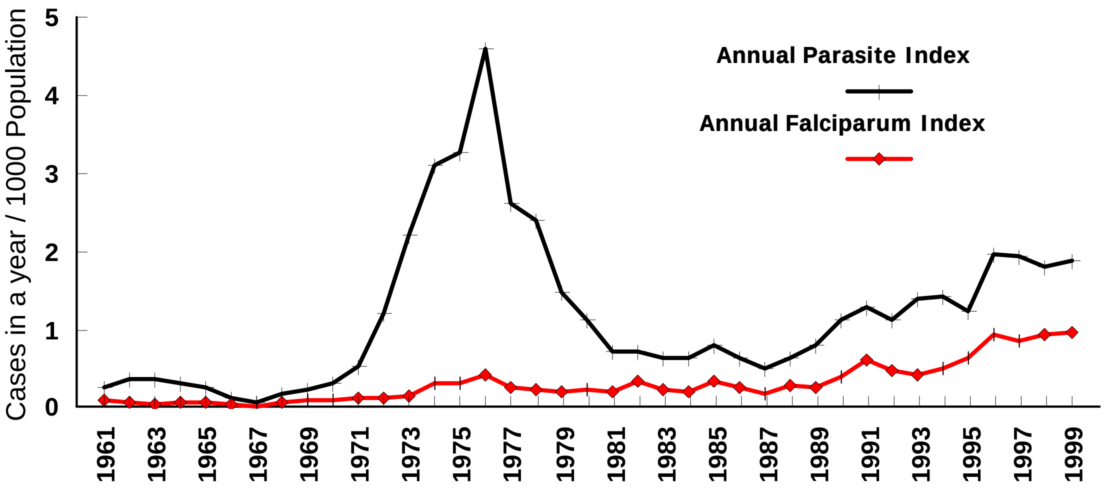


[1] Source: See footnote to Figure-25

Clearly there was a dramatic decline in incidence of falciparum malaria after introduction of the NMCP. By 1960 the annual falciparum index had declined to 0.09 / 1000 population from the high level of at least 2.32 / 1000 population in 1952. The incidence of falciparum malaria was the lowest around 1967. By 1973, there was a resurgence, which has continued since then till date.

Figure-27 shows the trend of combined incidence of both vivax and falciparum malaria (annual parasite index) as well as the disaggregated incidence of falciparum malaria (annual falciparum index). This figure brings out the malaria trend after 1960s more clearly. Due to the very high level of incidence prior to 1953, details of malaria incidence trend after 1960s was not very clear in Figures 25 and 26. The Y axis in Figure- 27 is rescaled within the small range of 0 to 5 / 1000 population compared to the 0 t0 220 / 1000 population range in the previous two figures. Hence the pattern in the 1970s, 1980s and 1990s is more clearly visible here. As said earlier, there was a resurgence during mid 1970s. Incidence of vivax and falciparum malaria increased during this period. But the spurt in vivax malaria was quite high. The modified plan of operations (MPO) introduced in 1977 surely reversed the trend of vivax malaria. But the falciparum malaria continued to rise at a slow but steady pace. Since the mid 1980s there is again a resurgence of vivax malaria in the state. This time, however, the resurgence of vivax malaria is not as sudden and acute as it was in the mid 1970s. The resurgence of falciparum malaria has continued unabated. Note that the API includes both vivax and falciparum malaria. As can be seen from Figure- 27 most of the increase in API during the late 1980s and 1990s appears to have been contributed by the increased incidence of falciparum malaria. Recent increases in malarial deaths can be attributed to the fact that most of the current resurgence consist of the falciparum variety.

Figure-27: Incidence trend of all forms of malaria and falciparum malaria in AP, 1961-2000

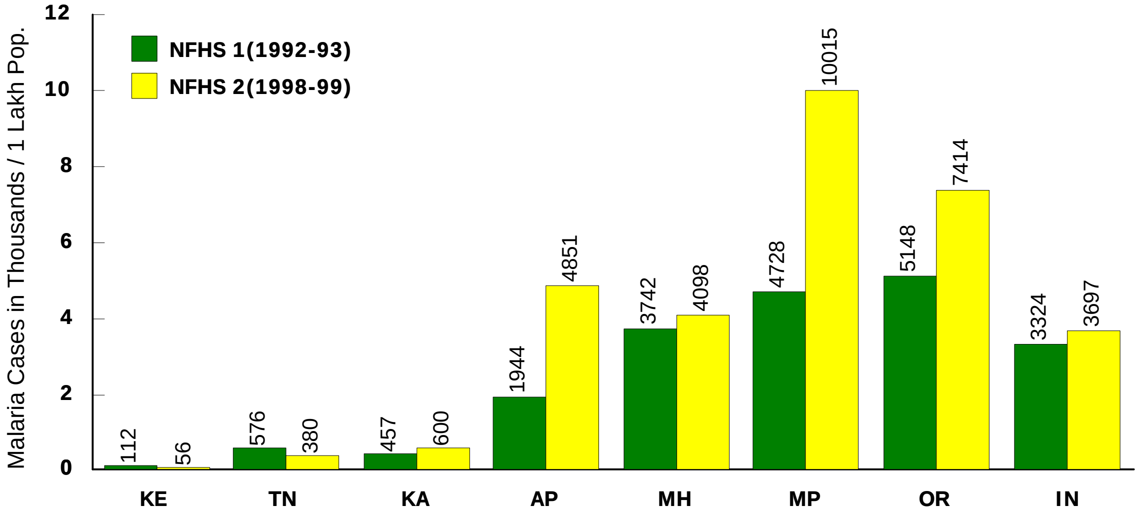


[1] Source: See footnote to Figure-25

In fact, except for the initial decline during the 1950s, P. falciparum appears to have been never under control. This could be due to lack of any impact of control measures in hard core falciparum areas which are usually the hilly regions of the state mostly inhabited by various tribes. In other words, malaria was prevalent in some hard core areas which in subsequent years appeared in the form of focal outbreaks.

The two National Family and Health Surveys (NFHS) provide with a comparative picture of malaria among AP and its neighbouring states and also gives us an independent estimate of time trend during the 1990s. This also corroborates the rise of malaria in 1990s. Incidence of malaria in the state of AP is similar to the incidence in Maharashtra and Orissa, and is less than the incidence in Madhya Pradesh. Malaria incidence in Tamil Nadu, Karnataka and Kerala is considerably lower.

Figure-28: Recent trends of malaria incidence in AP, other states, and all India

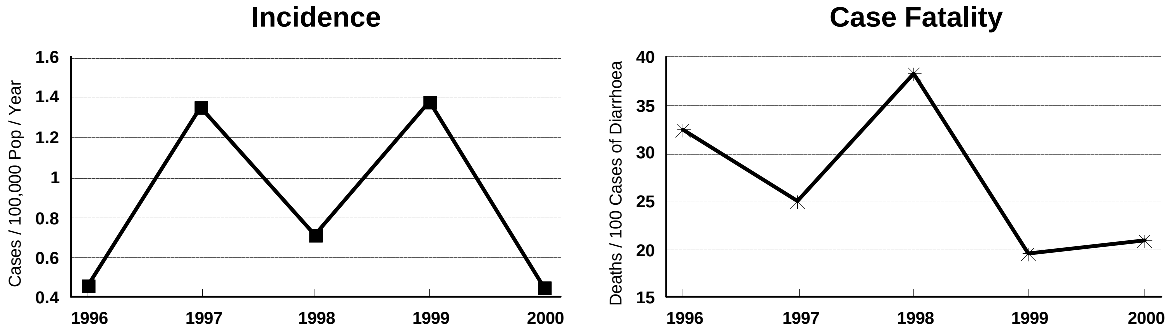


[1] Source: NFHS data from IIPS(1995)Table-8.2p 205; NFHS-2 data from IIPS(2000) Table6.8p 202

Incidence of urban malaria seemed to be on rise. It is estimated that about 40.8% of the total positive cases of malaria are from the urban areas. Considering that the share of urban population is around 27%, the incidence of malaria in urban areas is disproportionately higher.

7. Japanese Encephalitis

Figure-29: Recent trend of Japanese Encephalitis incidence and case fatality



[1] Source: Directorate of Health, Government of AP.

Japanese encephalitis (JE) is caused by a virus. JE incidence in the state has been swinging up and low. The state has made significant efforts in building up professional capacity for management of JE cases. This appears to have contributed to the significant reduction in case fatality (right chart) over the last two years.

References:

i. District wise gastroenteritis incidence of Andhra Pradesh, data from Directorate of Health, Government of Andhra Pradesh, Hyderabad.
ii. International Institute for Population Sciences (IIPS), ORC Macro, Roy TK et al. National Family Health Survey 1998-99 (NFHS-2). India. Mumbai (Bombay): International Institute for Population Sciences (IIPS), 2000.
iii. International Institute for Population Sciences (IIPS), Ramesh BM, Arnold Fred et al. National Family Health Survey 1992-93. India. Mumbai (Bombay): International Institute for Population Sciences (IIPS), 1995.
iv. Mahapatra Prasanta. Estimating national burden of disease: Sensitivity to local data. (The burden of disease in Andhra Pradesh, 1990s.
v. National Leprosy Eradication Programme in Andhra Pradesh, Performance for the last five years, Data from Directorate of Health, Government of Andhra Pradesh, Hyderabad.
vi. National Nutrition Monitoring Bureau (NNMB), Repeat surveys, 1975-79, 1988-90, 1996-97. National Institute of Nutrition, Hyderabad.
vii. Sharma RS, Sharma GK, Dhillon GPS. Epidemiology and control of Malaria in India. 1996. New Delhi: GOI-MOHFW National Malaria Eradication Programme, 22 Shamnath Marg, Delhi 110054, 1996.
viii. SRS Annual Reports, Registrar general, India, New Delhi.
ix. World Health Organisation (WHO). Development of indicators for monitoring progress towards health for all by the year 2000. Geneva: 1981.