CHAPTER III

SPATIAL PATTERNS OF MAJOR DISEASES AND IDENTIFICATION OF ENDEMIC AREAS
The word 'disease' means any deviation from or interruption of normal structure and function of any part of the body. It is manifested by a characteristic set of signs and symptoms and in most cases the epidemiology, pathology and progeresis is known. The word 'disease' also means lack of case and the extent to which one is not at ease and to determine the seriousness of the disease.

From an ecological point of view, disease is defined as "a maladjustment of the human organism to environment". From a sociological point of view, disease is considered as a social phenomenon, occurring in all societies and defined and fought in terms of the particular cultural forces prevalent in the society. The simplest definition is, of course, that disease is just the opposite of health. i.e., any deviation from normal functioning or state of complete physical or mental well-being. The term 'disease' is so broad in definition and can be applied to every physical and mental ailment affecting human kind. It should be discussed in terms of the contributing elements.(Willgoose 1979).

The study of the diseases and injuries is called epidemiology. The epidemiologist is usually the first health
professional to ascertain the effect of the environment on human welfare and disease control. In standing the distribution of diseases determinants, the epidemiologist is concerned with the extent and types of illness and injuries to groups of people and with the factors which influence their distribution (Basu 1969), Mausner and Bahu 1974).

Regional differences in health ought to be weighed along with other measures of well-being or ill-being, that compliment a fundamental tool like the population density map. Geographical analysis can be powerful tool to study the course of events.

DISEASE MAPPING AN OVERVIEW:

Mapping of incidence of diseases and identification of disease-prone areas will form the basis in planning for better health care delivery. According to Pyle (1979), the mapping of patterns of diseases occurrence is a central theme in medical geography, while to others it is considered certainly an essential ingredient but not necessarily an end-result.

The world atlas of diseases and the volumes on the ecology of diseases are indeed the pioneering studies carried out by May (1950) in USA. Gilbert (1958, 1972) has shown how several Victorian pioneers used dot maps to identify the link between cholera incidence and polluted drinking water supplies in number of English cities.

Learmonth (1957,1958) has reproduced the papers of malarialogists working in India. Allen Price (1960) used quite
simple maps to plead a strong case that differences in cancer mortality within a single village in Devon. Burkitt (1962) proposed a simplified mapping of diseases of East Africa by visual cartographic correlation with special reference to the malignant lymphadenoma of the neck glands called after himself as 'Burkitt's tumour'. This pioneer work suggested that, because the tumour was absent from population living at high altitudes, it was possibly mosquito borne, and perhaps linked with a mosquito borne virus.

Discoveries can be made by basically simple and classical map correlation. Haggett (1965), Mc Glasshan (1972), Learmonth (1972) have reviewed the medical atlases of developed and developing countries prepared during 1950-70 and stated that they aim to give not only some description but also some critical perspectives in relation to the development of medical geography during those decades.

According to Learmonth (1972), the Great Atlases of Disease of the post-war years are mainly prepared by medical men with cartographic assistance. The advantage of a demographic-base map for disease mapping have been established by geographers namely Howe (1970) and Forster (1972).

Pyle (1979) has used the traditional cartographic methods in mapping health problems and mortality in cities by using crude and age standardised rates. This method has been used to calculate in other studies in populations living in urban and sub-urban areas from blocks to metropolitan Boroughs in size Dover (1972),
The above mentioned studies have brought out the spatial variations in the distribution of most forms of ill-health and mortality. Disease-mapping should be repeated at regular intervals. But the temporal studies are rare because of the morbidity data collection and analysis is difficult. However, Pyle (1976) studied the changing distribution of measles-epidemic in Akron. Studies related to suicide in London are carried out by Whitelock (1973) and Howe (1979).


The incidence of diseases have been carried out and mapped by Indrapal (1968), Basu (1969), Akthar (1978, 1979), Hyma and Ramesh (1976a, 1976b) and Kumara Swamy (1981).
Maps are thus used as the tool for areal differentiation of health and disease. The geographer's contribution is specific in the analysis of complex relationship between place, work and folk and in turn its relationship to the social, economic and general health conditions of the community. By plotting the data the endemic and epidemic areas are identified. The disease map will bring out the regional differences in the prevalence rate more clearly over space through time. The five years morbidity data (1989-93) are collected from the records of the district medical and Health Office, Anantapur. It is assumed that the five years average will bring a clear understanding of the disease prevalence in a given area than one year.

There are more than hundred diseases recorded in the study area. Based on the International Disease Classification system (WHO, 1979), they have been grouped into 17 categories for the case of preparing maps and interpreting. The seventeen categories of diseases followed in the study are given below:

1) Infectious and parasitic diseases,
2) Malignant neoplasms,
3) Endocrine, nutritional and metabolic diseases,
4) Diseases of blood and blood forming organs,
5) Mental disorders,
6) Diseases related to central nervous system,
7) Diseases of circulatory system,
8) Diseases of respiratory system,
9) Diseases of digestive system,
10) Diseases of genito-urinary system,
11) Complications of pregnancy and childbirth,
12) Skin diseases,
13) Diseases of musculoskeletal system,
14) Congenital anomalies,
15) Diseases in the perinatal period,
16) Symptoms, signs and ill-defined conditions and
17) Injuries and poisoning.

INFECTIOUS AND PARASITIC DISEASES:

The infectious and parasitic diseases include cholera, typhoid, amebiasis, tuberculosis, plague, leprosy, diphtheria and tetanus. Viral diseases like small pox, measles, dengue fever and arthropod-borne diseases like malaria, leishmaniasis, venereal diseases and other parasitic diseases. About 51 diseases have been grouped under this category. The minimum number of 9 cases per 1000 population have been reported in Nallamada mandal and the maximum number of cases reported are 512 per 1000 population in Kothacheruvu mandal. The average number of cases reported in the infectious category in the district were 126.37 cases per 1000 population.

The spatial distribution shows that in about 20 mandals the cases reported are less than 75. In 25 mandals, the cases reported vary from 75 to 150, in 11 mandals the cases vary from 150 to 225, in four mandals the cases range from 225 to 300 and in 3 mandals the cases reported are more than 300 per 1000 population. The distribution is uneven. However, in central mandals Pamidi, Kudair, Anantapur, Dharmavaram, Chennekothapalli
and Kothacheruvu, the infectious disease occurrence has exceeded 225 cases per 1000 population. In northwestern, northern, southeastern and southwestern mandals, the cases reported vary from 75 to 150 per 1000 populations. The distribution low occurrence of disease is dispersed in of the district (fig. 3.1).

SPATIAL DISTRIBUTION OF MALIGNANT NEOPLASMS:

The disease malignant neoplasms effects the lip and oral cavity and pharynx, digestive organs, respiratory organs, bone connective tissues, skin, breast, genito-urinary organs and lymphatic tissues. The number of cases per 1000 population reported under this category vary from 0.04 in Tadipatri mandal to a maximum of 68.12 per 1000 population in Atmakur Mandal. In about 34 mandals, the cases of malignant neoplasms are not reported. The average number of cases of the district is 3.52 cases per 1000 population. The distribution shows that in about 21 mandals, the cases reported are less than 5, in 2 mandals 5 to 10, in 3 mandals 10 to 15, in one mandal 15 to 20 and in 2 mandals namely, Pamidi and Garladinne, above 20 cases per 1000 population.

The spatial distribution shows that in Pamidi, Garladine, Kudair, Kanekal, Kalyandurg, and Pedda Pappur mandals the cases reported exceed 10 per 1000 population. In Penukonda and Parigi mandals, the cases reported vary from 5 to 10 per 1000 population. In north-western, eastern and southern mandals, the cases reported are below 5 per 1000 population (fig.3.2). In
central, north-western and south-eastern mandals the malignant neoplasms are not reported.

**DISTRIBUTION OF ENDOCRINE, NUTRITIONAL AND METABOLIC DISEASES**

The endocrine nutritional and metabolic diseases are disorders of thyroid gland, diabetes mellitus, vitamin 'A' deficiency, beriberi, glossitis, stomatitis, malnutrition and other ill-defined nutritional diseases. The number of cases reported under this category vary from 0.08 cases per 1000 population in Peddavadugur mandal to a maximum of 134.35 cases per 1000 population in Bathalapalli mandal. The average of the district is 41.73 cases per 1000 population.

The distribution shows that in about 3 mandals namely, Dharmavaram, Bathalapalli and D.Harihal, the cases reported are above 120 per 1000 population. In four mandals 90 to 120 cases, in 10 mandals 60 to 90 cases, in 19 mandals 30 to 60 cases and in 27 mandals below 30 cases per 1000 population are reported. The spatial distribution shows D.Harihal, Uravakonda, Singanamala Bathalapalli, Dharmavaram, Nambulapulakunta, and Pendukonda mandals, the cases reported exceed 90 per 1000 population. The cases vary from 60 to 90 per 1000 population in Raydurg, Kudair, Garladinne, Gooty, Puttur, Nallacheruvu, O.D.Cheruvu, Kothacheruvu and Madakasira mandals. In western and central mandals the cases range from 30 to 60 per 1000 population, in northern, eastern and southwestern mandals the cases reported are below 30 per 1000 population (fig.3.3).
ANANTAPUR DISTRICT
ENDOCRINE NUTRITIONAL AND METABOLIC DISEASES

LEGEND
Cases per 1000 population

BELOW 30
30-60
60-90
90-120
ABOVE 120

SCALE
Kms.

FIG. 3-3
ANANTAPUR DISTRICT

DISEASES OF BLOOD AND BLOOD FORMING ORGANS

LEGEND
Cases per 1000 population

- BELOW 30
- 30-60
- 60-90
- 90-120
- ABOVE 120

SCALE

0  20  40
Kms.

FIG. 3 - 4
DISEASES OF BLOOD AND BLOOD FORMING ORGANS:

The diseases of blood and blood forming organs are anaemia of pregnancy, anaemia of other than iron deficiency, anaemia due to iron deficiency and other ill-defined diseases of blood and blood-forming organs. The cases reported under this category vary from a minimum of 1.14 cases per 1000 population in Lepakshi mandal to a maximum of 151.33 cases per 1000 population in Uravakonda mandal. The district average is 48.53 cases per 1000 population. The distribution shows that in about 5 mandals namely, Nallacheruvu, Penukonda, Chenneckothapalli, Uravakonda and Gooty the cases reported are about 120 per 1000 population. In Tanakal, N.P. Kuntal Kudair, Tadipatri and Kothacheruvu mandals 90 to 120 cases per 1000 population are reported. In about 10 mandals the cases vary from 60 to 90, in 23 mandals 30 to 60 and in 20 mandals cases reported are below 30 per 1000 population. The spatial distribution shows that in central, north-eastern, south-eastern and south-central mandals, the cases exceed 90. In majority of mandals, the cases reported are 30 to 60 and less than 30 cases per 1000 population (fig.3.4).

MENTAL DISORDERS:

The mental disorders in the district vary from 0.02 cases per 1000 population in Tadipatri mandal to maximum of 14.82 cases per 1000 population in Gudibanda mandal. The district average is 0.67 cases per 1000 population. In about 38 mandals, the mental disorders are not reported. In Anantapur and Gudibanda mandals, the cases reported exceed 6 per 1000 population. In
Hindupur mandal, the cases vary from 4 to 6 per 1000 population. In Penukonda, Kudair, Vijnakarur and Kanekal mandals, cases reported vary from 2 to 4 per 1000 population. In about 18 mandals, the cases reported are less than 2 per 1000 population. The spatial distribution shows that in a few mandals of northern, central and southern parts of district, the mental disorder cases are noticed (fig.3.5).

DISEASES RELATED TO CENTRAL NERVOUS SYSTEM AND SENSE ORGANS:

The diseases of central nervous system include meningitis, encephalitis, epilepsy, sclerosus and other ill defined nervous system, disorders of the eye and adnex and disorders of the ear and mastoid process. The diseases of eye and adnex are glaucoma, cataract, blindness and low vision, conjunctivitis and other disorders of eye and adnex. The disorders of the ear and mastoid process are of is media and stesritis, deafness and other ill-defined diseases of ear and mastoid process. The number of cases reported under the above category vary from 0.69 per 1000 population in Gummagatta mandal to a maximum of 207.84 cases per 1000 population in D.Harihal mandal. The district average is 47.47 cases per 1000 population. The distribution shows that in about 5 mandals namely D.Harihal, Pamidi, Garladinne, Raptadu and Kambadur the cases reported exceed 100 per 1000 population. In Peddapappur, Kudair, Bukkapatnam and Singanamala mandals the cases vary from 75 to 100 per 1000 population. In 18 mandals, 25 to 50 cases per 1000 population and in 19 mandals below 25 cases per 1000 population. The
ANANTAPUR DISTRICT
DISEASES OF CIRCULATORY SYSTEM

LEGEND
Cases per 1000 population
NIL
BELOW 5
5 - 10
10 - 15
15 - 20
ABOVE 20

SCALE
20 Kms.
spatial distribution shows, that in north-eastern, north-western, and south-central mandals the cases recorded exceed 75 per 1000 population. In Northern, eastern and south-western mandals the cases vary from 25 to 50 and 50 to 75 per 1000 population. In south-eastern, western, and a few mandals in north-western parts of the district the cases reported are below 25 per 1000 population (fig.3.6).

DISEASES OF THE CIRCULATORY SYSTEM:

The diseases of circulatory system are rheumatic fever, rheumatic heart diseases, hypertensive diseases, disorders of pulmonary circulation, atherosclerosis, thrombosis, etc. The diseases of the circulatory system vary from 0.09 cases per 1000 population in Gudibanda to a maximum of 45.47 cases per 1000 population in Kalyandrug mandal. The spatial distribution of cases reported show that in Hindupur, Kalyandurg, Anantapur, Yellanur and Yadiki mandals, the cases reported exceed 20 per 1000 population. In Raydurg, Kanekal, Atmakur and Kothacheruvu mandals the cases reported vary from 15 to 20 per 1000 population. In D.Harihal and Narpala mandals the cases range from 10 to 15 per 1000 population. In about 9 mandals the cases reported vary from 5 to 10, in 38 mandals they are below 5 and in 5 mandals the cases are nil. The spatial distribution shows that in central, north-western, and north-eastern mandals, the cases reported exceed 10. In majority of mandals the cases reported due to circulatory disorders are below 5 per 1000 population (fig.3.7).
ANANTAPUR DISTRICT
DISEASE OF RESPIRATORY SYSTEM

LEGEND
Cases per 1000 population
BELOW 50
50 - 100
100 - 150
150 - 200
ABOVE 200

SCALE

FIG. 3.4
DISEASES OF THE RESPIRATORY SYSTEM:

The diseases of the respiratory system are acute bronchitis, acute laryngitis and tracheitis, acute upper respiratory infections, tonsils, adenoids, acute pneumonia, influenza, asthma and other ill-defined diseases of the respiratory system. The number of cases reported vary from a minimum of 9.04 per 1000 population in Roddam to a maximum of 362.12 cases of 1000 population in Kadiri mandal. The district average is 121.38 cases per 1000 population. The distribution of reported cases shows that in about 10 mandals namely Tanakal, Nallacheruvu, Kothacheruvu, Penukonda, Bathalapalli, Atmakur, D.Harihal, Gooty and Pamidi the cases exceed 200 per 1000 population. In 8 mandals the cases vary from 150 to 200 per 1000 population, in 13 mandals 100 to 150 cases per 1000 population, in 23 mandals 50 to 200 per 1000 population, in and in 9 mandals below 50 cases per 1000 population. The spatial distribution shows that in northwest, north, central, south-eastern and south-central mandals of the district the cases reported exceed 100 per 1000 population. In eastern and western mandals the cases reported vary from 50 to 100 and below 50 per 1000 population (fig.3.8).

DISEASES OF THE DIGESTIVE SYSTEM:

The diseases of the digestive system include diseases of the oral cavity, salivary glands and jaws and diseases of the hearts of the digestive system like ulcers, gastritis, appendicitis, hernia of the abdominal cavity, interstitial
ANANTAPUR DISTRICT
DISEASES OF DIGESTIVE SYSTEM

LEGEND
Cases per 1000 population

BELOW 25
25 - 50
50 - 75
75 - 100
ABOVE 100

SCALE
Kms.
0
20
40

FIG. 3-9
abstractions, peritonitis and other illdefined diseases of digestive system.

The spatial distribution shows that the number of cases reported vary from 0.53 in Nallamada mandal to a maximum of 118.39 in Narpala mandal. The district average is 30.82 cases per 1000 population. The distributions of cases shows that in Anantapur, Narpala, Madakasira and Uravakonda, the cases reported exceed 100 per 1000 population. In Tadipatri mandal the cases vary from 75 to 100 per 1000 population. In Singanamala, Peddapappur, Guntakal, Raydurg, Raptadu, Chennekothapalli and Penukonda mandals the cases vary from 50 to 75 per 1000 population. In about 19 mandals the cases vary from 25 to 50 and in 32 mandals the cases reported are less than 25 per 1000 population. The spatial distribution shows that the cases reported are high and exceed 50 in north estern mandals of the district. In majority mandals of the district, the cases of digestive system are below 25 per 1000 population. In eastern, southern and south-western mandals, the cases vary from 25 to 50 per 1000 population (fig.3.9).

DISEASES OF THE GENITO-URINARY SYSTEM:

The diseases of the genito-urinary system includes diseases of the Urinary system, male genital organs and female genital organs. They are nephritis, nephrosis, infections of kidney and other illdefined diseases of the Urinary system. The diseases of male genital organs are hyperplasis, hydrocele, infertility and other ill defined male genital organs. The diseases of female
organs are salpingitis, uter vaginal prolapse, menstrual disorders, infertility and other ill-defined female genital organs.

The distribution of cases reported are above 80 per 1000 population in Vijrakur and Guntakal mandals. In Kanekal, Atmakur and Kundurpi mandals, the cases vary from 60 to 80 per 1000 population. The district average is 16.49 cases per 1000 population. In Mudigubba, Narpala and Gorentla mandals the number of cases reported vary from 40 to 60 per 1000 population. In Uravakonda, Beluguppa, Kalyandrug, Garladinne, Bukkarayasamudram, Anantapur and Puttaparthi mandals, the number of cases reported vary from 20 to 40 per 1000 population. In about 41 mandals, the number of cases reported are below 20 per 1000 population and in 8 mandals, the cases are not reported. The spatial distribution shows that in a few mandals of northern, central, eastern and southern the cases reported exceed 40 per 1000 population. In majority mandals of the district, the cases reported are less than 20 per 1000 population (Fig. 3.10).

COMPLICATIONS OF PREGNANCY AND CHILD BIRTH:

The complications of pregnancy and child birth are abortion (spontaneous or legally induced), amenorrhoea of pregnancy and child birth, toxaemia of pregnancy, infections of genito-urinary tract in pregnancy, dysmenorrhoea, menorrhagia, prolapsed uterus and ill-defined (direct and indirect) obstetric cases.

The number of cases reported of the complications of pregnancy and child birth vary from a minimum of 0.30 in
ANANTAPUR DISTRICT
COMPLICATIONS OF PREGNANCY AND CHILD BIRTH

LEGEND
Cases per 1000 population
- NIL
- BELOW 5
- 5 - 10
- 10 - 15
- 15 - 20
- ABOVE 20

FIG. 3.11
Numbulapulakuntla to a maximum of 203.32 cases per 1000 population in Nallacheruvu mandal. The district average is 7.07 cases per 1000 population. The distribution of cases reported shows that in Pamidi, Kambadur, Numbulapulakunta, Talupula, Beluguppa and Rolla mandals the cases exceed 20 per 1000 population. In Kanekal, Uravakonda, Bathalapalli, Dharmavaram, Lepakshi and Channekothapalli mandals the cases vary from 15 to 20 per 1000 population. The number of cases range from 10 to 15 per 1000 population in 5 mandals, 5 to 10 cases per 1000 population in 7 mandals and below 5 cases per 1000 population in 31 mandals. In about 9 mandals, the cases related to complications of pregnancy and child birth are not reported. The spatial distribution in south-eastern, western and few mandals in the central parts of the district shows that the cases reported are above 10 per 1000 population. In majority of the mandals in northern, eastern and southern parts of the district, the cases reported are below 5 per 1000 population (fig.3.11).

SKIN DISEASES:

Abscess, allergic dermatitis, dermatitis impetigo, itching, scabies and urticaria are the diseases in this group. Relatively very high number of cases are observed in Tanakal mandal (203.32 cases per 1000 population) and very low in Numbulapulakunta with 0.3 cases per 1000 population. The average of district is 42.36 cases per 1000 population. The distribution shows that in Tanakal, Vajrakarur, Peddavadugur, Mudigubba, Gudibanda, Rolla and Beluguppa mandals the number of cases reported are above 100 per 1000 population. In Uravakonda, Kothacheruvu, Puttaparthi,
ANANTAPUR DISTRICT
SKIN DISEASES

LEGEND
Cases per 1000 population

BETWEEN 25
25-50
50-75
75-100
ABOVE 100

SCALE
0 20 40
Kms.
Gorantla and Narpala mandals, the number of cases vary from 75 to 100 per 1000 population. In 19 mandals, the cases are 25 to 50 per 1000 population. In 22 mandals the cases of skin disease are below 25 per 1000 population and in 2 mandals the cases reported are nil. The spatial distribution shows that in a few mandals of north, central, north-eastern, southern and south-western the cases reported are above 75 per 1000 population. In majority of the mandals of the district, the cases reported lie below 50 per 1000 population (fig.3.12).

**DISEASES OF MUSCULOSKELETAL SYSTEM:**

The diseases of musculoskeletal system are rheumatoid arthritis, disorders of joints, spondylitis, osteomyelitis, and ill-defined diseases of the musculoskeletal system. The number of cases vary from 0.41 in Bukkarayasamudram to a maximum of 111.11 in Chilamattur mandal. The district average is 17.81 cases per 1000 population. The distribution of cases reported in Chilamattur, Vijrakurur, Kothacheruvu, Gorantla and Lepakshi mandals are above 60 per 1000 population. In Pamidi, Anantpur, Atmakur and Gandlapenta the cases reported vary from 40 to 60 per 1000 population. In about 3 mandals 30 to 45 cases per 1000 population, in 10 mandals 15 to 30 cases per 1000 population and in 33 mandals the cases are below 15 per 1000 population are reported. The diseases of musculoskeletal system are not reported in 8 mandals. The spatial distribution shows that in majority of mandals the cases reported are less than 30 per 1000 population (fig.3.13).
FIG 3.44

ANANTAPUR DISTRICT
CONGENITAL ANOMALIES

SCALE
0 20 40 Kms.

LEGEND
Cases per 1000 population
NIL
Below 5
Above 5
CONGENITAL ANOMALIES:
The diseases of congenital anomalies vary from 0.05 in Nallamada mandal to a maximum of 10.19 in Nambulapulakunta mandal. The average of the district is 0.04 per 1000 population. The distribution shows that in Naumbulapulakunta the cases reported are above 5 per 1000 population. In Uravakonda, Kothacheruvu, Nallamada, Singanamala and Gorantla mandals the cases reported are below 5 per 1000 population. In about 57 mandals the cases are not reported (fig.3.14).

DISEASES IN PERINATAL PERIOD:
The diseases formed during perinatal period vary from a minimum of 0.03 cases per 1000 population in Tadipatri mandal and a maximum of 5.06 cases per 1000 population in Kothacheruvu mandal. The district average is 0.13 cases per 1000 population. The distribution shows that in Kothacheruvu mandal the cases reported are above 5 per 1000 population. In Madakasira, Tadipatri and Singanamala mandals the cases reported are below 5 per 1000 population. In about 59 mandals of the district, the disorder of the perinatal period are not reported (fig.3.15).

SYMPTOMS, SIGNS AND ILL-DEFINED CONDITIONS:
The symptoms, signs and ill-defined conditions vary from 0.20 cases per 1000 population in Raydurg mandal to a maximum of 34.45 in Pamidi mandal. The district average is 0.85 cases per 1000 population. In Pamidi mandal, the cases reported are above 10 per 1000 population. In Tadipatri and Anantapur mandals the cases reported vary from 5 to 10 per 1000 population. In
Vajrakarur, Guntkal, Garladinne and Rayadurg mandals, the cases reported are below 5 per 1000 population. In about 56 mandals, the symptoms, signs and ill-defined conditions are not reported (fig.3.16).

INJURIES AND POISONING:

The disorders of injuries and poisoning are fractures, dislocations, internal injuries, injuries to blood vessels and toxic effects due to poisoning, accidents, suicide and other injuries.

The number of cases reported vary from 0.11 per 1000 population in Rayadurg mandal to a maximum of 182.84 cases per 1000 population in Kothacheruvu mandal. The district average is 24.89 cases per 1000 population. The distribution of injuries and poisoning shows that in about 5 mandals, namely Kothacheruvu, Penukonda, Nallamada, Bukkapatnam and Puttaparthi the cases reported are above 80 per 1000 population. In Vajrakarur, Mudigubba and Uravakonda mandals, the cases reported vary from 60 to 80 per 1000 population. In Tadipatri, Yellanur and Somendepalli, the cases reported range 40 to 60 per 1000 population. In about 11 mandals, they are 20 to 40 per 1000 population. In 32 mandals, the cases are below 20 per 1000 population and in 9 mandals the injuries and poisoning are not reported. The spatial distribution shows that in a few eastern and south-central mandals, the cases reported are above 40 per 1000 population. In majority of mandals, the cases reported due
to injuries and poisoning are less than 40 per 1000 population (fig.3.17).

From the study of spatial distribution of diseases, it has been found that infectious, parasitic and respiratory diseases occurrence are very high in the district. The average occurrence in the district vary from 121.38 to 126.37 cases per 1000 population. The diseases of blood and blood forming organs and diseases of nervous system and sense organs rank next to infectious, parasitic and respiratory diseases. Their average occurrence vary from 47.47 to 48.53 cases per 1000 population. The third order diseases that occurred in the district are endocrine, nutritional and metabolic diseases, diseases of digestive system and skin diseases. Their average occurrence vary from 30.82 to 42.36 cases per 1000 population.

The fourth order diseases are diseases of circulatory system, genito-urinary system, musculo-skeletal system, and injuries and poisoning. Their average occurrence in the district vary from 16.49 to 24.89 cases per 1000 population. The fifth order diseases in the district are malignant neoplasms, diseases related to mental disorders, complications of pregnancy and childbirth, congenital anomalies, disorders in the perinatal period and symptoms, signs and ill-defined conditions. Their occurrence vary from 0.04 to 7.07 cases per 1000 population.

ENDEMIC AREAS:

The endemic areas of Anantapur district have been analysed adopting one standard coefficient method taking into
consideration mandal level cases reported in primary health centres, hospitals etc., for 17 grouped major diseases. From the study it has been found that the minimum index value of 21.08 per cent is noticed in Gummagatta mandal and the maximum value of 47.12 per cent is found in Kothacheruvu mandal. Based on the index value, the endemic areas have been categorised into five types. They are, 1. very high endemic areas (above 40 per cent), 2. high endemic areas (30 to 40 per cent), 3. moderate endemic areas (20 to 30 per cent), 4. low endemic areas (10 to 20 per cent) and 5. very low endemic areas (less than 10 per cent) (fig.3.18).

In the very high category, only one mandal namely Kothacheruvu is noticed. In the high category three mandals namely Anantapur, Pamidi and Uravakonda are found. In the moderate endemic category 17 mandals are noticed. There are D.Harihal, Raydurg, Beluguppa, Kalyandurg, Atmakur, Garladinne, Vijrakarur, Gooty, Tadipatri, Singanamala, Narpaala, Tanakal, Numbulapulakunta, Penukonda, Madakasira and Rolla. In the low category of endemic areas about 24 mandals are noticed. They are Gudibanda, Hindupur, Lepakshi, Chilamattur, Gorantla, Penukonda, Puttaparthi, Nallacheruvu, Kadiri, Talupula, Mudigubba, Tadimirri, Bathalapalli, Dharmavaram, Kudair, Raptadu, Kanekal, Yellanur, Putlur, Guntakal, Settur, Kambadur and Knaganipalli.

In the very low category, 18 mandals are found. They are Kundrupi, Gummagatta, Brahmasamudram, Bommanahal, Vidapanakal, Yadiki, Peddapappur, Ramagiri, Bukkarayasamudram, Gandlapenta,
The spatial distribution of endemic areas shows that the moderate to very high distribution is noticed in north-western, north-central, south-eastern, south-central and south-western parts of the district. In majority of the mandals (42 mandals) the disease occurrence is low to very low. Based on the identification of endemic areas or disease prone areas detailed field work has been carried out for primary data collection to bring out the reasons or causes for high occurrence of diseases in north-western, north-central, south-eastern, south-central and south-western parts of the district.