HIV does not cause cancer, but the virus does destroy the immune system, leaving a person without an important defense mechanism against the growth of cancer. "We all know the immune system battles infections. But what we've learned from studying HIV-associated cancers is just how critical the immune system is in protecting you against malignancy" (Alexandra Levine) [145].

Cancer is a significant cause of mortality and morbidity in people infected with HIV [13]. In fact 30% to 40% will develop a malignancy during their lifetime [14]. The majority of cancers affecting HIV-positive people are those established as AIDS-defining: Kaposi's sarcoma, non-Hodgkin's lymphoma, and invasive cervical cancer [114]. However, other types of cancer also appear to be more common among those infected with HIV. While not classified as AIDS-defining, these malignancies are affecting the HIV/AIDS community greatly and have been referred to as "Non AIDS defining malignancies" [4,5] or "opportunistic" cancers [4].

The current spectrum of AIDS-related cancers is based on the studies in the United States and western European countries. Because there are no population-based cancer registries and/or AIDS registries in developing countries, the pattern of AIDS-related cancers in developing countries is unknown. It may be different from
that in developed countries as the baseline cancer spectrums are different. United
States and Western European countries have high incidences of breast, colorectum,
and endometrial cancers, while China and other developing countries such as India
have high risk of stomach, liver, and cervical cancer instead of Kaposi’s sarcoma, Non
Hodgkin’s Lymphoma and Hodgkin’s Lymphoma.

According to Jennifer Newcomb-Fernandez, 2003 although it remains
unclear whether HIV functions directly as an oncogenic agent, it putatively
contributes to the development of malignancies through several mechanisms.
Impaired immune surveillance, dysregulation of cytokine pathways and growth
factor production, inability to combat genomic instability, chronic B cell stimulation,
and imbalance between cellular proliferation and differentiation may all contribute
to the prevalence of HIV/AIDS-associated malignancies. Prolonged exposure to viral
oncogenes, moderate immune suppression, and genomic instability could result in
impaired immune surveillance and the subsequent development of tumors [146].

Hence the present study has been planed to study incidence of HIV
seropositive in the patients of different forms of malignancies, because practical
experience that HIV seropositivity is many fold more then the reported prevalence so
it is absolutely important and urgent need of our society to detect the true
prevalence of HIV seropositivity.

I choose a study group of patients suffering from various types of
malignancies. On the basis of clinical diagnosis 24.89% cases were of Carcinoma of
cervix, 16.88% cases were of Carcinoma of breast, 10.47% cases were of Larynx cancer, 6.64% cases were of Lung cancer, 4.68% cases were of Non Hodgkin’s Lymphoma, 2.59% cases were of Hodgkin’s Lymphoma, 3.83% cases were of Liver cancer, 9.75% cases were of cancer of gall bladder, 3.67% cases were of cancer of oesophagus, 12.26% cases were of Tongue cancer, 3.11% cases were of Ovary cancer, 1.23% cases were of Testis cancer. (Table-1)

On Clinical Diagnosis of cases (study population) according to AIDS defining and Non AIDS defining malignancies 410 (29.58%) cases were belonged to AIDS defining malignancy category and 976 (70.42%) cases were belonged to Non AIDS defining malignancy category. (Table-2)

Among the total study population of 1386 patients suffering from a variety of malignancy which we find 57.79% cases were females, while the rest were male 42.21%. Maximum percentage of cases was 29.29% belongs to 51-60 years of age group while lowest numbers of cases 0.36% were seen in 0-10 year age group. Quite similar study were obtained by Ocheni S et al (2004) [36] they studied patients with various forms of malignancies seen at the University College Hospital Ibadan, Nigeria for HIV infection, There were 41% male and 59% female with age ranging from 7 months to 80 years. The known age distribution patterns of different cancer seen in my study population are almost similar to known distribution pattern. (K Park) [115].
In our study population maximum patients of cervical cancer were seen between the age group 30-50 year which is almost similar to reported incidence of this cancer, which rapidly rises from age group 25-45 year than labeling off than falling again. Majority of breast cancer patients were in the age group 31-50 year age group this trend again in similar to reported incidence trend. (WHO, 2002) [116].

Tongue cancer, larynx cancer, lung cancer, non Hodgkin’s cancer, oesophagus cancer, liver cancer, ovary cancer, Hodgkin’s lymphoma and testis cancer are more common among male than female in our study population this pattern is almost similar to known distribution of these cancers among both sex. However this sex differentiation pattern was not observed in gall bladder cancer. (K Park) [115].

In age distribution maximum 30.19% female cases of AIDS defining malignancies belonged to 41-50 year age group and 22.44% male cases of AIDS defining malignancies were also belonged to 41-50 year age group. 29.31% female cases of Non AIDS defining malignancies belonged to 51-60 year age group and 37.31% male cases of Non AIDS defining malignancies belonged to 51-60 year age group. The higher number of female in AIDS defining malignancy category because of greater number of cervical cancer patients.

(Table-3, 4, 5, 6)

Distribution of malignant cases (study population) according to education status it was observed that 39.76% were illiterate, 16.66% were high school, 15.45% were primary educated, 15.72% were intermediate, 10.17% were
graduate, and 2.23% were post graduate. In education wise of distribution maximum 37.56% cases of AIDS defining malignancies were illiterate and 40.67% cases of Non AIDS defining malignancies also illiterate. Minimum 0.97% cases of AIDS defining malignancies were post graduate and 2.77% cases of Non AIDS defining malignancies were post graduate. In cervical cancer and testis cancer patients majority of patients belonged to illiterate group have been because of poor genital hygiene among illiterate group of patients. However most of these other cancers (Tongue cancer, larynx cancer, gall bladder, lung cancer, non Hodgkin’s cancer, oesophagus cancer, liver cancer, ovary cancer, and Hodgkin’s lymphoma) the majority are also observed illiterate group this could be because of their ignorance, poor knowledge about the care and prevention of cancer. (Table-7, 8)

Distribution of study population according to marital status it was observed that 81.96% was married, 7.14% were widow or widower, 7.07% were unmarried, and 3.82% were divorced or separated. According to AIDS defining and non AIDS defining malignancies distribution of marital status is, maximum 80.48 % cases of AIDS defining malignancies were married and 82.58% cases of non AIDS defining malignancies were also married and lowest number of cases 5.85% of AIDS defining malignancies were in unmarried group and 2.56 % cases of non AIDS defining malignancies were in divorced or separated. Maximum percentages of cases were married in our study. This might be because of married group was largest group hence majority of patients in different malignancies were observed in this group. Highest number of cases in our study population were suffering from cervical cancer
and this disease is more common in married women in compare to single women because this is a sexually transmitted disease. (Table-9, 10)

On the basis of distribution of cases according to religion and caste in different forms of malignancies it was observed that 38.31% were Lower class Hindu, 31.02% were backward Hindu, 11.90% were Muslim, 10.61% were Upper class Hindu, and 8.15% were others. According to AIDS defining and non AIDS defining malignancies distribution of religion and caste, maximum 78.29% cases of AIDS defining malignancies were Hindu and 80.64% cases of Non AIDS defining malignancies were also Hindu and lowest 12.68% cases of AIDS defining malignancies were Muslims and 11.58% cases of Non AIDS defining malignancies were also Muslims. 9.02% cases of AIDS defining malignancies were belonged to other caste and 7.79% cases of non AIDS defining malignancies were also belonged to other caste. Maximum percentages of cases were Hindu in our study population because Hindu group was largest group so that majority of the patients in different malignancies were seen in this group and maximum 38.31% patients were observed among lower Hindu group this could be attributed the poor literacy status, ignorance and the poverty. (Table-12, 11)

Distribution of cases according to occupational status in different forms of malignancies in which out of 1386 cases 50.07% cases were unemployed or non working, 33.12% were unskilled worker, 10.75% were service / vendor / shopkeeper /farming / business class, 67 (4.83%) were skilled worker, 17 (1.23%) cases were in
professional jobs. According to AIDS defining and non AIDS defining malignancies distribution of occupational status maximum 68.29% cases were unemployed or non working and lowest .42% cases were in skilled worker and no case was found in professional jobs and in non AIDS defining malignancies maximum 42.42% cases were also unemployed or non working and lowest number of cases 1.23% were in professional jobs. Maximum numbers of cases were in unemployed or non working group. This is because of inclusion of most of the women in this group who were no working and also men and women of age less than 20 years. (Table-13, 14)

Distribution of cases on the basis of premarital/extramarital sexual contact 4.33% (60/1386) cases had admitted for any sexual promiscuity while 95.67% (1326/1386) of cases had not admitted for any sexual promiscuity (premarital and extramarital sexual contact) while in history of premarital or extramarital sexual contact maximum 95.13% cases of AIDS defining malignancies had no past history of premarital/extramarital sexual contact while 4.87% had positive history of premarital/extramarital sexual contact in the same group. In non AIDS defining malignancies 95.91% also had no past history of premarital or extramarital sexual contact while 4.09% had positive history of blood transfusion but Seriano et al found 7.5% of cases who had admitted for premarital or extramarital sexual contact which is quite higher than our study.

Distribution of cases on the basis of past history of blood transfusion 15.58% (210/1386) of cases had positive history of blood transfusion While 84.42%
(1176/1386) of cases had no history of blood transfusion while in past history of blood transfusion maximum 74.88% cases of AIDS defining malignancies had no past history of blood transfusion, 25.12% had positive history of blood transfusion in the same group. In Non AIDS defining malignancies 88.42% also had no past history of blood transfusion while 11.58% had positive history of blood transfusion.

History of STD in male patients of AIDS defining malignancies and Non AIDS defining malignancies. In AIDS defining malignancies maximum 89.80% had no history of STD. 10.20% had past history of STD. In Non AIDS defining malignancies maximum 87.13% had no history of STD, 12.87% had past history of STD. History of STD in female patients of AIDS defining malignancies and non AIDS defining malignancies. In AIDS defining malignancies maximum 89.75% had no history of STD and 10.25% had past history of STD. In Non AIDS defining malignancies maximum 89.75% had no history of STD and 10.25% had past history of STD.

These could have been one of the possible modes of transmission for HIV infection among different type of malignancy

(Table-15, 16, 17, 18, 19, 20)

Distribution of HIV positive cases according to AIDS defining and Non AIDS defining malignancies:

AIDS defining malignancies- (Table-21, 23)
In our study population out of 345 cases of cases of cervical cancer 0.57% (2/345) cases were HIV seropositive. While Maiman et al reported 19% of cervical cancer patients were infected with HIV and in another study by Dr. Nitin Shah, 2002 reported that HIV makes women more at risk for HPV (Human Papilloma Virus) and it has been investigated to be a major etiological factor in women for cancer of cervix. Chirenje, Z.M. et al, 2002 reported a cross-sectional study of the association of cervical squamous intraepithelial lesions (SIL) and HIV-1 infection in Zimbabwe. They observed that among 554 women in the study, the prevalence of HIV was 36.8 percent. Fruchter, R.G. et al 1998 compared HIV-infected and HIV-negative women with invasive cervical cancer with respect to predictors of advanced disease. The study compared 28 HIV-infected and 132 HIV-negative cervical cancer patients with regard to stage of disease, Results from a retrospective analysis of the data showed that HIV-infected women had a fivefold greater rate of cervical intraepithelial neoplasia or unevaluated abnormal smears than the HIV-negative women. La Ruche, G. et al (1998) screened 2,198 women from three outpatient gynecological clinics in Abidjan, Cote d'Ivoire, for cervical disease and HIV infection. The prevalence of HIV infection was 21.7 percent. But in another study according to Y. M. Chan et al (2004) out of 225 women with newly diagnosed cervical cancer were tested for HIV infection, all tests were negative which is quite similar to our study where prevalence is very low (.57%) [116].

In our study out of 65 cases of Non Hodgkin’s lymphoma 1.54% (1/65) was found to be HIV seropositive. This observation is in conformity with the findings
of Ocheni S et al (2004) where HIV seroprevalence was found to be 2 % (2/100), which is quite similar to our study. DW Lyter et al, (2004) supported that the incidences of malignancy like Non- Hodgkin’s lymphoma is moderately increased in the setting of HIV infection and immunosuppression. They reported that out of 430 HIV seropositive patients 13 patients were infected from Non- Hodgkin’s lymphoma (prevalence 3.02%)45. Dal Maso L et al (2001) reported that in 17 Western European countries, NHL number rose steadily from 408 in 1988 to 975 in 1995 but declined thereafter to 524 in 1998 [55].

**Non AIDS defining malignancies**

In our study out of 53 cases of liver cancer 1.88% (1/53) was found to be HIV seropositive. According to Reuters Health information, New York, 2001 in HIV-infected individuals, hepatocellular carcinoma is largely related to chronic hepatitis C virus infection (HCV) and has a "more aggressive clinical course" than in HIV-negative individuals. Dr. Massimo Puoti from the University of Brescia compared the clinical and epidemiological features and outcome of HCC in 41 HIV-positive and 384 HIV-negative patients. Aluisio Segurado, 2002 HIV-HCV co infection is common, results from shared mechanisms of acquisition and its prevalence is estimated as 30% to 40% in Europe and the USA, whereas Brazilian studies indicate 17.7% in Sao Paulo and 36.2% in Santos 132. In comparison to our study this prevalence quite high which could be due to high prevalence of HIV seropositivity in western countries.
In this study out of 234 case of breast cancer 0.43% (1/234) case was found to be HIV seropositive. According to Oluwole SF et al, 2005 1.6% (5/305) cases was HIV seropositive and they concluded that their results do not support the recent reports suggesting that HIV infection is associated with poorly differentiated, aggressive disease with poor survival outcome. It remains unclear if breast carcinoma is directly linked to HIV infection and Liron Pantanowitz et al, 2004 reported that till date, only 46 published cases of breast cancer in HIV-positive individuals have been identified [117]. Amber A. Guth (2003) studied epidemiologic data of Western countries and Africa, and then he concluded that HIV infection is not permissive for breast cancer. This is reflected in the paucity of available data. Early reports consisted of case reports, describing advanced cancers with unusual presentations [118].

In our study out of 53 cases of tongue cancer 0.59% (1/170) was found to be HIV seropositive. Demopoulos BP et al 2003 described the age of onset of malignant disease in patients seropositive for HIV and in control patients presumed to be negative for HIV, but with the same primary site. They find 5/16 (HIV-positive patients/control group) infected by Tongue cancer (Prevalence-31.23%) 142. This study was conducted in Weill Medical College of Cornell University, New York, USA. This difference might be due to higher prevalence of HIV seropositivity in western countries.
In our study we find .73% (3/410) cases were HIV seropositive in AIDS defining malignancies and 0.30% cases were HIV seropositive in Non AIDS defining malignancies. According to Bhatia, Parmar et al (2005) who compared the prevalence of various AIDS defining cancers in India, Thailand and Australia. Kaposi’s sarcoma was detected in 1% of 143 cases from India, 3.5 % of 278 cases in Thailand and 27.8% of 2.580 cases in Sydney, Australia. Similarly lymphoma detected in 1.6% of HIV infected subjects in India, 0.7% in Thailand and 10.6% in Sydney, Australia and in another study conducted by Ocheni S et al (2004) in their study they found that two patients with non-Hodgkin's lymphoma (NHL) and one patient each with carcinoma of the cervix, Kaposi’s sarcoma, Hodgkin’s lymphoma and carcinoma of the breast were HIV seropositive while in our study we observed one patient with non-Hodgkin's lymphoma (NHL), two patients with carcinoma of cervix, one patient with liver cancer, one patient with tongue cancer and one patient with carcinoma of breast this study is quit similar to our findings. (Table -22)

In distribution HIV seropositivity and age of patients, maximum HIV seropositive patients was observed in 21-40 (5) year age group. Because this is most sexually active group. (Table-24)

In distribution HIV seropositivity and sex of patients, it was observed that HIV is equally spreading in the both sex. (Table-25)
Religion was not found to be related with HIV seropositivity all HIV seropositive patients were Hindu by religion. This could be because of larger number of Hindu patients as such in our study population. (Table-26)

Maximum number of HIV seropositive patients belongs to married group and only one patient was unmarried. The high seropositive amongst married patient could have been due to larger number of married patient in our study population. (Table-27)

Almost one third of HIV seropositive patient were illiterate and two third HIV seropositive patient though were literate but of poor education level. This observation indicates towards low awareness level about HIV/AIDS among most of the patients in our study population. (Table-28)

Fifty percent of HIV seropositive patients were employed in different occupation and fifty percent of HIV seropositive patients were unemployed. No relationship between occupation and HIV seropositivity was found. (Table-29)

Case study-(Table-30, 31)

In our study:

The first HIV seropositive case was 35 year old illiterate married female who had no past history of intravenous drug abuse, had past history of blood transfusion, sexual promiscuity and STD. This could have been possible mode of HIV
acquiring in this patient, patient was diagnosed with cervical cancer and a simple house wife by occupation.

**The second HIV seropositive case** was 31 year old illiterate married female with no past history of blood transfusion and intravenous drug abuse but had history of sexual promiscuity and STD. This positive case was diagnosed with cervical cancer and was a simple house wife by occupation. Gichangi Peter B et al (2003) concluded that women with invasive cervical cancer who also were HIV-positive on an average younger than HIV-negative women with invasive cervical cancer and found that there is fivefold greater rate of acquiring cervical neoplasia among HIV positive female than HIV negative women. Our finding regarding the age of HIV positive cervical cancer patients are in conformity with the above mentioned study.

**The third HIV seropositive case** was 30 year old high school passed unmarried male, diagnosed with Non Hodgkin’s lymphoma. He had no past history of blood transfusion and intravenous drug abuse, but had positive history of sexual promiscuity and STD and was a truck Driver by occupation, which could have been possible source of HIV infection.

**The Fourth HIV seropositive case** was 45 year old primary educated married male, diagnosed with liver cancer and labour by occupation had past history of STD and blood transfusion but had no positive history of sexual promiscuity and intravenous drug abuse.
The Fifth HIV positive case was 30 year old intermediate passed, married housewife suffering from breast cancer with no previous history of sexual promiscuity, STD and intravenous drug abuse but had positive history of blood transfusion. Mayer et al (1996) has also reported a case of 48 year old HIV seropositive female with breast cancer.

The sixth HIV seropositive case was 40 year illiterate married male diagnosed with tongue cancer with no past history of blood transfusion, STD and intravenous drug abuser but had positive history sexual promiscuity and labor by occupation.

Use of oral contraceptive was present in 14.58% patients of cervical cancer and 10.18% patients were suffering with other cancer though no relationship was found between patient’s use of contraceptive pills and cervical cancer in our study. It was however reported by Moreno Vet al in 2002 [119] he reported that use of oral contraceptives may increase the risk of cervical cancer. Nevertheless, the impact of oral contraceptive use in women with human papillomavirus (HPV) is the main cause of cervical cancer. According to the National Cancer Institute, there is some evidence that long-term use (more than five years) of oral contraceptives may slightly increase the risk of cervical cancer. Brinton et al, 1986 was also found that there was a higher risk of cervical cancer with steroid contraception in women who had never used barrier methods of contraception. These interactions suggest that steroid contraception acts as co-carcinogens with sexually transmissible agents [120].
A recent WHO study finds an increased risk with increased duration of pill use and with the use of oral contraceptives high in oestrogen [121]. (Table-32)

In our study .432% (6/1386) cases were found to be HIV seropositive screened by Enzyme Linked Immunosorbent Assay (ELISA) method and confirmed with the Western Blot method. According to Ocheni S et al (2004) the seroprevalence of HIV infection in patients with malignancies in his study was 6%. Despite the HIV/AIDS epidemic, he did not find any significant statistical relationship between HIV infection and malignancies. They screened one hundred patients with various forms of malignancies seen at the University College Hospital Ibadan, Nigeria between October 2001 and June 2002 for HIV infection by the Enzyme Linked Immunosorbent Assay (ELISA) method and confirmed with the Western Blot method. Lanjewar et al (2005) presented an Autopsy study of 162 cases of AIDS (1988-2003) from the Grant Medical College in Mumbai. There were a total of 6 cases of malignancies: Kaposi’s sarcoma (1), Systemic Lymphoma (3), primary hepatic Lymphoma (1) and bronchogenic squamous cell carcinoma (1). From the same institution a total of 455 biopsies were performed in HIV infected individuals and 13 cases of malignant tumors were detected (Prevalence 2.85%). These included Kaposi’s sarcoma (1), one each of colon, liver, anal canal and 9 cases of penile carcinoma. Larger, preferably multicenter studies need to be carried out to ascertain the relationship between HIV infection and malignancies.
According to UNAIDS /WHO, between 270,000 and 680,000 Indians died of AIDS in 2005 in which only 1,751 were from Uttar Pradesh so we can say that the prevalence of HIV seroositivity is exceptionally low in contrast to other states of India. The greatest numbers were in Maharashtra and Gujarat in the west; Tamil Nadu, Andhra Pradesh and Karnataka in the south; and Manipur and West Bengal in the north-east.