Geo-spatial analysis of HIV Status in East Godavari District, Andhra Pradesh, India

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Abstract:East Godavari district is one of the hardest hit strokes of HIV of Andhra Pradesh State in Southern India. Most part of the district is infested by HIV incidence. The year-wise data on HIV disease collected from the records of District Leprosy Office, Kakinada for the year 2002-2008 and cumulative childrens household's HIV cases for fourteen mandals of the district were collected from St.Paul's Trust, Samalkot from July, 2007 to March, 2009. Analysis of the data indicated that a total of 8561 cases were identified in the district. . The analysis of HIV disease reveals that the number of HIV positive cases are steadily increasing since 2002-2003. The number was doubled during 2004-2005 and became more than 8000 by 2007-2008. Data is not available most part of the district and are available for fourteen mandals namely Samalkot, Biccavolu, Anaparthy, Mandapeta, Peddapuram, Rangampeta, Rajanagaram, Jaggampeta, Gandepalle, Kakinada (Rural), Kakinada (Urban), Karapa, Pedapudi and Rayavaram. Among the mandals Peddapuram, Samalkot, Jaggampeta, Biccavolu and Mandapeta are highly prevalence of the disease low incidence in the mandals namely Rangampeta, Rayavaram and Karapa. Peddapuram records the high incidence of the disease with 1411 cases and followed by Samalkot and Jaggampeta. The maximum deaths were recorded in these mandals namely Peddapuram, Biccavolu and Rayavaram. Peddapuram records the high mortality with 35 and followed by Biccavolu and Rayavaram and less number of deaths recorded at Rangampeta. In the present study the spatial patterns of HIV incidence and mortality were made.

Introduction

Health is a state of complete, physical, mental and social well-being and not merely an absence of disease (WHO report 1948). The term disease is associated with health hazard that literally means 'without ease' (dis-ease). Park and Park (1977) defined disease as a condition in which body health is impaired, an alteration of the human body interrupting the performance of vital functions.

Acquired Immunodeficiency Syndrome (AIDS) represents the late clinical stage of infection with the Human Immunodeficiency Retro Viruses (HIV). The virus causing AIDS was first identified and called as 'lymphhadenopathy-associated virus' (LAV)' by a French scientists. United States researchers named it as 'human T-cell lymphotrophic virus -III (HTLV-III). In May 1986, the International Committee on Taxonomy gave it new name as human immunodeficiency virus (HIV) (Anupa Mukhopadhyay et al., 1996). It has emerged as leading morbidity and premature mortality in cities around the world in a short period of over a decade. In North America it had become the principal killer of young adult males and it has outstripped overdose, suicide, homicide and hepatis B (Anupa Mukhopadhyay et al, 2004) AIDS most often results in progressive damage to the immune, organ and central nervous systems.

Acquired Immuno Deficiency Syndrome A – Acquired (something that you get) I - Immune (capability of the human body to fight diseases)

D –Deficiency (shortage; reduction) S - Syndrome (A group of symptoms)

In simple words, it means AIDS is a disease in which the capability of the body to fight diseases i.e., immunity is reduced and because of that, a group of symptoms develop in the affected person. The Acquired Immune Deficiency Syndrome (AIDS), caused by the Human Immune-deficiency Virus (HIV) which is so small and can be seen under a very powerful microscope (1/10000 part of a millimeter). HIV is a retrovirus that mainly infects and destroys the vital components of the human immune system such as CD4+ cells, microphages and dendritic cells which are required for the proper functioning of immune system (Wikipedia, 2006). This virus supposedly infects and kills the "T-cells" of the immune system, leading to an inevitably, fatal immune deficiency after a symptomatic period that averages 10 years or so. HIV invades the body's defence system, exposing the infected person over time to a range of lung diseases, cancers, fungal infections, rashes, sores and other debilitating conditions until death. There is as yet no cure or vaccine available. Most people do not know the severity of the disease because there has been a visual media blackout on the subject-about a longstanding scientific controversy over the cause of AIDS (Charles et al, 1994).

AIDS is a communicable disease, i.e., it can spread from a HIV positive persons or AIDS patient to other healthy persons, but it is not a contagious disease, and does not spread by mere usual social contact. HIV makes body vulnerable to a number of life threatening infections. The two serotypes of HIV are known as HIV-1 and HIV-2. Both cause the HIV infection and AIDS (Grace George, 2006). HIV-1 is the most prevalent form of the virus, however, HIV-2 cases have been found in West Africa, East Africa, Europe, Asia and Latin America Anupa et al, 1996)

HIV could be transmitted through direct contact of a mucous membrane with a bodily fluid containing HIV including mother's milk, blood transmission and by sharing contaminated hypodermic needles with HIV infected drug users, instruments used for piercing ear, nose and tattooing on body. And also the disease spreads from HIV positive mother to the child either in pregnancy or during delivery. Intravenous drug users are also victims for this disease. Some researchers expressed their view like as per their knowledge drug abuse had never before had such an important role in the spread of an epidemic (Ashok Dutt, 1987). However, sharing clothing, sneezing and coughing, sharing of drinking glasses, shaking of hands, hugging and kissing cannot transmit HIV (Prakash et al., 2001). There is a great misconception that HIV can be transmitted through mosquito bites.

HIV infection has four stages. The first stage (primary/acute infection) begins when the HIV enters the human body and lasts until the body's initial immune response gains some control over viral replication. HIV disease is asymptotic and during this period blood tests would not reveal the presence of HIV antibodies. This period is known as the "window period". Generally, it is about three months in HIV.

During the second stage (asymptotic) the HIV antibodies can be detected in the bloodstream. The infected person remains clinically healthy and does not display any symptoms. But sometimes it manifests with minor muco-cutaneous and recurrent upper respiratory tract infections. It depends upon the immune responses of person; this period can last from as little as three months, to as long as 15 years. Once the virus causing AIDS, infects the body there is no possibility to get rid of it by medicines. As soon as it establishes, the HIV starts destroying the defense system (Immune system) of the affected person and immune system slowly starts getting weak.

The person remains HIV positive throughout life. The person looks absolutely normal and healthy from outside for 4-10 years. The physical symptoms of AIDS appear only 5-10 years after the exposure to HIV. These are:

Fever of more than 3 weeks duration

Despite eating good diet, weight loss greater than 10 percent of the body weight

Persistent Cough or diarrhoea of more than 3 weeks duration, which don't get treated with routine treatment.

Skin irritation

Extreme weakness

Swellings (just like peas) may appear in the neck, armpits and groins

There may be reddish rash on the skin or white patches in the mouth

These symptoms keep progressing and the person goes on becoming weak, the person frequently keeps getting some or the other disease or infection. After appearance of AIDS symptoms, the patient usually dies within 1 to 2 years. Children born as HIV positive die within 2 to 3 years of birth.

As the HIV positive persons look absolutely normal and healthy, they become carriers of the disease. The vast majority of infections occur through heterosexual sex and through 'high-risk groups of population which include sex workers, homosexuals, truck drivers and migrant workers.Current treatment for HIV infection consists of highly active antiretroviral therapy or HAART. This has been highly beneficial to many HIV-infected individuals since its introduction in 1996 when the protease inhibitor-based HAART initially became available. Anti-retroviral drugs are expensive, and the majority of the world's infected individuals do not have access to medications and treatments for HIV and AIDS.

The aim of the present study is to assess the trends in the incidence of HIV/AIDS in East Godavari District, Andhra Pradesh, India.

Study Area East Godavari District is located in the North Coastal part of the state of Andhra Pradesh covering an area of about 10,807 Sq Kms. (Fig.1). The District is bounded on the north by Visakhapatnam District and the State of Orissa, on the east and south by the Bay of Bengal, on the west by West Godavari District, and on the northwest by Khammam District.The District is known as rice bowl of Andhra Pradesh with lush paddy fields and coconut groves. East Godavari District can be broadly classified into three natural divisions, namely the delta, upland, and hill tracts. The general elevation of the district varies from a few meters near the sea to about 300 meters in the hills. The main rivers are the Godavari, Pampa, Thandava, and Yeleru

The climate is comparatively moderate throughout the year except during the months of April to June when the temperature reaches a maximum of 48 degrees Celsius. The average

rainfall of the district is around 1280 mm. More than half of the rainfall is brought by southwest monsoon and the remaining has been received from the northeast monsoon, during October and November.

Administratively, the district is divided into 5 Revenue divisions, 60 Revenue mandals and 1011 Gram panchayats. According to 2001 population census, total population of the district is 4,901,420 with 2,459,640 males and 2,441,780 females. 12.52 percent of population is in the age group of 0-6 years. With this 49 lakh population the district is the highest populous district in the State (Census report, 2006). The density of the population is 454 persons per km

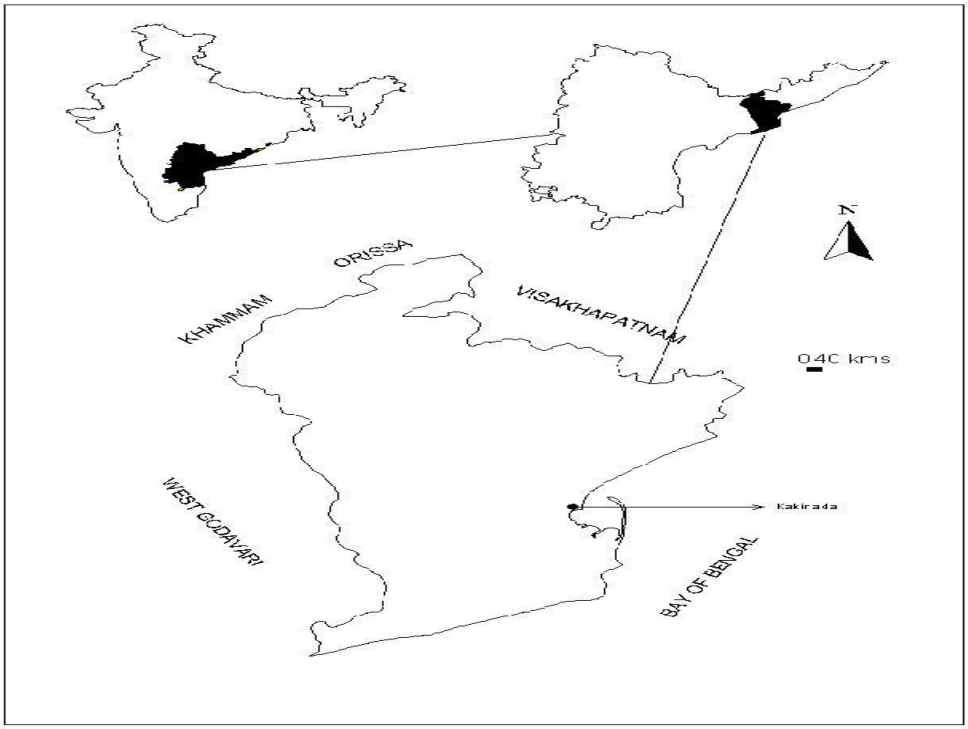

Fig.1. Location map of East Godavari District

Table. 1 Year-Wise HIV positive cases in East Godavari District

Year	Positive Cases
2002-2003	2075
2003-2004	3490
2004-2005	4450
2005-2006	5630
2006-2007	7910
2007-2008	8561

Table. 1 and Fig.2. reveals that the number of HIV positive cases are steadily increasing since 2002-2003. The number was doubled during 2004-2005 and became more than 8000 by 2007-2008.

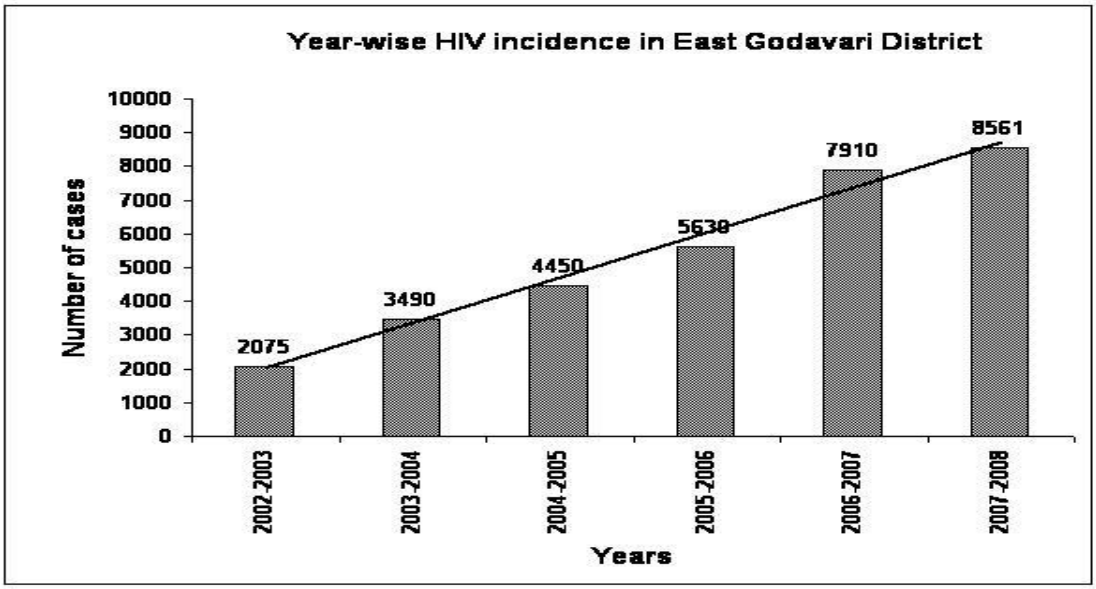

Fig. 2. Spatial spread of HIV

Data is not available for most part of the district and are available for fourteen mandals namely Samalkot, Biccavolu, Anaparthy, Mandapeta, Peddapuram, Rangampeta, Rajanagaram, Jaggampeta, Gandepalle, Kakinada (Rural), Kakinada (Urban), Karapa, Pedapudi and Rayavaram.

Table. 2 Cumulative data on Children's household HIV cases in East Godavari District from July, 2007 to March, 2009

Name of the Mandal	Male	Female	Children		Total
			Boys	Girls	
Samalkot	149	332	306	312	1099
Biccavolu	123	238	204	209	774
Anaparthi	100	182	162	119	563
Mandapeta	131	225	205	197	758
Peddapuram	177	446	406	382	1411
Rangampeta	63	125	134	106	428

Rajanagaram	116	197	146	140	599
Jaggampeta	184	358	242	244	1028
Gandepalli	154	199	165	132	650
Kakinada (Rural)	82	159	132	149	522
Kakinada (Urban)	90	215	184	206	695
Karapa	89	162	133	110	494
Pedapudi	124	198	125	167	614
Rayavaram	77	127	127	112	443

Table. 2 and Fig. 3 reveals that a total of 10078 HIV infected persons were identified in the fourteen mandals of the district from July, 2007 to March, 2009. Out of which 1659 are men, 3163 are women and 2671 are boys, 2585 are girls. Among the mandals Peddapuram recorded a maximum of 1411 cases followed by Samalkot with 1099 cases. Minimum cases were recorded at Rangampeta with 428 cases only. The analysis indicated that the maximum incidence in the general population is occurring in three mandals namely Peddapuram, Samalkot and Jaggampeta and low incidence in the mandals namely Rangampeta, Rayavaram and Karapa.

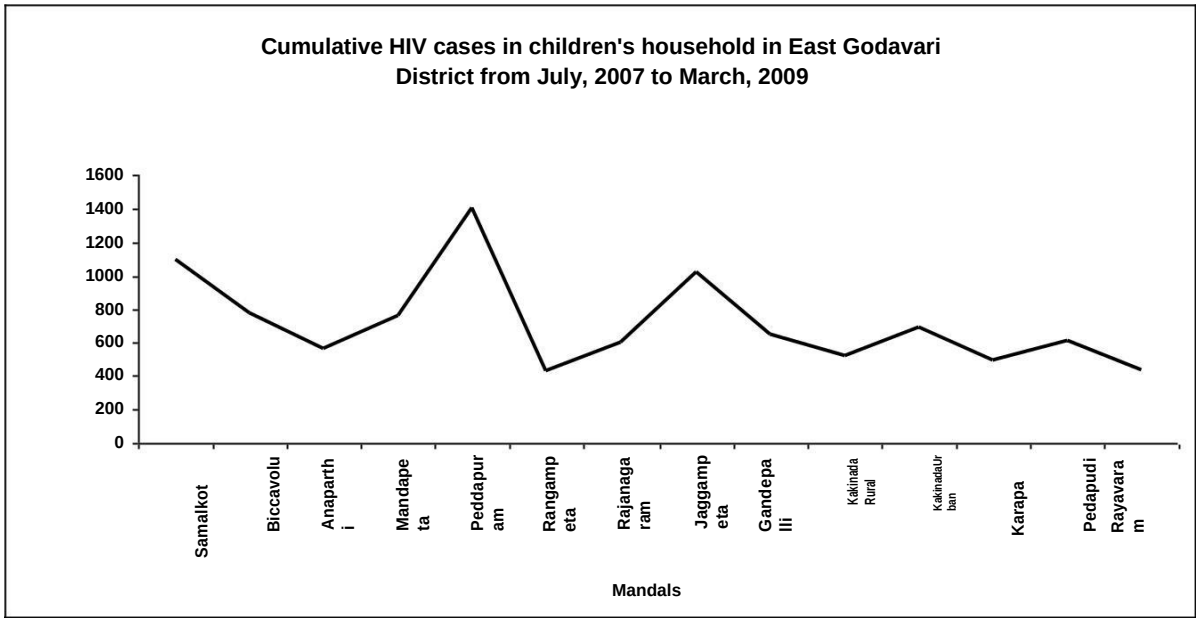

Fig.4 indicates that the spread patterns of the disease among male, female and children in the 14 mandals of the district

Fig.4 indicates that the spread patterns of the disease among male, female and children in the 14 mandals of the district. Based on the incidence, the spread of disease the district is recognized into high, moderate and low prevalence zones. Among male population, HIV is widely spread in the mandals namely Peddapuram, Jaggampeta and Gandepalli. Moderately spread in Rajanagaram, Mandapeta, Anaparthi, Biccavolu, Samalkot and Pedapudi and low prevalence is occurring in the mandals namely Rangampeta, Rayavaram, Karapa, Kakinada Rural and Kakinada Urban. Among female the spread is more in Peddapuram, Samalkot and Jaggampeta mandals, moderate in Mandapeta, Biccavolu and Kakinada Urban and low in Gandepalli, Rajanagaram, Rangampeta, Anaparthi, Rayavaram, Pedapudi, Karapa and Kakinada Rural. HIV is high in boys in the mandals namely Peddapuram, Samalkot, Jaggampeta, Biccavolu and Mandapeta. Moderate in Gandepalli, Anaparthi and Kakinada Urban and low in Rajanagaram, Rangampeta, Rayavaram, Pedapudi, Karapa and Kakinada Rural. HIV is high in girls in the mandals namely Peddapuram and Samalkot. Moderate Jaggapeta, Biccavolu and Kakinada Urban and low in Gandepalli, Rajanagaram, Rangampeta, Mandapeta, Anaparthi, Rayavaram, Pedapudi, Karapa and Kakinada Urban. The analysis indicates that the disease spread is high among men, women and children in the mandals namely Peddapuram, Samalkot and Jaggampeta of East Godavari district.

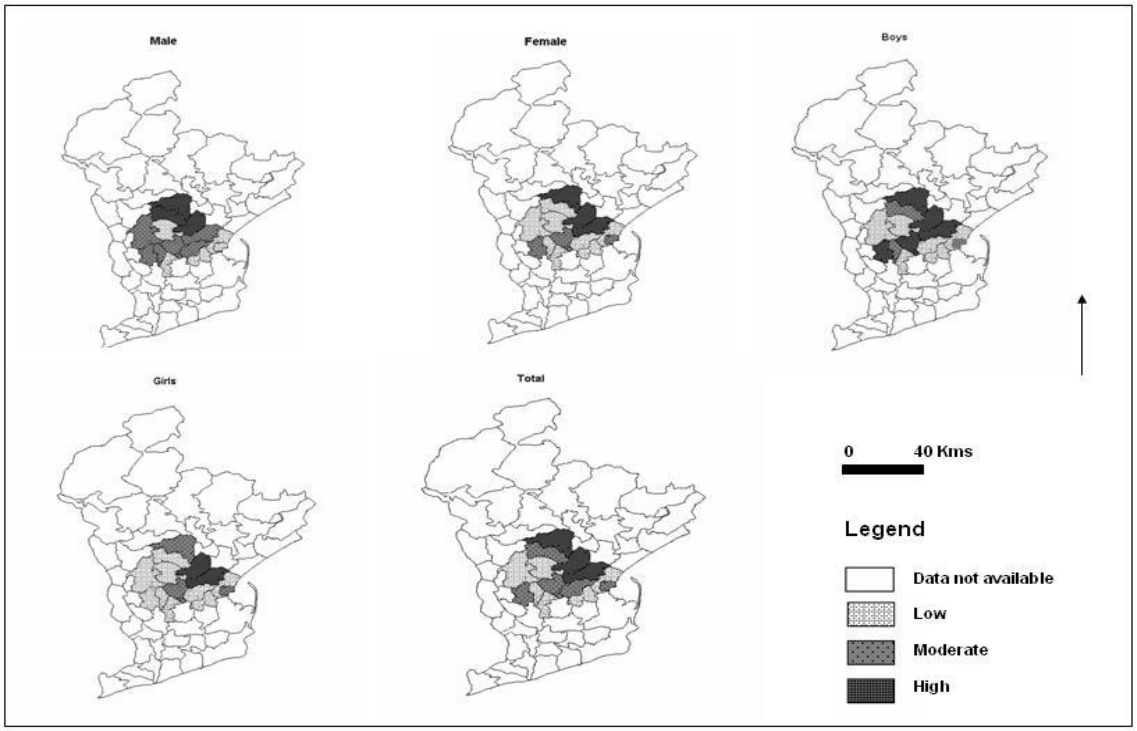

Fig. 4 Spatial spread of HIV in East Godavari District

Table. 3 Deaths due to HIV in East Godavari District from July, 2007 to March, 2009

Name of the Mandal	Male	Female	Children	Total

			Boys	Girls	
Samalkot	7	5	1	1	14
Biccavolu	18	11	0	1	30
Anaparthi	12	6	0	1	19
Mandapeta	14	9	0	0	23
Peddapuram	19	13	0	3	35
Rangampeta	2	0	0	0	2
Rajanagaram	12	10	0	1	23
Jaggampeta	12	7	1	1	21
Gandepalli	11	2	0	0	13
Kakinada (Rural)	4	3	1	0	8
Kakinada (Urban)	5	5	0	2	12
Karapa	9	7	1	0	17
Pedapudi	13	6	0	0	19
Rayavaram	18	6	0	0	24

Table. 3 and Fig. 5 indicates the mortality in part of East Godavari district due to HIV infection during July, 2007 to March, 2009. The data are available for fourteen mandals of the district. The mortality among male and female population. Few deaths were recorded among children. A total of 260 deaths due to HIV occurred during July, 2007 to March, 2009. Out of which 156 were male and 90 were female and 14 were children. The high mortality in male population is indicating that HIV in Peddapuram recorded 32 deaths out of which 156 were men and 90 women. It is followed by 29 deaths out of which 156 were men and 90 were women in Biccavolu. It was noticed that mortality in the male population is more than the female population.

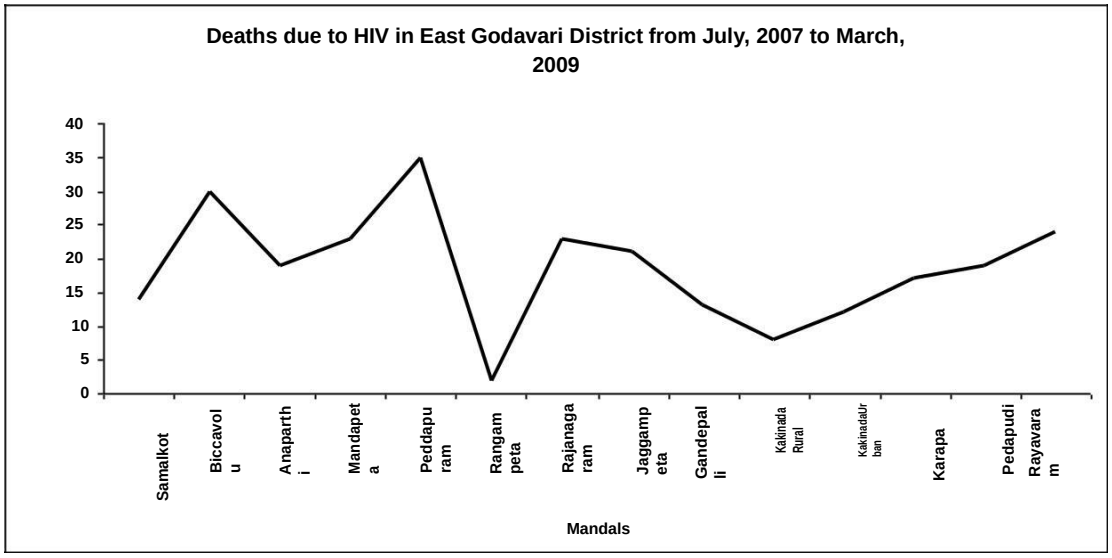

Fig. 6 indicates that the maximum deaths during July, 2007 to March, 2009 were recorded in three mandals namely Peddapuram Biccavolu and Rayavaram among men. Medium number of

deaths was recorded in Jaggampeta, Gandepalle, Pedapudi, Rajanagaram, Mandapeta and Anaparthi. Less number of deaths was recorded in Samalkot, Rangampeta, Karapa, Kakinada Rural and Kakinada Urban. Among female population maximum number of deaths occurred in Peddapuram and Biccavolu. Medium number of deaths occurred Rajanagaram, Jaggampeta, Mandapeta, Anaparthi, Rayavaram, Karapa and Pedapudi. Less number of deaths occurred Gandepalli, Samalkot Rangampeta, Kakinada Rural and Kakinada Urban. The analysis indicates that the mortality is high among men, women and children in the mandals namely Peddapuram, Biccavolu of the East Godavari district

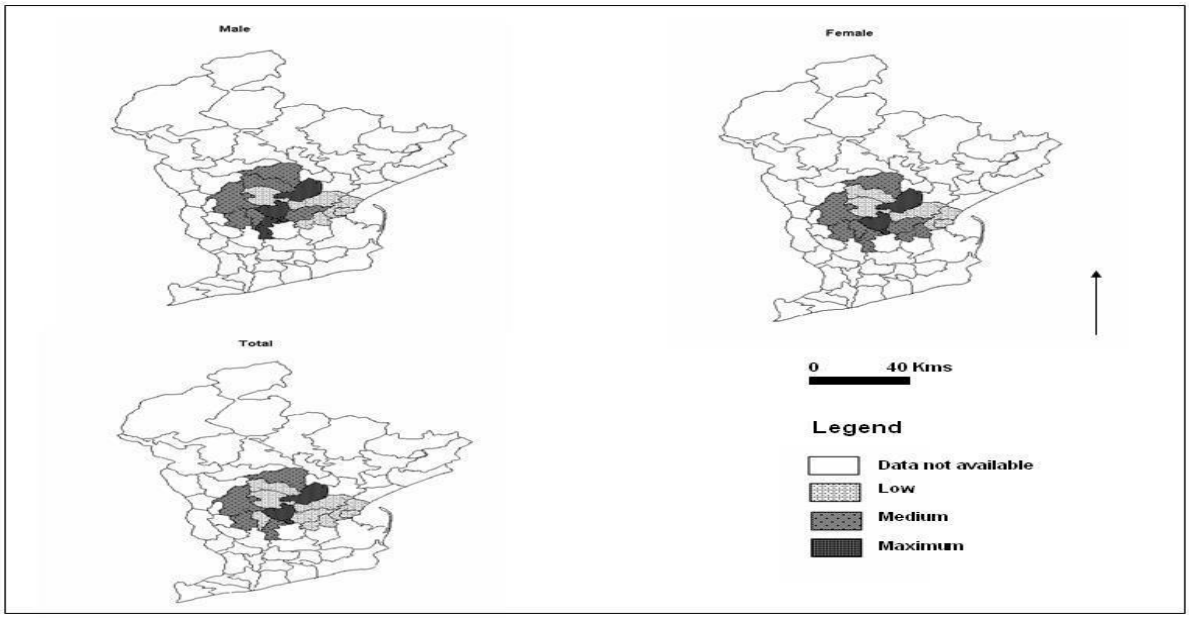

Fig. 6 Deaths due to HIV in East Godavari District

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