IDENTIFICATION OF COMMON CANCERS AND RISK FACTORS IN POVERTY LEVEL PEOPLE IN BANGLADESH

A dissertation submitted to the department of Pharmacy, East West University in conformity with the requirements for the degree of Bachelor of Pharmacy.

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All praises are to the Supreme Being, creator and ruler of the universe, whose mercy keeps alive and guiding me through each step in my endeavor for education as well as my research for the fulfillment of the degree of Bachelor of Pharmacy.

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Finally, I am profoundly indebted to the Almighty for providing me the strength and perseverance to carry out the whole work in time.

CERTIFICATE

This is to certify that the thesis "IDENTIFICATION OF COMMON CANCERS AND RISK FACTORS IN POVERTY LEVEL PEOPLE IN BANGLADESH" submitted to the Department of Pharmacy, East West University, Aftab Nagor, Dhaka in partial fulfillment to the requirements for the degree of Bachelor of Pharmacy (B. Pharm) was carried out by **Farjana Pervin (ID: 2008-1-70-017)** and that no part of the thesis has been submitted for any other degree. I also certify that all the sources of information availed of this connection is duly acknowledged.

Sufia Islam 17.07.2012

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DEDICATION

This research paper is dedicated to my parents

ABSTRACT

Purpose: The present research was a comprehensive study that was conducted to identify risk factors in poverty level in Bangladesh.

Method: This was a survey based study where cancer patients of different genders, locations, occupations were taken as volunteers. A questionnaire was made to observe the patients diagnostic reports, prescriptions etc. Data was analyzed using Microsoft Excel 2010.

Results: From this study, it was found that adults (60%) were more susceptible to cancer than other. Males (71.25%) are very susceptible to cancer than females. Respiratory cancers (33.3%) and gastro intestinal cancer (33.3%) were most common in male. Betel nut and jorda may cause various kinds cancers, among them respiratory cancers (24.4%) and gastrointestinal cancers (19.5%) were most common. Cisplatin (42.5%) and etoposide (31.25%) were given to most common cancer patents.

Conclusion: However, this study has not been able to establish the all types of cancer treatment of all classes of patients and identify different risk factors. These studies clearly indicate the most common types of cancer in poverty level and under poverty level people I Bangladesh.

Key Words: Cancer, gene, tumor, risk factors, mechanism, chemotherapy etc.

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Chapter 1: Introduction

1.1 Cancer:

Cancer is a class of diseases characterized by out-of-control cell growth. There are over 100 different types of cancer, and each is classified by the type of cell that is initially affected.Cancer harms the body when damaged cells divide uncontrollably to form lumps or masses of tissue called tumors (except in the case of leukemia where cancer prohibits normal blood function by abnormal cell division in the blood stream). Tumors can grow and interfere with the digestive, nervous, and circulatory systems and they can release hormones that alter body function. Tumors that stay in one spot and demonstrate limited growth are generally considered to be benign. More dangerous, or malignant, tumors form when two things occur cancerous cell manages to move throughout the body using the blood or lymph systems, destroying healthy tissue in a process called invasion that cell manages to divide and grow, making new blood vessels to feed itself in a process called angiogenesis. When a tumor successfully spreads to other parts of the body and grows, invading and destroying other healthy tissues, it is said to have metastasized. This process itself is called metastasis, and the result is a serious condition that is very difficult to treat. [1]

1.2 Demography of Cancer:

Children's Cancer Group Studies 2861 and 2891:

In recent pediatric trials of acute myeloid leukemia (AML), children with Down syndrome (DS) have had significantly more megakaryoblastic leukemia and have experienced better outcome than other children. To further characterize AML in DS, Children's Cancer Group Studies 2861 and 2891 prospectively studied demography, biology, and response in AML and myelodysplastic syndrome (MDS) of children with and without DS. These studies evaluated timing of induction therapy and compared postremission chemotherapy with marrow transplantation in 1,206 children. One-hundred eighteen (9.8%) had DS, a fourfold increase in 20 years. DS patients were younger, had lower white blood cell and platelet counts, more antecedent MDS, acute megakaryoblastic leukemia or undifferentiated AML, and an under-representation of chromosomal translocations. Four-year event-free survival in DS was 69% versus 35% in others. Conventional induction followed by chemotherapy achieved an 88%, 4-year, disease-free survival in DS patients versus 42% in others. Megakaryoblastic leukemia was unfavorable in others but prognostically neutral in DS. AML in DS is demographically and biologically distinct from AML in other children. [2]

1.2.1 Lung Cancer:

This study is based upon 4,129 patients who consulted the author for respiratory disease. All these patients were over 35 years of age. Among patients of the General Hospital of Mexico City and from data of other surveys of different groups infer that this disease is rare in Mexico compared with other countries. In Mexico lung cancer tends to be equally distributed between men and women. In Mexico cancer of the lung is more prevalent among Whites who immigrated after they were 35 years of age and who have resided in the country for over 20 years than among native-born Mexicans.

Among the author's patients complaining of respiratory ailments, lung cancer was found 50 per 1000 persons in immigrants over 35 years of age who had lived in Mexico over 20 years; the frequency in a comparable group of native-born Mexicans over 35 years of age is 32:1000. The ratio of men to women who suffered from lung cancer was: for immigrants, 3.5:1.0; for native Mexicans 2.3:1.0.The ratio of smokers to nonsmokers in the immigrant group is: for male Spaniards, 1:1.3; for male Jews, 1:1.7. The ratio for Mexican-born males is 1:4.8. The ratio for all women is 1.0:14.8, for Jewish women, 1:5.5. Lung cancer is more frequent among adult immigrants to New Zealand, Israel, Mexico and the City of Los Angeles than among native residents of these places. Lung cancer is much less frequent in Mexico than in the United States or in Europe, according to our estimate, about eight times less frequent. Nevertheless, Mexican incidence is increasing. Certified deaths in 1945 numbered 0.90 per 100,000 and in 1954, 1.7 per 100,000.[3]

1.2.2 Changing demography of Prostate Cancer in Asia:

In study, age-specific and age-standardized (world) incidence rates and mortality rates for prostate cancer in Asian countries for 1978–1997 were retrieved and compared. The results confirm that the incidence of prostate cancer has risen by 5–118% in the indexed Asian countries. Incidence at centers in Japan rose as much as 102% (Miyagi 6.3–12.7 per 100,000 person-years) whilst the incidence in Singaporean Chinese increased 118% from 6.6 to 14.4 per 100,000 person-years. The lowest incidence rate recorded was in Shanghai, China and the highest rates were in Rizal Province in the Philippines, although still much lower than those in the United States of America (USA) and many European countries. The mortality data for prostate cancer showed a similar rising trend. The increases in age-adjusted mortality rates per 100,000 person-years, adjusted to the world standard, ranged from 50% in Thailand to 260% in Korea. [4]

1.3 Cancer among Men:

Three Most Common Cancers among Men.

1.3.1 Prostate cancer (156.9):

First among men of all races and Hispanic origin populations.

1.3.2 Lung cancer (80.5):

Second among white, black, American Indian/Alaska Native, and Asian/Pacific Islander men.

1.3.3 Colorectal cancer (52.7):

Second among Hispanic men.

Third among white, black, American Indian/Alaska Native, and Asian/Pacific Islander men.

Leading Causes of Cancer Death among Men

1.3.4 Lung cancer (65.2):

First among men of all races and Hispanic origin populations.

1.3.5 Prostate cancer (23.5):

Second among white, black, American Indian/Alaska Native, and Hispanic men.

Fourth among Asian/Pacific Islander men.

1.3.6 Colorectal cancer (20.0):

Third among men of all races and Hispanic origin populations.

1.3.7 Liver cancer:

Second among Asian/Pacific Islander men.[5]

1.4 Cancer among Women:

Three Most Common Cancers among Women

1.4.1 Breast cancer (120.4):

First among women of all races and Hispanic origin populations.

1.4.2 Lung cancer (54.5):

Second among white, black, and American Indian/Alaska Native women.

Third among Asian/Pacific Islander and Hispanic women.

1.4.3 Colorectal cancer (39.7):

Second among Asian/Pacific Islander and Hispanic\ women.

Third among white, black, and American Indian/Alaska Native women.

Leading Causes of Cancer Death among Women

1.4.4 Lung cancer (40.0):

First among white, black, Asian/Pacific Islander, and American Indian/Alaska Native women.

Second among Hispanic women.

1.4.5 Breast cancer (22.8):

First among Hispanic women.

Second among white, black, Asian/Pacific Islander, and American Indian/Alaska Native women.

1.4.6 Colorectal cancer (14.1):

Third among women of all races and Hispanic origin populations.[6]

1.5 Cancer among Children:

1.5.1 Leukemias:

Highest incidence rate (8.7) found among children aged 1–4 years.

Highest death rate (0.9) found among children aged 10–19 years.

1.5.2 Brain and central nervous system cancer:

Highest incidence rate (4.1) found among children aged 1–4 years.

Highest death rate (0.9) found among children aged 5–9 years.[7]

1.5.3 United States Cancer Statistics (USCS):

The current report provides state-specific and regional data for cancer cases diagnosed and for cancer deaths that occurred in 2007, the most recent year for which incidence data are available. It includes cancer incidence data obtained from registries in 49 states, 6 metropolitan areas, and the District of Columbia, covering 99% of the U.S. population. Mortality data from all states and the District of Columbia also were included and cover 100% of the U.S. population.

These data are presented by race, sex, age, and primary site as well as by specific cancer types.

1.6 Major Findings:

1.6.1 Cancer among Men:

The three most common cancers among men include:

Prostate cancer (156.9): First among men of all races and Hispanic origin populations.

Lung cancer (80.5): Second among white, black, American Indian/Alaska Native, and Asian/Pacific Islander men; third among Hispanic men.

Colorectal cancer (52.7): Second among Hispanic men; third among white, black, American Indian/Alaska Native, and Asian/Pacific Islander men.

The leading causes of cancer death among men are:

Lung cancer (65.2): First among men of all racial and Hispanic origin populations.

Prostate cancer (23.5): Second among white, black, American Indian/Alaska Native, and Hispanic men; fourth among Asian/Pacific Islander men.

Liver cancer: Second among Asian/Pacific Islander men.

Colorectal cancer (20.0): Third among men of all races and Hispanic origin populations.

1.6.2 Cancer among Women:

The three most common cancers among women include:

Breast cancer (120.4): First among women of all races and Hispanic origin populations.

Lung cancer (54.5): Second among white, black, and American Indian/Alaska Native women, and third among Asian/Pacific Islander and Hispanic women.

Colorectal cancer (39.7): Second among Asian/Pacific Islander and Hispanic women and third among white, black, and American Indian/Alaska Native women.

The leading causes of cancer death among women are:

Lung cancer (40.0): First among white, black, Asian/Pacific Islander, and American Indian/Alaska Native women and second among Hispanic women.

Breast cancer (22.8): First among Hispanic women and second among white, black, Asian/Pacific Islander, and American Indian/Alaska Native women.

Colorectal cancer (14.1): Third among women of all races and Hispanic origin populations.[8]

1.7 Symptoms of cancer:

A broad spectrum of non-specific cancer symptoms may include:

1.7.1 Persistent Fatigue:

Fatigue is one of the most commonly experienced cancer symptoms. Anemia is commonly the culprit -- a condition that is associated with many types of cancer, especially types affecting the bowel. Fatigue is a symptom of both malignant and non-malignant conditions and should be evaluated by a physician.

1.7.2 Unintentional Weight Loss:

Losing 10 pounds or more unintentionally definitely warrants a visit to the doctor. This type of weight loss can occur with or without loss of appetite. Remember, weight loss can be a symptom of cancer, but is also a symptom of many other illnesses, too.

1.7.3 Pain:

Typically, pain is not an early symptom of cancer, except in some cancer types like those that spread to the bone. Pain generally occurs when cancer spreads and begins to affect other organs and nerves. Lower back pain is cancer symptom that is associated with ovarian cancer and colon cancer. Shoulder pain can also be a symptom of lung cancer. Pain in the form of headaches can be associated with brain tumors (malignant and benign).

1.7.4 Fever:

In relation to cancer, a fever that is persistent or one that comes and goes frequently can signal stress on the immune system. Fevers are commonly associated with types of cancer that affects the blood, like leukemia and lymphoma, but are also common in people whose cancer has spread.

1.7.5 Bowel Changes:

Constipation, diarrhea, blood in the stools, gas, thinner stools, or just a general overall change in bowel habits, these symptoms are most commonly associated with colon cancer, but are also related to other cancer types.

1.7.6 Chronic Cough:

Blood and/or mucus may accompany the cough and can be caused many conditions. In relation to cancer, a chronic cough with blood or mucus can be symptom of lung cancer.[9]

1.8 Causes of cancer:

Cancers are primarily an environmental disease with 90-95% of cases attributed to environmental factors and 5-10% due to genetics. Environmental, as used by cancer researchers, means any cause that is not genetic, not merely pollution. Common environmental factors that contribute to cancer death include tobacco (25-30%), diet and obesity (30-35%), infections (15-20%), radiation (both ionizing and non-ionizing, up to 10%), stress, lack of physical activity, and environmental pollutants**.**

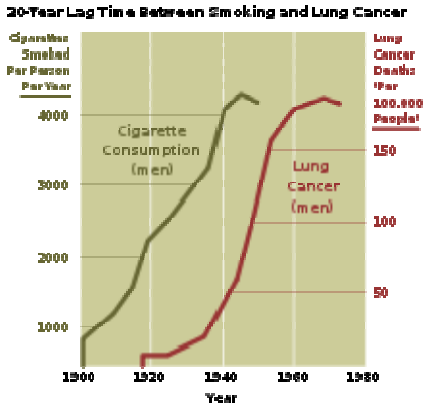

Figure 1.8

The incidence of lung cancer is highly correlated with smoking.

Cancer pathogenesis is traceable back to DNA mutations that impact cell growth and metastasis. Substances that cause DNA mutations are known as mutagens, and mutagens that cause cancers are known as carcinogens. Particular substances have been linked to specific types of cancer. Tobacco smoking is associated with many forms of cancer and causes 90% of lung cancer.

Many mutagens are also carcinogens, but some carcinogens are not mutagens. Alcohol is an example of a chemical carcinogen that is not a mutagen. In Western Europe 10% of cancers in males and 3% of cancers in females are attributed to alcohol.

1.8.1 Diet and exercise:

Diet, physical inactivity, and obesity are related to approximately 30–35% of cancer cases. In the United States excess body weight is associated with the development of many types of cancer and is a factor in 14–20% of all cancer deaths. Physical inactivity is believed to contribute to cancer risk not only through its effect on body weight but also through negative effects on immune system and endocrine system.

Diets that are low in vegetables, fruits and whole grains, and high in processed or red meats are linked with a number of cancers. A high salt diet is linked to gastric cancer, aflatoxin B1, a frequent food contaminate, with liver cancer, and Betel nut chewing with oral cancer. This may partly explain differences in cancer incidence in different countries for example gastric cancer is more common in Japan with its high salt diet and colon cancer is more common in the United States

1.8.2 Infection:

Worldwide approximately 18% of cancers are related to infectious diseases. This proportion varies in different regions of the world from a high of 25% in Africa to less than 10% in the developed world. Viruses are usual infectious agents that cause cancer but bacteria and parasites may also have an effect.

A virus that can cause cancer is called an oncovirus. These include human papillomavirus (cervical carcinoma), Epstein-Barr virus (B-cell lymphoproliferative disease and nasopharyngeal carcinoma), Kaposi's sarcoma herpesvirus (Kaposi's Sarcoma and primary effusion lymphomas), hepatitis B and hepatitis C viruses (hepatocellular carcinoma), and Human T-cell leukemia virus-1 (T-cell leukemias). Bacterial infection may also increase the risk of cancer, as seen in Helicobacter pylori-induced gastric carcinoma. Parasitic infectionsstrongly associated with cancer include Schistosomahaematobium (squamous cell carcinoma of the bladder) and the liver flukes, Opisthorchisviverrini and Clonorchissinensis (cholangiocarcinoma).

1.8.3 Radiation:

Up to 10% of invasive cancers are related to radiation exposure, including both ionizing radiation and non-ionizing radiation. Additionally, the vast majority of non-invasive cancers are non-melanoma skin cancers caused by non-ionizing radiation from ultraviolet radiation.

Sources of ionizing radiation include medical imaging, and radon gas. Radiation can cause cancer in most parts of the body, in all animals, and at any age, although radiation-induced solid tumors usually take 10–15 years, and can take up to 40 years, to become clinically manifest, and radiation-induced leukemias typically require 2–10 years to appear. Some people, such as those with nevoid basal cell carcinoma syndrome or retinoblastoma, are more susceptible than average to developing cancer from radiation exposure. Children and adolescents are twice as likely to develop radiation-induced leukemia as adults; radiation exposure before birth has ten times the effect. Ionizing radiation is not a particularly strong mutagen. Residential exposure to radon gas, for example, has similar cancer risks as passive smoking. Low-dose exposures, such as living near a nuclear power plant, are generally believed to have no or very little effect on cancer development. Radiation is a more potent source of cancer when it is combined with other cancer-causing agents, such as radon gas exposure plus smoking tobacco.

Medical use of ionizing radiation is a growing source of radiation-induced cancers. Ionizing radiation may be used to treat other cancers, but this may, in some cases, induce a second form of cancer. It is also used in some kinds of medical imaging. One report estimates that approximately 29,000 future cancers could be related to the approximately 70 million CT scans performed in the US in 2007. It is estimated that 0.4% of current cancers in the United States are due to CTs performed in the past and that this may increase to as high as 1.5–2% with 2007 rates of CT usage.

Prolonged exposure to ultraviolet radiation from the sun can lead to melanoma and other skin malignancies. Clear evidence establishes ultraviolet radiation, especially the non-ionizing medium wave UVB, as the cause of most non-melanoma skin cancers, which are the most common forms of cancer in the world.

Non-ionizing radio frequency radiation from mobile phones, electric power transmission, and other similar sources have been described as a possible carcinogen by the World Health Organization's International Agency for Research on Cancer.

1.8.4 Heredity:

The vast majority of cancers are non-hereditary, which are called sporadic cancers. Hereditary cancers are cancers that are primarily caused by an inherited genetic defect. Less than 0.3% of the populations are carriers of a genetic mutation which has a large effect on cancer risk. They cause less than 3–10% of all cancer. Some of these syndromes include:certain inherited mutations in the genes BRCA1 and BRCA2 with a more than 75% risk of breast cancer and ovarian cancer Li-Fraumeni syndrome (various tumors such as osteosarcoma, breast cancer, soft tissue sarcoma, brain tumors) due to mutations of p53Turcot syndrome (brain tumors and colonic polyposis)Familial adenomatous polyposis an inherited mutation of the APC gene that leads to early onset of colon carcinoma. Hereditary nonpolyposis colorectal cancer (HNPCC, also known as Lynch syndrome) can include familial cases of colon cancer, uterine cancer, gastric cancer, and ovarian cancer, without a preponderance of colon polyps.Retinoblastoma, when occurring in young children, is due to a hereditary mutation in the retinoblastoma gene.Down syndrome patients, who have an extra chromosome 21, are known to develop malignancies such as leukemia and testicular cancer, though the reasons for this difference are not well understood.

1.8 5 Physical agents:

Some substances cause cancer primarily through their physical, rather than chemical, effects on cells. A prominent example of this is prolonged exposure to asbestos, naturally occurring mineral fibers which are a major cause of mesothelioma, a type of lung cancer. Other substances in this category include both naturally occurring and synthetic asbestos-like fibers, such as wollastonite, attapulgite, glass wool, and rock wool, are believed to have similar effects. Nonfibrous particulate materials that cause cancer include powdered metallic cobalt and nickel, and crystalline silica (quartz, cristobalite, and tridymite). Usually, physical carcinogens must get inside the body (such as through inhaling tiny pieces) and require years of exposure to develop cancer.

1.8.6 Physical trauma and inflammation:

Physical trauma resulting in cancer is relatively rare. Claims that breaking bone resulted in bone cancer, for example, have never been proven. Similarly, physical trauma is not accepted as a cause for cervical cancer, breast cancer, or brain cancer.

Generally, it is believed that the cancer arises, or a pre-existing cancer is encouraged, during the process of repairing the trauma, rather than the cancer being caused directly by the trauma.

1.8.7 Hormones:

Some hormones factor in the development of cancer by promoting cell proliferation. Hormones are important agents in sex-related cancers such as cancer of the breast, endometrium, prostate, ovary, and testis, and also of thyroid cancer and bone cancer. Men of Asian ancestry, with the lowest levels of testosterone-activating androstanediolglucuronide, have the lowest levels of prostate cancer. However, non-genetic factors are also relevant: obese people have higher levels of some hormones associated with cancer and higher rates of those cancers. Women who take hormone replacement therapy have a higher risk of developing cancers associated with those hormones. On the other hand, people who exercise far more than average have lower levels of these hormones, and lower risk of cancer.[10]

1.9 Pathophysiology:

Carcinogenesis and the Hallmarks of Cancer

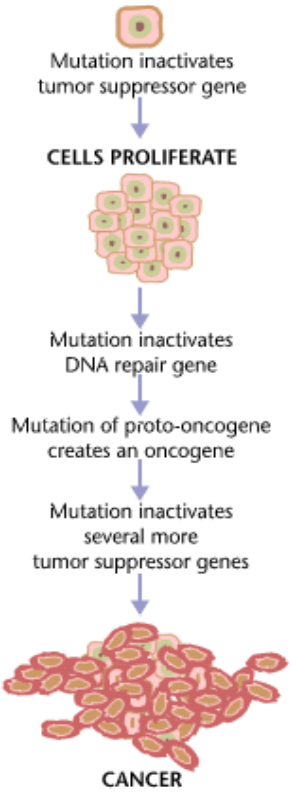

Figure 1.9 Carcinogenesis and the Hallmarks of Cancer

Cancers are caused by a series of mutations. Each mutation alters the behavior of the cell somewhat.Cancer is fundamentally a disease of failure of regulation of tissue growth. In order for a normal cell to transform into a cancer cell, the genes which regulate cell growth and differentiation must be altered. The affected genes are divided into two broad categories. Oncogenes are genes which promote cell growth and reproduction. Tumor suppressor genes are genes which inhibit cell division and survival. Malignant transformation can occur through the formation of novel oncogenes, the inappropriate over-expression of normal oncogenes, or by the under-expression or disabling of tumor suppressor genes. Typically, changes in many genes are required to transform a normal cell into a cancer cell. The errors which cause cancer are self-amplifying and compounding, for example: A mutation in the error-correcting machinery of a cell might cause that cell and its children to accumulate errors more rapidly.

A further mutation in an oncogene might cause the cell to reproduce more rapidly and more frequently than its normal counterparts. A further mutation may cause loss of a tumour suppressor gene, disrupting the apoptosis signalling pathway and resulting in the cell becoming immortal. A further mutation in signaling machinery of the cell might send error-causing signals to nearby cells. The transformation of normal cell into cancer is akin to a chain reaction caused by initial errors, which compound into more severe errors, each progressively allowing the cell to escape the controls that limit normal tissue growth. This rebellion-like scenario becomes an undesirable survival of the fittest, where the driving forces of evolution work against the body's design and enforcement of order. Once cancer has begun to develop, this ongoing process, termed clonal evolution drives progression towards more invasive stages.[11]

1.10 Risk Factor of Cancer:

Oral Cavity & Pharynx :

Mouth	Tobacco and alcohol usage accounts for most mouth cancers. Another risk factor is a diet low in fruits and vegetables and possible risk factors are poor tooth development and oral hygiene, trauma due to ill-fitting dentures or jagged teeth, use of mouthwashes with high alcohol content, and iron-deficiency anemia.

Digestive System :

Colorectal	Risk factors are personal or family history of colorectal polyps or inflammatory bowel disease, certain rare hereditary conditions, and a diet high in fat and/or low in fiber, fruits and vegetables. Possible risk factors are physical inactivity, alcohol consumption, obesity, and smoking. Risk may be reduced by estrogen replacement therapy, non-steriodal anti-inflammatory drugs (e.g. aspirin, ibuprofen), dietary calcium and vitamin D.
Pancreas	Risk factors are cigarette smoking and possibly alcohol, coffee, or tea consumption, diabetes, chronic pancreatitis, cirrhosis, allergies, diet high in meat or butter fat.
Stomach	Risk factors are dietary nitrites (in pickled, salted, and smoked foods), pernicious anemia, and diet low in fruits and vegetables. Possible risk factors are infection with Helicobacter pylori, high doses of ionizing radiation, cigarette smoking, and genetic factors.
Liver	Risk factors are chronic infection with hepatitis B or C virus, cirrhosis of the liver (chronic liver injury, usually due to alcohol abuse), aflatoxin ingestion (produced by a common mold that invades poorly stored peanuts and other foods), and occupational exposure to thorium dioxide or vinyl chloride. Possible risk factors are use of steroids, smoking, and some inherited metabolic diseases (e.g. hemochromatosis).
Esophagus	The most important risk factors are tobacco use (cigarettes, cigars, pipes), and excessive alcohol use along with the syndrome, Barrett's esophagus. Possible risk factors are obesity, inadequate diet, poor nutrition, decreased levels of certain nutrients (carotene, ascorbic acid, riboflavin, niacin, thiamin, zinc, magnesium, and selenium), and insufficient consumption of fruits and vegetables.
Gallbladder	The most important risk factor is gallstones; factors related to stone formation are increasing age, being female, being pregnant, certain ethnicity, and obesity, use of estrogen-containing drugs and high fat and caloric intake.

Respiratory System :

Lung	Tobacco smoking is responsible for nearly 90% of all lung cancers. Other contributing risk factors are smoking cigars or pipes and environmental tobacco smoke (second-hand smoke). High doses of ionizing radiation, residential radon exposure and occupational exposure to mustard gas, chloromethyl ethers, inorganic arsenic, chromium, nickel, vinyl chloride, radon, asbestos or byproducts of fossil fuel are also thought to increase risk. Possible risk factors are air pollution and insufficient consumption of fruits and vegetables.
Larynx	Most cases are caused by cigarette smoking. Other risk factors are alcohol and occupational exposure to asbestos or mustard gas.

Skin :

Melanoma	Risk factors are excessive exposure to ultraviolet radiation (sunlight), fair skin, history of severe sunburns, personal or family history of melanoma, multiple moles or atypical moles (colored skin spots), giant congenital moles, xerodermapigmentosum (a rare hereditary disease), personal history of melanoma, and reduced immune function due to organ transplants or HIV infection. Melanoma occurs almost exclusively among whites.
Non-melanoma	Risk factors are ultraviolet radiation (sunlight), fair skin, high doses of ionizing radiation, occupational exposure to arsenic, polycyclic hydrocarbons (coal tars, pitches, and asphalt, creosote, soot, lubricating and cutting oils) and rare hereditary diseases such as multiple basal cell carcinoma syndrome, xerodermapigmentosum, and albinism. Possible risk factors are burn scars, chronic infections, and photosensitizers in tanning aids, cosmetics, and medicines.

Breast	For women, risk factors are family history (especially mother or sister) of breast cancer, personal history of breast, ovarian, or endometrial cancer, susceptibility genes (BRCA-1, BRCA-2), some forms of benign breast disease (atypical hyperplasia), higher education and socioeconomic status, menstruation at an early age, late menopause, never bearing children, first child born after age 30, high doses of ionizing radiation, long term use of post-menopause estrogens and progestins, obesity after menopause, and excessive alcohol consumption. Possible risk factors are dietary fat and physical inactivity. For men, risk factors include increasing age, family history, radiation exposure, and having high levels of estrogen due to inherited gene mutations or treatments. Possible risk factors include gynecomastia and obesity.

1.10.1 Reproductive Organs:

Prostate	Risk factors are some types of prostatic hyperplasia and a family history, especially a father or brother. Possible risk factors are a diet high in animal fat, obesity, hormonal factors, a sexually transmitted agent, smoking, alcohol, and physical inactivity. Black males have much higher prostate cancer rates than white males.
Endometrium	High cumulative exposure to estrogens including never bearing children or bearing few children, menstruation beginning at an early age, failure to menstruate, late menopause, estrogen replacement therapy are major risk factors. Also, use of tamoxifen, infertility, obesity, diabetes, hypertension, gallbladder disease, and Stein-Leventhal syndrome are known risk factors. Possible risk factors are dietary fat and hereditary non-polyposis colon cancer.
Ovary	Risk factors are personal history of breast cancer, family history of breast or ovarian cancer, susceptibility genes (BRCA-1, BRCA-2), never bearing children, and hereditary non-polyposis colon cancer. A possible risk factor is dietary fat. Risk may be reduced by tubal ligation and hysterectomy.

Cervix	Risk factors are infection with human papilloma viruses (HPV), early age at first sexual intercourse, many sexual partners or partners who have had many sexual partners, multiple births, long-term oral contraceptive use, and cigarette smoking. Possible risk factors are certain vitamin deficiencies and hormonal factors.

1.10.2 Urinary System:

Bladder	The most important risk factor is cigarette smoking; other risk factors are occupational exposure to benzidine and 2-naphthylamine and occupations in the dye, leather or rubber industry. Possible risk factors are heavy coffee consumption, bladder infection with schistosomahaematobium (a parasitic flatworm), treatment with chlornaphazine or cyclophosphamide (anti-cancer drugs), long-term use of pain killers containing phenacetin, urinary tract infections or low urine flow, dietary factors, tobacco use other than cigarettes, and genetic factors.
Kidney	Cigarette smoking is the most important risk factor; others are obesity, abuse of analgesics (especially phenacetin-containing pain relievers), and occupational exposure to arsenic. Possible risk factors are regular use of prescription diuretics and increased meat consumption.

1.10.3 Lymphoma/Leukemia/Multiple Myeloma:

Non-Hodgkin Lymphoma	Risk factors are reduced immune function due to organ transplants or nfection with HIV, Epstein-Barr or human T-cell leukemia/lymphoma virus. Possible risk factors are occupational exposure to pesticides, herbicides, or organic solvents.
Hodgkin Lymphoma	Risk factors are infectious mononucleosis and Epstein-Barr virus infection. Possible risk factors are family history of Hodgkin lymphoma especially among siblings and genetic factors.

Leukemia	Risk factors are family history, high doses of ionizing radiation, alkylating drugs used to treat cancer and other diseases, human T-cell leukemia/ lymphoma virus I infection, Down syndrome or other genetic abnormalities, and occupational exposure to benzene. Possible risk factors are exposure to electromagnetic fields, pesticides, smoking, and several immune-related diseases.
Multiple myeloma	High doses of ionizing radiation are a risk factor. Possible risk factors are repeated infections, allergic conditions, autoimmune disease, genetic factors, cigarette smoking, farming, and occupational exposure to benzene.

1.10.4 Other:

Brain	Risk factors are genetic factors, certain rare inherited syndromes such as neurofibromatosis, being a parent or sibling of a child with brain cancer, high doses of ionizing radiation, and occupational exposure to certain aromatic hydrocarbon compounds, bis-chloromethyl ether, vinyl chloride, and acrylonitrile. Possible risk factors are exposure to electromagnetic fields, exposure to farm animals and pets, severe head trauma, loud noise, and N-nitroso compounds in the diet, cigarettes, and alcohol.[12]

1.11 Other Mechanism:

Cancer is the result of multi-step process in which cells acquire features that enable them to divide uncontrollably and to metastasize. Crucial steps in transformation of normal cells into migrant cells are the ability of the cells to be self-sufficient in growth signals and to be intensive to growth-inhibitory signals. As a consequence the cell cycle will be deregulated in favour of continuous growth. The cell cycle is the period from one cell division to the next and can be divided into four phases. In G1, the first phase, mitogenic stimulation results in activation of cell cycle dependent kinases like cyclin D1/CDK4 and Cyclin E/CDk2, which activate proteins that retain cells in a non-dividing state. Cells that are not stimulated to divide in G1 enter into G0 state and can remain quiescent for longer periods of time. However, activated cells will enter the second phase, S-phase, in which DNA is duplicated and here for the activity of cyclin A/CDK2 is required. A schematic representation of the cell

cycle and in which stages these different CDK/cyclin complexes are active is depicted in Figure 1.

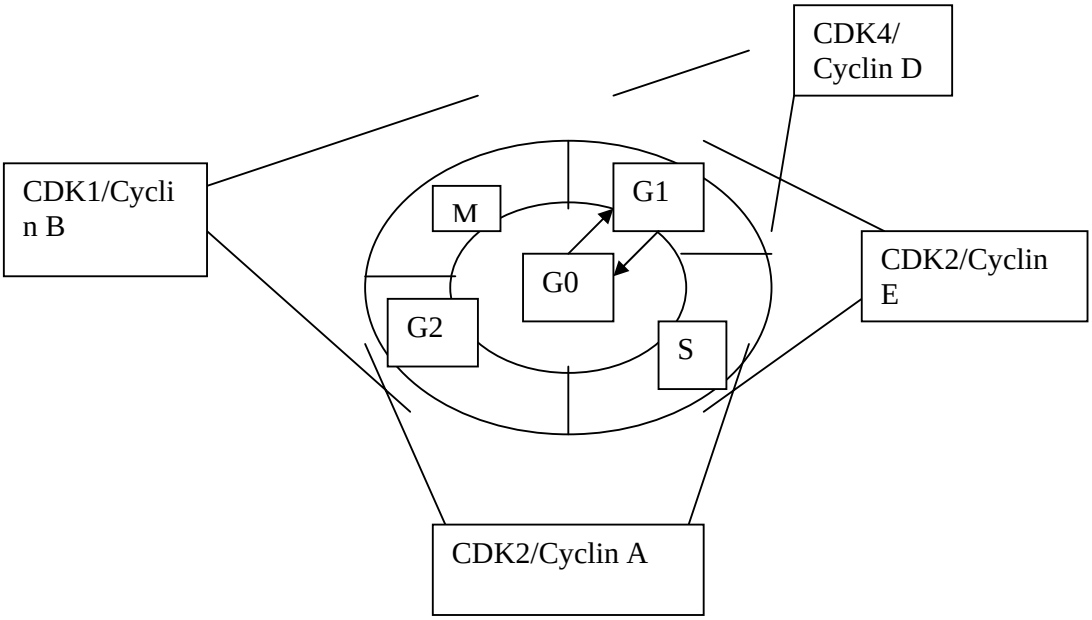

Figure 1.11 Schematic representation of CDK activity during different stages of the cell cycle

In G2 phase cells ensure that the DNA is properly replicated and that the conditions are right for the final separation of sister chromatids and cytokinesis in M-phase or mitosis.

In cancer the transition from G1- phase to S- phase is often deregulated due to alter gene function. Continuous growth signaling can be a consequence of mutations in extra cellular receptors or intracellular signal transducers, like EGF receptor and Ras. However, it can also be due to applications of cell cycle activating proteins such as Cyclin D1 and cyclin E or loss of negative regulators of the cell cycle such as the CDK inhibitors p21 and p27. Also loss of a functional Retinoblastoma (Rb) protein, which inhibits cell cycle progression by inhibitin the E2F transcription factor family that is crucial for G1/S transition, is a frequent event in human cancers.[13]

1.12 Stage of cancer:

The stage of a cancer is a description of the extent the cancer has spread. The stage often takes into account the size of a tumor, how deeply it has penetrated, whether it has invaded adjacent organs, how many lymph nodes it has metastasized to (if any), and whether it has spread to distant organs. Staging of cancer is the most important predictor of survival, and cancer treatment is primarily determined by staging. Thus, staging does not change with progression of the disease as it is used to assess prognosis. Patients' cancer, however, may be restaged after treatment but the staging established at diagnosis is rarely changed.

1.12.1 TNM staging system:

Cancer staging can be divided into a clinical stage and a pathologic stage. In the TNM (Tumor, Node, and Metastasis) system, clinical stage and pathologic stage are denoted by a small "c" or "p" before the stage (e.g., cT3N1M0 or pT2N0). Clinical stage is based on all of the available information obtained before a surgery to remove the tumor. Thus, it may include information about the tumor obtained by physical examination, radiologic examination, and endoscopy. Pathologic stage adds additional information gained by examination of the tumor microscopically by a pathologist.

1.12.2 Systems of staging:

Staging systems are specific for each type of cancer (e.g., breast cancer and lung cancer). Some cancers, however, do not have a staging system. Although competing staging systems still exist for some types of cancer, the universally-accepted staging system is that of the UICC, which has the same definitions of individual categories as the AJCC.
Systems of staging may differ between diseases or specific manifestations of a disease.

1.12.3 Blood:

Lymphoma: Uses Ann Arbor staging
Hodgkin's Disease: Follows a scale from I–IV and can be indicated further by an A or B, depending on whether a patient is non-symptomatic or has symptoms such as fevers. It is known as the "Cotswold System" or "Modified Ann Arbor Staging System".

1.12.4 Solid:

For solid tumors, TNM is by far the most commonly used system, but it has been adapted for some conditions. Breast cancer: In breast cancer classification, staging is usually based upon TNM, but staging in I–IV may be used as well Cervical and ovarian cancers: the "FIGO" system has been adopted into the TNM system. For premalignant dysplastic changes, the CIN (cervical intraepithelial neoplasia) grading system is used. Colon cancer: originally consisted of four stages: A, B, C, and D (the Dukes staging system). More recently, colon cancer staging is indicated either by the original A-D stages or by TNM.

Kidney cancer: uses TNM

Cancer of the larynx: Uses TNM

Liver cancer: uses Stages I–IV

Lung cancer: uses TNM

Melanoma: TNM used. Also of importance are the "Clark level" and "Breslow depth" which refer to the microscopic depth of tumor invasion ("Microstaging").

Prostate cancer: outside of US, TNM almost universally used. Inside US, Jewett-Whitmore sometimes used.

Testicular cancer: uses TNM along with a measure of blood serum markers.

Non melanoma skin cancer: uses TNM

Bladder cancer: uses TNM

1.12.5 Overall stage grouping:

Overall Stage Grouping is also referred to as Roman Numeral Staging. This system uses numerals I, II, III, and IV (plus the 0) to describe the progression of cancer.

Stage 0 carcinoma in situ.

Stage I cancers are localized to one part of the body.

Stage II cancers are locally advanced.

Stage III cancers are also locally advanced. Whether a cancer is designated as Stage II or Stage III can depend on the specific type of cancer; for example, in Hodgkin's Disease, Stage II indicates affected lymph nodes on only one side of the diaphragm, whereas Stage III indicates affected lymph nodes above and below the diaphragm. The specific criteria for Stages II and III therefore differ according to diagnosis.

Stage IV cancers have often metastasized, or spread to other organs or throughout the body.

1.12.6 Stage migration:

Stage migration describes change in the distribution of stage in a particular cancer population induced by either a change in the staging system itself or else a change in technology which allows more sensitive detection of tumor spread and therefore more sensitivity in detecting spread of disease (e.g., the use of MRI scan). Stage migration can lead to curious statistical phenomena (for example, the Will Rogers phenomenon).[14]

1.13 Classification of cancer:

Cancers are classified in two ways: by the type of tissue in which the cancer originates and by primary site, or the location in the body where the cancer first developed. Cancer classification based on histological type. The international standard for the classification and nomenclature of histologies is the International Classification of Diseases for Oncology
From a histological standpoint there are hundreds of different cancers, which are grouped into six major categories:

- Carcinoma
- Sarcoma
- Myeloma
- Leukemia
- Lymphoma
- Mixed Types

1.13.1 Carcinoma:

Carcinoma refers to a malignant neoplasm of epithelial origin or cancer of the internal or external lining of the body. Carcinomas, malignancies of epithelial tissue, account for 80 to 90 percent of all cancer cases.Carcinomas are divided into two major subtypes: adenocarcinoma, which develops in an organ or gland, and squamous cell carcinoma, which originates in the squamous epithelium. Adenocarcinomas generally occur in mucus membranes and are first seen as a thickened plaque-like white mucosa. They often spread easily through the soft tissue where they occur. Squamous cell carcinomas occur in many areas of the body.Most carcinomas affect organs or glands capable of secretion, such as the breasts, which produce milk, or the lungs, which secrete mucus, or colon or prostate or bladder.

1.13.2 Sarcoma:

Sarcoma tumors usually resemble the tissue in which they grow.Examples of sarcomas are:

- Osteosarcoma or osteogenic sarcoma (bone)
- Chondrosarcoma (cartilage)
- Leiomyosarcoma (smooth muscle)
- Rhabdomyosarcoma (skeletal muscle)
- Mesothelial sarcoma or mesothelioma (membranous lining of body cavities)
- Fibrosarcoma (fibrous tissue)
- Angiosarcoma or hemangioendothelioma (blood vessels)
- Liposarcoma (adipose tissue)
- Glioma or astrocytoma (neurogenic connective tissue found in the brain)
- Myxosarcoma (primitive embryonic connective tissue)
- Mesenchymous or mixed mesodermal tumor (mixed connective tissue types)

1.13.3 Myeloma:

Myeloma is cancer that originates in the plasma cells of bone marrow. The plasma cells produce some of the proteins found in blood.

1.13.4 Leukemia:

Leukemia’s are cancers of the bone marrow. The word leukemia means "white blood" in Greek. The disease is often associated with the overproduction of immature white blood cells. These immature white blood cells do not perform as well as they should, therefore the patient is often prone to infection. Leukemia also affects red blood cells and can cause poor blood clotting and fatigue due to anemia. Examples of leukemia include:

- Myelogenous or granulocytic leukemia (malignancy of the myeloid and granulocytic white blood cell series)
- Lymphatic, lymphocytic, or lymphoblastic leukemia (malignancy of the lymphoid and lymphocytic blood cell series)
- Polycythemia vera or erythremia (malignancy of various blood cell products, but with red cells predominating)

1.13.5 Lymphoma:

Lymphomas develop in the glands or nodes of the lymphatic system, a network of vessels, nodes, and organs (specifically the spleen, tonsils, and thymus) that purify bodily fluids and produce infection-fighting white blood cells, or lymphocytes. The lymphomas are subclassified into two categories: Hodgkin lymphoma and Non-Hodgkin lymphoma. The presence of Reed-Sternberg cells in Hodgkin lymphoma diagnostically distinguishes Hodgkin lymphoma from Non-Hodgkin lymphoma.

1.13.6 Mixed Types:

The type components may be within one category or from different categories. Some examples are:

- adenosquamous carcinoma
- mixed mesodermal tumor
- carcinosarcoma
- teratocarcinoma

In the next section, you will be provided with a comprehensive list of tissue types and the tumors that arise from them.[15]

1.14 Diagnosis of Cancer:

Early detection of cancer can greatly improve the odds of successful treatment and survival. Physicians use information from symptoms and several other procedures to diagnose cancer. Imaging techniques such as X-rays, CT scans, MRI scans, PET scans, and ultrasound scans are used regularly in order to detect where a tumor is located and what organs may be affected by it. Doctors may also conduct an endoscopy, which is a procedure that uses a thin tube with a camera and light at one end, to look for abnormalities inside the body.

Extracting cancer cells and looking at them under a microscope is the only absolute way to diagnose cancer. This procedure is called a biopsy. Other types of molecular diagnostic tests are frequently employed as well. Physicians will analyze your body's sugars, fats, proteins, and DNA at the molecular level. For example, cancerous prostate cells release a higher level of a chemical called PSA (prostate-specific antigen) into the bloodstream that can be detected by a blood test. Molecular diagnostics, biopsies, and imaging techniques are all used together to diagnose cancer.

After a diagnosis is made, doctors find out how far the cancer has spread and determine the stage of the cancer. The stage determines which choices will be available for treatment and informs prognoses. The most common cancer staging method is called the TNM system. T (1-4) indicates the size and direct extent of the primary tumor, N (0-3) indicates the degree to which the cancer has spread to nearby lymph nodes, and M (0-1) indicates whether the cancer has metastasized to other organs in the body. A small tumor that has not spread to lymph nodes or distant organs may be staged as (T1, N0, M0), for example.

TNM descriptions then lead to a simpler categorization of stages, from 0 to 4, where lower numbers indicate that the cancer has spread less. While most Stage 1 tumors are curable, most Stage 4 tumors are inoperable or untreatable.[16]

1.15 Cancer treatment:

Treatments usually fall into one of the following categories: surgery, radiation, chemotherapy, immunotherapy, hormone therapy, or gene therapy.

1.15.1 Surgery:

Surgery is the oldest known treatment for cancer. If a cancer has not metastasized, it is possible to completely cure a patient by surgically removing the cancer from the body. This is often seen in the removal of the prostate or a breast or testicle. After the disease has spread, however, it is nearly impossible to remove all of the cancer cells. Surgery may also be instrumental in helping to control symptoms such as bowel obstruction or spinal cord compression.

1.15.2 Radiation:

Radiation treatment, also known as radiotherapy, destroys cancer by focusing high-energy rays on the cancer cells. This causes damage to the molecules that make up the cancer cells and leads them to commit suicide. Radiotherapy utilizes high-energy gamma-rays that are emitted from metals such as radium or high-energy x-rays that are created in a special machine. Early radiation treatments caused severe side-effects because the energy beams would damage normal, healthy tissue, but technologies have improved so that beams can be more accurately targeted. Radiotherapy is used as a standalone treatment to shrink a tumor or destroy cancer cells (including those associated with leukemia and lymphoma), and it is also used in combination with other cancer treatments.

1.15.3 Chemotherapy:

Chemotherapy utilizes chemicals that interfere with the cell division process - damaging proteins or DNA - so that cancer cells will commit suicide. These treatments target any rapidly dividing cells (not necessarily just cancer cells), but normal cells usually can recover from any chemical-induced damage while cancer cells cannot. Chemotherapy is generally used to treat cancer that has spread or metastasized because the medicines travel throughout the entire body. It is a necessary treatment for some forms of leukemia and lymphoma. Chemotherapy treatment occurs in cycles so the body has time to heal between doses. However, there are still common side effects such as hair loss, nausea, fatigue, and vomiting. Combination therapies often include multiple types of chemotherapy or chemotherapy combined with other treatment options.

1.15.4 Immunotherapy:

Immunotherapy aims to get the body's immune system to fight the tumor. Local immunotherapy injects a treatment into an affected area, for example, to cause inflammation that causes a tumor to shrink. Systemic immunotherapy treats the whole body by administering an agent such as the protein interferon alpha that can shrink tumors. Immunotherapy can also be considered non-specific if it improves cancer-fighting abilities by stimulating the entire immune system, and it can be considered targeted if the treatment specifically tells the immune system to destroy cancer cells. These therapies are relatively young, but researchers have had success with treatments that introduce antibodies to the body that inhibit the growth of breast cancer cells. Bone marrow transplantation (hematopoetic stem cell transplantation) can also be considered immunotherapy because the donor's immune cells will often attack the tumor or cancer cells that are present in the host.

1.15.5 Hormone therapy:

Several cancers have been linked to some types of hormones, most notably breast and prostate cancer. Hormone therapy is designed to alter hormone production in the body so that cancer cells stop growing or are killed completely. Breast cancer hormone therapies often focus on reducing estrogen levels (a common drug for this is tamoxifen) and prostate cancer hormone therapies often focus on reducing testosterone levels. In addition, some leukemia and lymphoma cases can be treated with the hormone cortisone.

1.15.6 Gene Therapy:

The goal of gene therapy is to replace damaged genes with ones that work to address a root cause of cancer: damage to DNA. For example, researchers are trying to replace the damaged gene that signals cells to stop dividing (the p53 gene) with a copy of a working gene. Other gene-based therapies focus on further damaging cancer cell DNA to the point where the cell commits suicide. Gene therapy is a very young field and has not yet resulted in any successful treatments.[17]

1.16 Cancer prevention:

Cancer prevention is defined as active measures to decrease the risk of cancer. The vast majority of cancer risk factors are due to environmental factors, and many of these factors are controllable. Thus, cancer is largely considered a preventable disease. Greater than 30% of cancer is considered preventable by avoiding risk factors including: tobacco, overweight / obesity, an insufficient diet, physical inactivity, alcohol, sexually transmitted infections, and air pollution.

1.16.1 Dietary:

Dietary recommendations to reduce the risk of developing cancer, including: (1) reducing intake of foods and drinks that promote weight gain, namely energy-dense foods and sugary drinks, (2) eating mostly foods of plant origin, (3) limiting intake of red meat and avoiding processed meat, (4) limiting consumption of alcoholic beverages, and (5) reducing intake of salt and avoiding mouldy cereals (grains) or pulses (legumes).

1.16.2 Medication:

The concept that medications could be used to prevent cancer is an attractive one, and many high-quality clinical trials support the use of such chemoprevention in defined circumstances. Aspirin has been found to reduce the risk of death from cancer. Daily use of tamoxifen or raloxifene has been demonstrated to reduce the risk of developing breast cancer in high-risk women by about 50%.Finasteride has been shown to lower the risk of prostate cancer, though it seems to mostly prevent low-grade tumors. The effect of COX-2 inhibitors such as rofecoxib and celecoxib upon the risk of colon polyps have been studied in familial adenomatous polyposis patients and in the general population. In both groups, there were significant reductions in colon polypincidence, but this came at the price of increased cardiovascular toxicity.

Vitamins have not been found to be effective at preventing cancer, although low levels of vitamin D are correlated with increased cancer risk.

1.16.3 Vaccination:

Vaccines have been developed that prevent some infection by some viruses that are associated with cancer, and therapeutic vaccines are in development to stimulate an immune response against cancer-specific epitopes. Human papillomavirus vaccine (Gardasil and Cervarix) decreases the risk of developing cervical cancer.Thehepatitis B vaccine prevents infection with hepatitis B virus and thus decreases the risk of liver cancer.

Advances in cancer research have made a vaccine designed to prevent cancers available. In 2006, the U.S. Food and Drug Administration (FDA) approved a human papilloma virus vaccine, called Gardasil. The vaccine protects against 6,11,16,18 strains of HPV, which together cause 70% of cervical cancers and 90% of genital warts. It also lists vaginal and vulvar cancers as being protected. There is a second vaccine from Cervarix which protects against the more dangerous HPV 16, 18 strains only.

1.16.4 Screening:

Cancer screening involves efforts to detect cancer after it has formed, but before any noticeable symptoms appear. This may involve physical examination, blood or urine tests, or medical imaging.

Cancer screening is not currently possible for some types of cancers, and even when tests are available, they are not recommended to everyone. *Universal screening* or *mass screening*involves screening everyone. *Selective screening* identifies people who are known to be at higher risk of developing cancer, such as people with a family history of cancer.

Several factors are considered to determine whether the benefits of screening outweigh the risks and the costs of screening. These factors include:

1.16.5 Possible harms from the screening test:

Some types of screening tests, such as X-ray images, expose the body to potentially harmful ionizing radiation. There is a small chance that the radiation in the test could cause a new cancer in a healthy person. Screening mammography, used to detect breast cancer, is not recommended to men or to young women because they are more likely to be harmed by the test than to benefit from it.

1.16.6 Possible harms from the screening test:

If the test is not *sensitive*, then it may miss cancers. If the test is not *specific*, then it may wrongly indicate cancer in a healthy person. All cancer screening tests produce both false positives and false negatives, and most produce more false positives.

1.16.7 The likelihood of cancer being present:

Countries often focus their screening recommendations on the major forms of treatable cancer found in their population. For example, the United States recommends universal screening for colon cancer, which is common in the US, but not for stomach cancer, which is less common; by contrast, Japan recommends screening for stomach cancer, but not colon cancer, which is rarer in Japan. Screening recommendations depend on the individual's risk, with high-risk people receiving earlier and more frequent screening than low-risk people.

1.16.8 Possible harms from follow-up procedures:

If the screening test is positive, further diagnostic testing is normally done, such as a biopsy of the tissue. If the test produces many false positives, then many people will undergo needless medical procedures, some of which may be dangerous.

1.16.9 Whether the cancer will ever need treatment:

Diagnosis of a cancer in a person who will never be harmed by the cancer is called overdiagnosis. Overdiagnosis is most common among older people with slow-growing cancers. Concerns about overdiagnosis are common for breast and prostate cancer.

1.16.10 Whether the test is acceptable to the patients:

If a screening test is too burdensome, such as requiring too much time, too much pain, or culturally unacceptable behaviors, then people will refuse to participate.[18]

Chapter 2 : Methodology

2.1 Objective of Study:

The cancer situation in Bangladesh is extremely alarming, which is evident from some basic facts and figures. According to conservative estimate, presently there are over 1 million registered cancer patients in Bangladesh. Every year another additional 200,000 people are diagnosed with cancer. More than 50% of the affected people's lives are slowly but surely being suffered out due to the cancer not being diagnosed on time and due to lack of proper treatment.

The main objective of this study is to-

1. Find out the environmental factors that are responsible for cancer.
2. Finding the habitual pattern that may influence the formation of cancer.
3. Find out the types of cancer that are common in Bangladesh in poverty level people.
4. To correlate habitual pattern and types of cancer.
5. Find out the common chemotherapy used in Bangladesh**.**

2.2 Study Area: The study was conducted in National Institute of Cancer Research and Hospital Mohakhali, Dhaka-1212. The research study was carried out by maintaining the national laws and regulations of the Country and the Hospital.

2.3 Total Number of Patients: Data was collected from 80 cancer patients**.**

2.4 Inclusion Criteria of patients:

- In-patient
- All age ranges
- Both Male and Female
- Patients willing to sign informed consent form
- Patients mainly give chemo therapy
- Patients at poverty level.

2.5 Exclusion Criteria:

- Unwilling to participate or unable to comply with protocol requirements.
- Surgery patient's wereavoided.
- Radiation therapy given to the cancer patients, were avoided.

2.6 Procedure:

- For collecting data, a questionnaire was prepared according to required questions. Also a research protocol was prepared for permissions from the authorized members of the hospital. The completed questioner and the research protocol were recommended by the chairperson of department of pharmacy, East-West University. Then the questionnaire as well as the research protocol was send to the hospital authority and was getting permission for data collection. Doctor, nurses other medical stuffs gave permission to collect data from cancer patients.

- After collecting all the data, these data were set on the Microsoft Office Excel and filtered out according to the Gender, Age range, Occupation, Cancer types by body location, Habitual pattern, Site of living area, Site of living in urban, Site of living in rural, chemotherapy drugs, blood group, smoking habit etc. So some graphical representation were found that is the visually representation of the targeted subject.

Chapter 3 : Result and Discussion

3.1 Distribution of patients according to age:

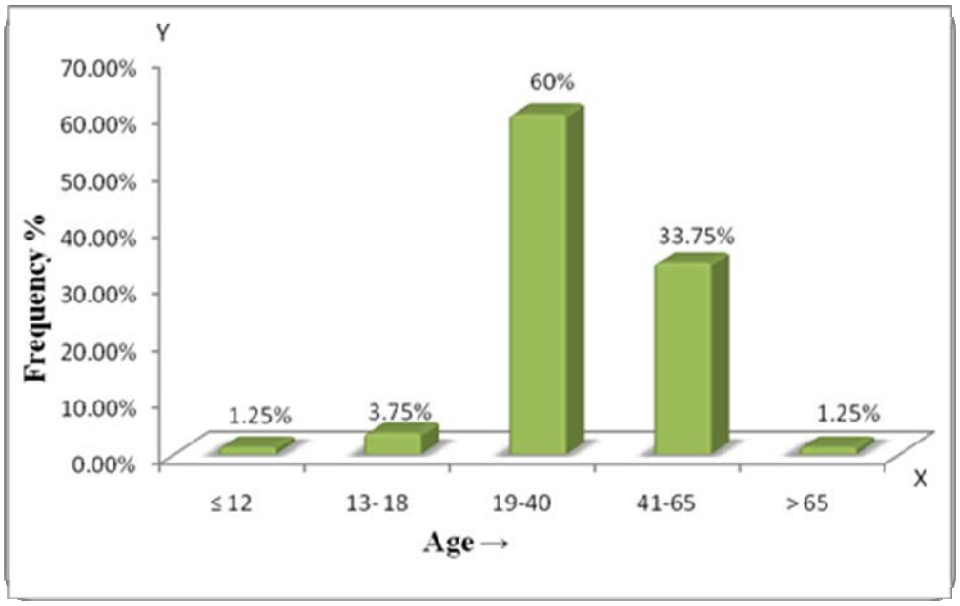

Figure 3.1 Distribution of patients according to age

In this survey based study, data were collected from 80 cancer patients (volunteers), 60% of the total cancer patients were between the ages of 19 to 40 years, 33.75% of the total patients were between the ages of 41 to 65 years, 3.75% patients were between the ages of 13 to 18 years, 1.25% patients were less than 12 years and higher than 65 years (Figure 3.1). From this study, it was determined that adults were more susceptible to cancer rather than geriatrics, teenagers and pediatrics.

3.2 Distribution of patients According to Gender:

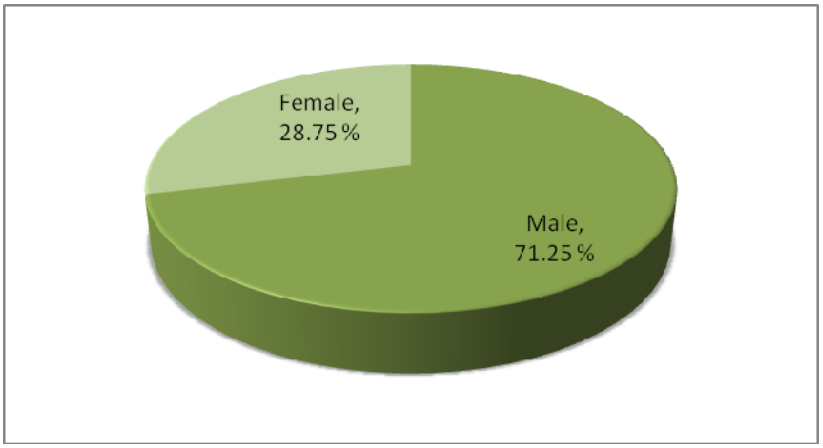

Figure 3.2 Distribution of patients According to Gender

Among 80 cancer patients, 71.25% were male patients and 28.75% were female patients (Figure 3.2). The study showed that, male was very susceptible rather than women in Bangladesh.

3.3 Distribution of patients according to Marital Status:

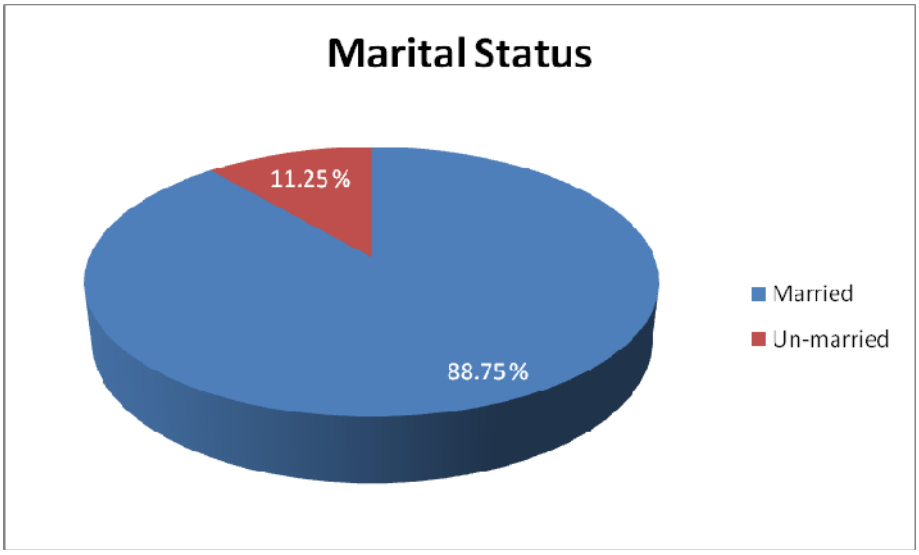

Figure 3.3 Distribution of patients according to Marital Status

Among 80 cancer patients, 88.75% were married patients and 11.25% were unmarried patients (Figure 3.3). Different type's cancers were mainly found in married persons.

3.4 Distribution of patient according to living areas:

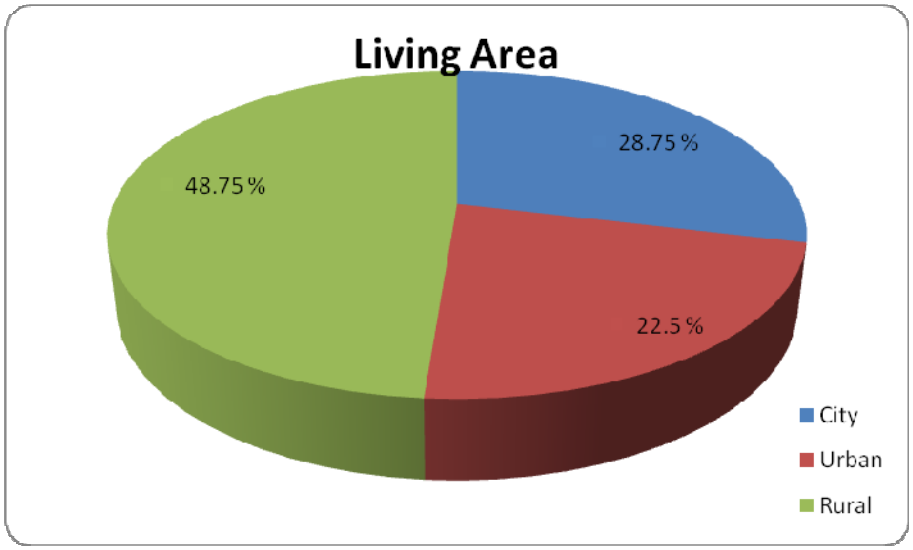

Figure 3.4 Distribution of patient according to living area

The data was collected from 80 cancer patients and these patients came from different districts of Bangladesh. Their living areas divided in three categories:

- City
- Urban
- Rural

Among those 80 patients, 48.75% of the total patients came from rural areas, 28.75% of the total patients came from cities, and 22.5% of the patients came from urban areas.So rural people were mainly affected by cancer.

3.5 Distribution of patient according to sites of living areas:

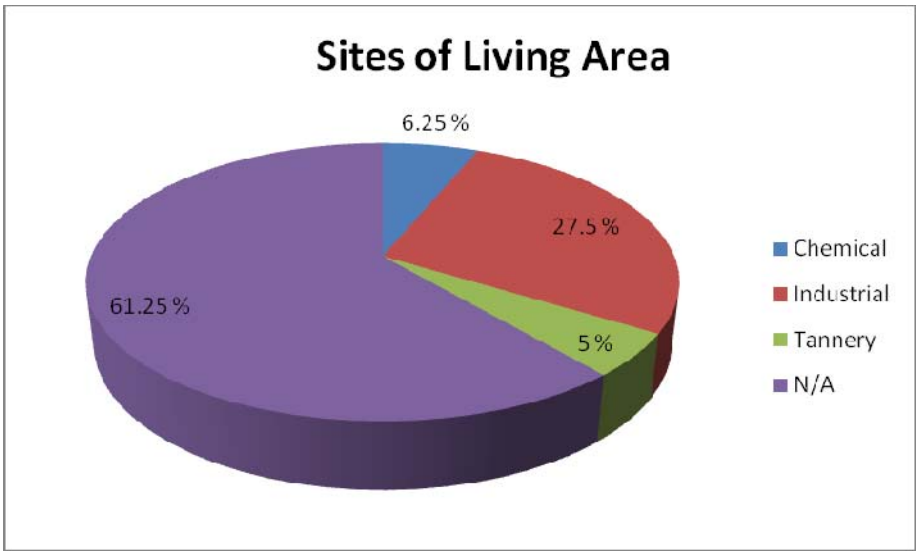

Figure 3.5 Distribution of patient according to sites of living areas

The sites of living area of those 80 cancer patients divided according to their personal information given by the patients, written documents and hospital authorities. Divided the sites of living area into four categories, they are given below:

- Chemical
- Industrial
- Tannery
- Not applicable/None

It was found that, 6.25% of the total cancer patients lived in the chemical areas for a long time and most of them were the workers of the chemicals based factories and a few were the only citizens.

27.5% of the total cancer patients lived in industrial areas, 5% of the total cancer patients lived in the tannery areas and 61.25% of the total number of patients were from nonchemical, nonindustrial and no tannery areas. From this result it was determined that maximum number of cancers occurs in the people of Bangladesh without any specific reason. Environmental factors may have harmful effects because patients from the chemical, industrial and tannery areas have severe cancerous conditions. Most of the chemical and industrial factories, tanneries in Bangladesh use harmful chemicals like chromium, sulfur, manganese which have harmful effects like carcinogenicity, teratogenisity, neurotoxicity and Blood toxicity on excessive or chronic exposure.

3.6 Distribution of patients according to Education:

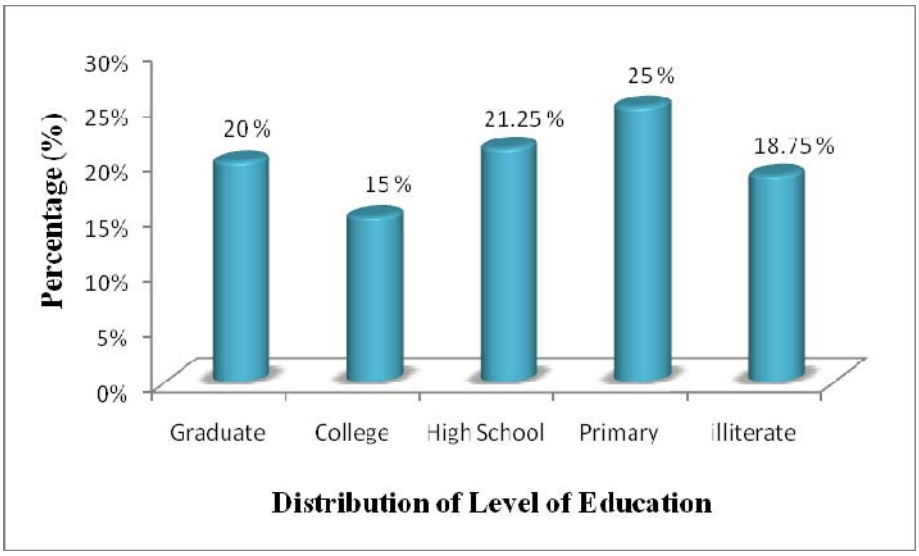

Figure 3.6 Distribution of patients according to Education

Among 80 volunteers (cancer patients), 20% of them were graduate persons, 15% of attended college, 21.25% have passed high school, 25% of them finished primary education and 18.75% of them were illiterate. So mainly primary educational level people mainly affected by cancer because of their lacking awareness.

3.7 Distribution of patients according to Occupation:

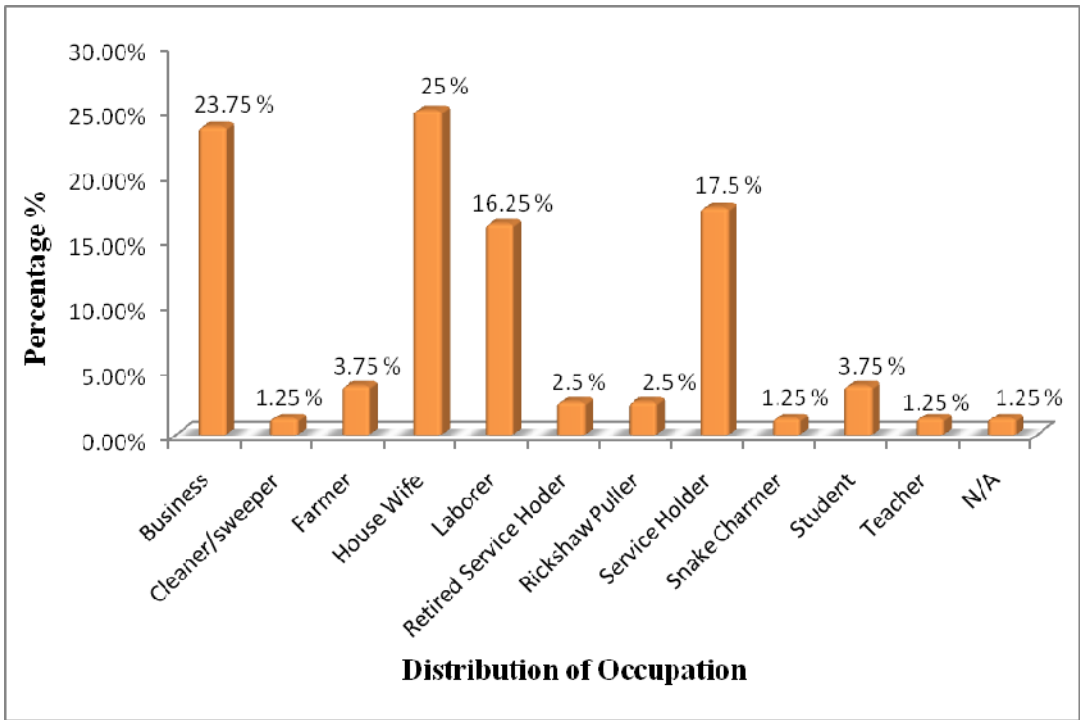

Figure 3.7 Distribution of patient according to Occupation

Among 80 cancer patients, 23.75% of them were businessmen, 25% of them were housewives, 17.5% of them were Service holders, 2.5% of them were retired service holders, 16.25% of them were laborers, 1.25% of them were cleaner/sweeper, 3.75% of them were farmers, 2.5% of them were rickshaw pullers, 1.25% of them were snake charmers, 3.75% of them were students, 1.25% of them were teachers and 1.25 % of them were not able to do any work. From our study it was found that house wives, businessmen, service holders and laborers were mainly affected by different type of cancers. The reason behind this may be their exposure largely outside environment..

3.8 Distribution of patient according to stress on work:

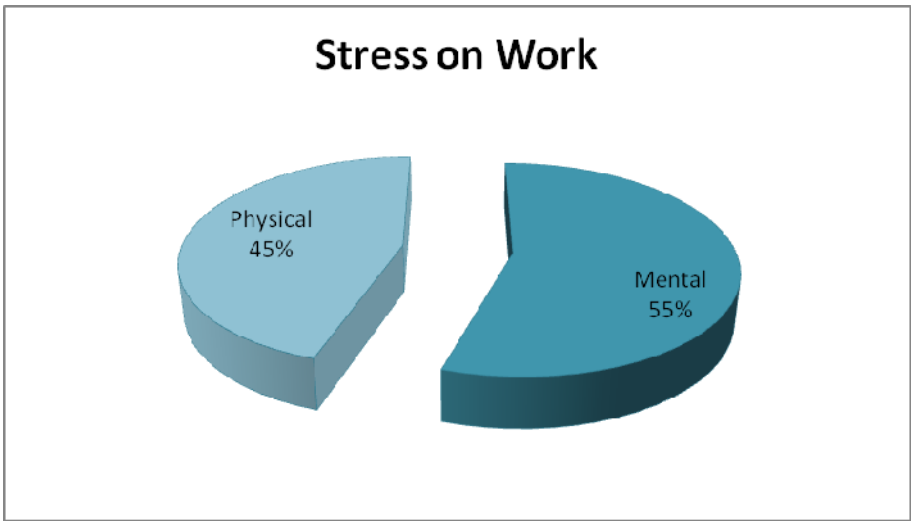

Figure 3.8 Distribution of patient according to Stress on work

Among 80 cancer patients, 55% of the patients had mental stress on work and 45% of the total cancer patients had physical stress on their work. From this result it was seen that, mental stress was the major cause of cancer incidents rather than the physical stress.

3.9 Distribution of patient according to Social Class:

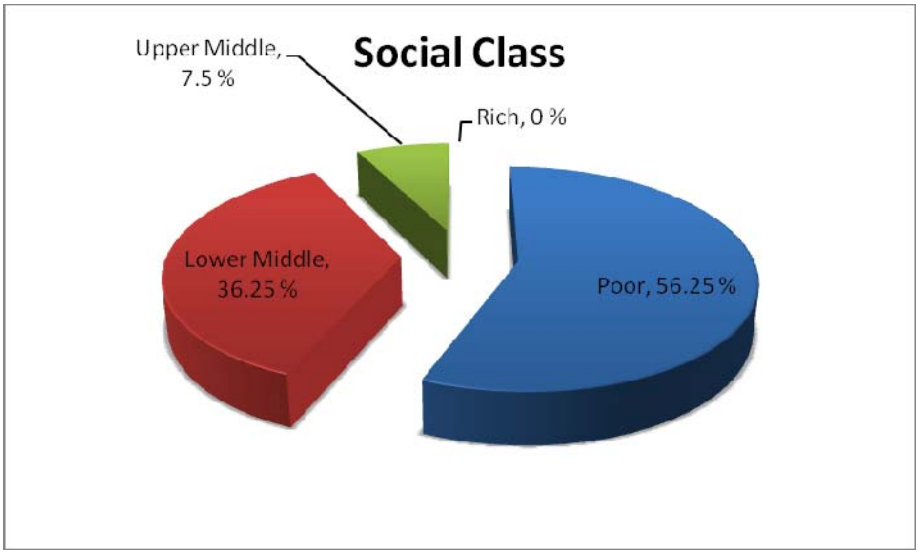

Figure 3.9 Distribution of patient according to Social Class

A survey was done on 80 cancer patients. This cancer patient came from different social class, society and cultures. For better study purposes, it was decided to create a social class. According to the plan, divided the social class into four major categories. They are:

- Rich
- Upper middle
- Lower middle
- Poor

Distributed all the selected 80 cancer patients in different categories according to their financial condition, monthly & yearly incomes, income sources and solvency. Among all of the patients, no rich patients were founded. 7.5% patients who came from upper middle class, 36.25% of the cancer patients came from lower middle class and 56.25% of the patients were poor. From this study, it was found that poverty level people are mainly affected by cancer in Bangladesh.

3.10 Distribution of patient according to Water Source:

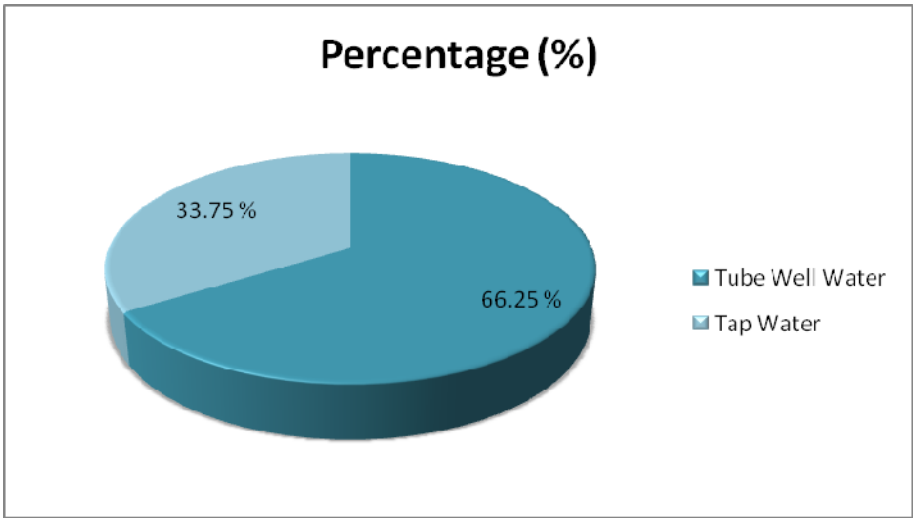

Figure 3.10 Distribution of patient according to Water Source

During this study, 66.25% patients used Tube Well Water, Other side 33.75% patient used tap water. So water was not a major the risk factor for cancer.

3.11 Distribution of patient according to Food intake:

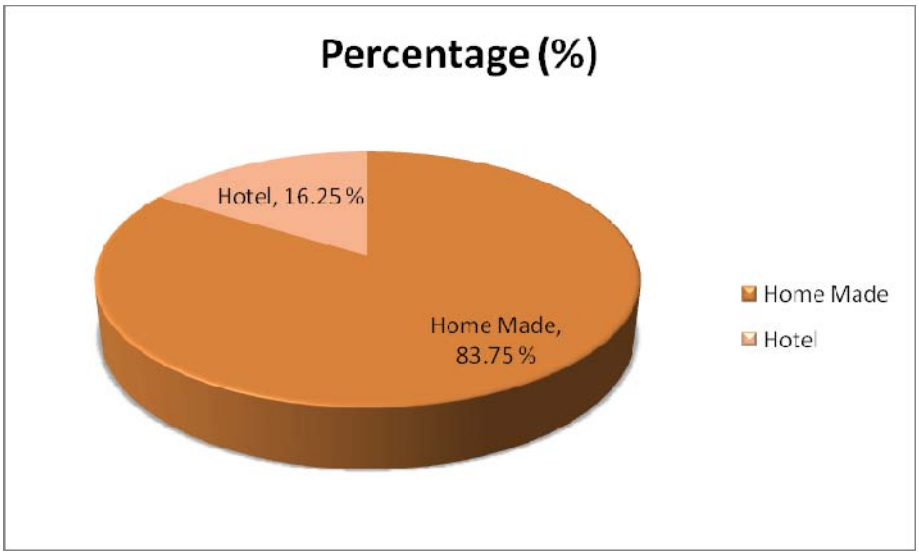

Figure 3.11 Distribution of patient according to Food intake

In this study, the data was collected from 80 patients. Among them 16.25% take hotel made food & 83.75% take home made food. So food was not a prevalent for inducing cancer. But it can be said that many chemicals that were used like formalin etc that may be induced cancer.

3.12 Distribution of patient according to Smoking Habit:

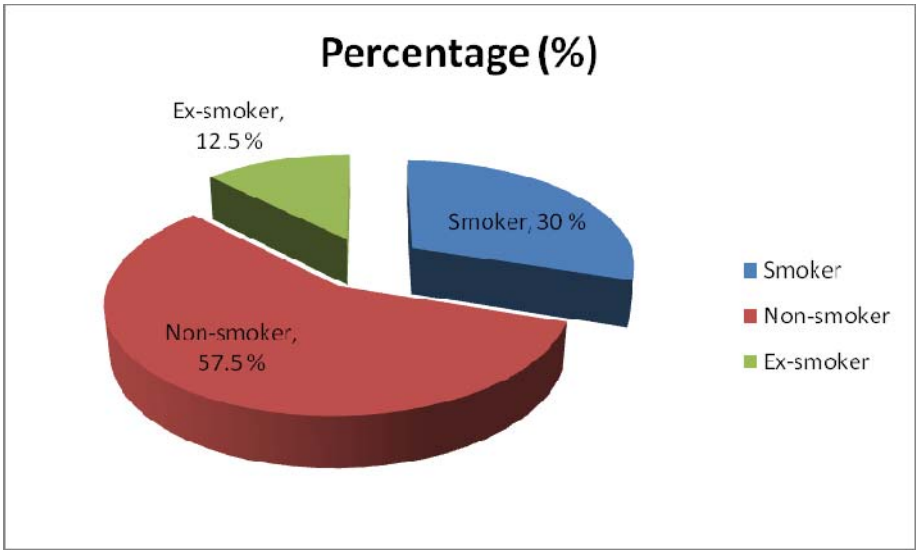

Figure 3.12 Distribution of patient according to Smoking Habit

This study included patients of adult and geriatric.It represented that about 12.5% patients were Ex-smoker, 30% were smoker and 57.5% were non-smoker.Smoking was one type of risk factor for cancer. Smoking mainly causes respiratory cancer, lung cancer etc.

3.13 Distribution of patient according to Other Habits:

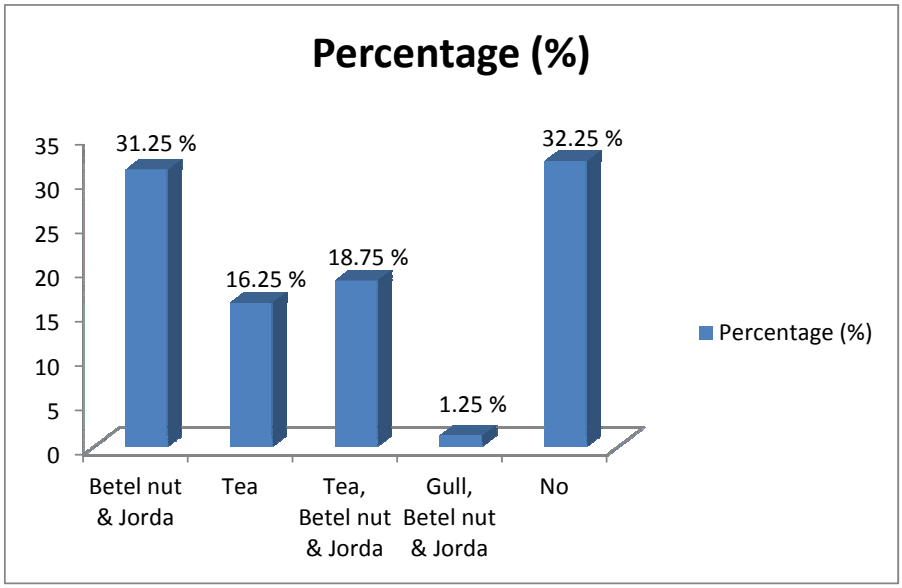

Figure 3.13 Distribution of patient according to Other Habits

It was found that betel nut and jorda was taken by 25 patients and the percentage is 31.25%, tea 13 patients and percentage 16.25%, tea betel nut and jorda 15 patients (18.75%), gul betel nut and jorda 1 patient (1.25%), no habit 26 patients (32.25%). It was one type of important risk factor for causing cancer. It mainly caused mouth related cancer, gastrointestinal cancer etc.

3.14 Distribution of patient according to Type of Sleep:

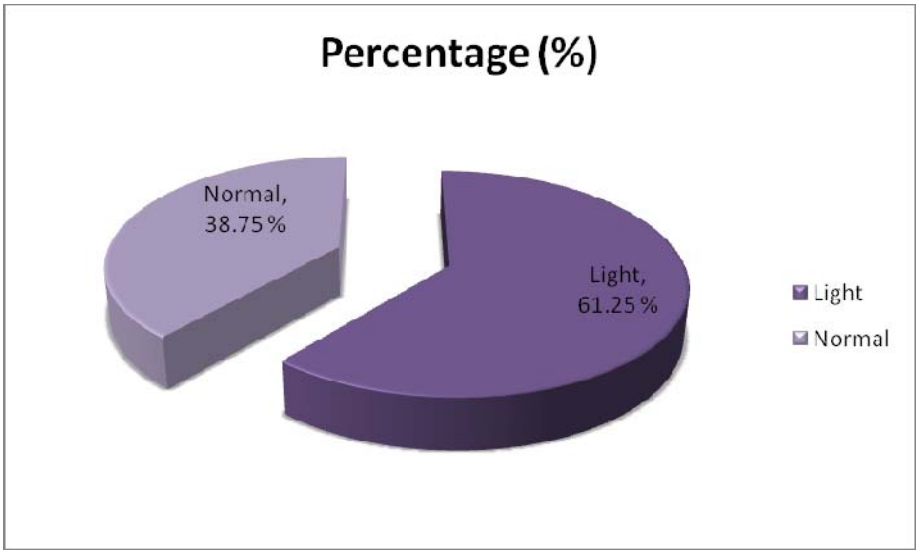

Figure 3.14 Distribution of patient according to Type of sleep

The correlation of cancer and the type of sleep were studied. The sleep is divided in two types such as

- Light sleep
- Normal sleep

The percentages of light sleep were 61.25% and normal sleep 38.75%.So most of the patients suffered from light sleep or sleep disturbance.

3.15 Distribution of patient according to Family History:

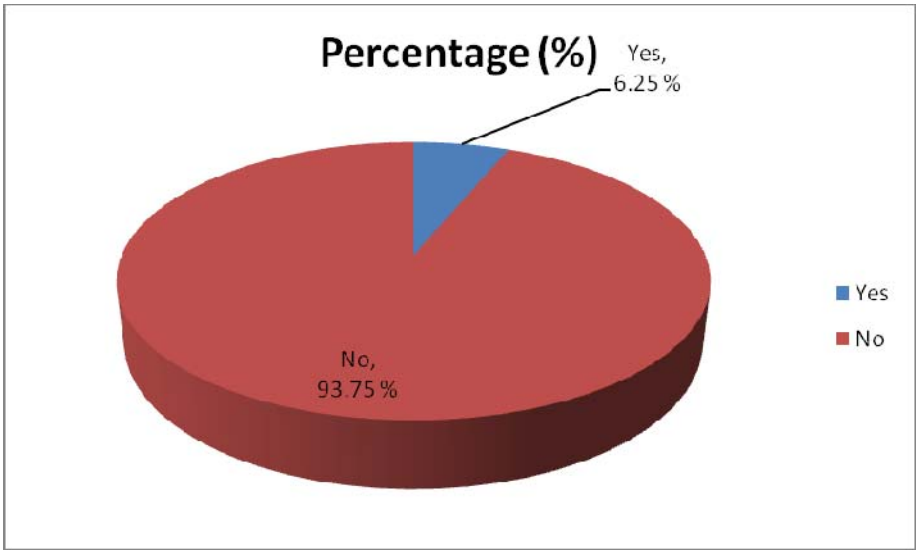

Figure 3.15 Distribution of patient according to Family History

This study represented that, only 6.25% patients had cancer in their family history and large number 93.75% had no cancer in their family history. So that it was not a risk factor for cancer.

3.16 Distribution of patient according to Type of Cancer:

Table 3.16 Distribution of patient according to Type of Cancer

Type of Cancer	Number of Patient	Percentage (%)
Gastro Intestinal Cancer	19	23.75
Blood Cancer	7	8.75
Breast Cancer	2	2.5
Genitourinary / Urinal / Gynecology	17	21.25
Endocrine	3	3.75
Head & Neck Cancer	4	5
Respiratory Tract	15	18.75
Soft Tissue/ Musculoskeletal	11	13.75
Neurological	1	1.25
Germ Cell	1	1.25
Skin Cancer	1	1.25

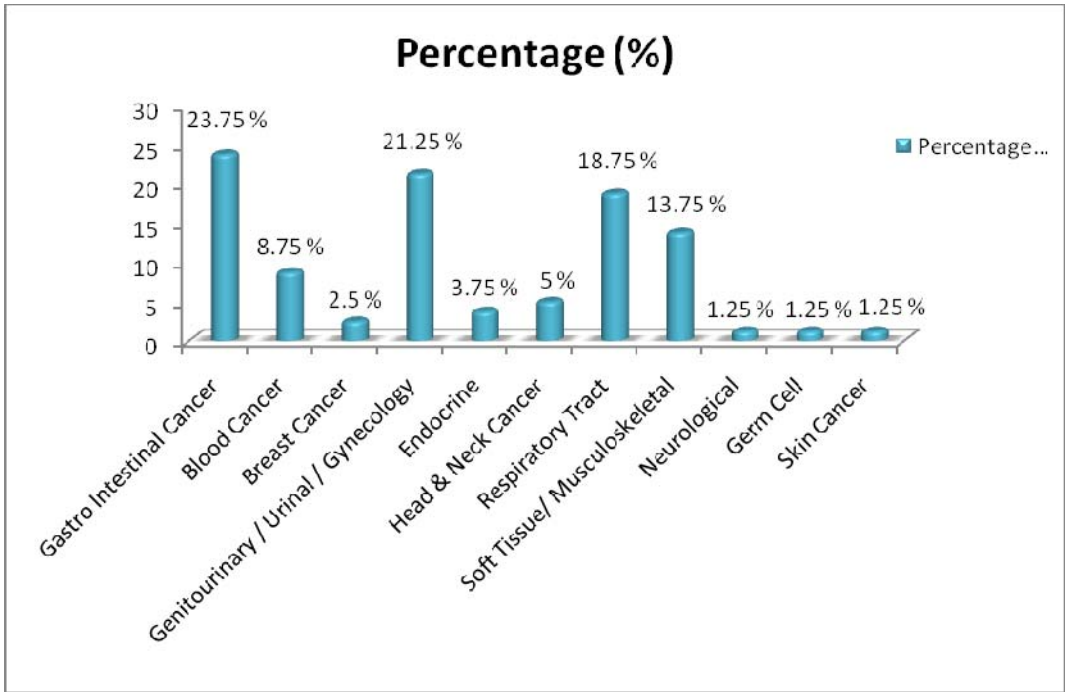

Figure 3.16 Distribution of patient according to Type of Cancer

This study represented that various types of cancer may cause.The number and percentage for gastro intestinal cancer was 19 (23.75%), blood cancer 7 (8.75%), breast cancer 2 (2.5%), genitourinary / urinal / gynecology 17 (2.25%), endocrine 3 (3.75%), head & neck cancer 4 (5%), respiratory tract 15 (18.75%), soft tissue/ musculoskeletal 11 (13.75%), neurological 1 (1.25%), germ cell 1 (1.25%), skin cancer 1 (1.25%). So gastro intestinal cancer was mainly found in large number of patents.The main reason may be ulceration, taking unhealthy food substance etc.

3.17 Distribution of patient according to their Smoking Habit and Type of Cancer:

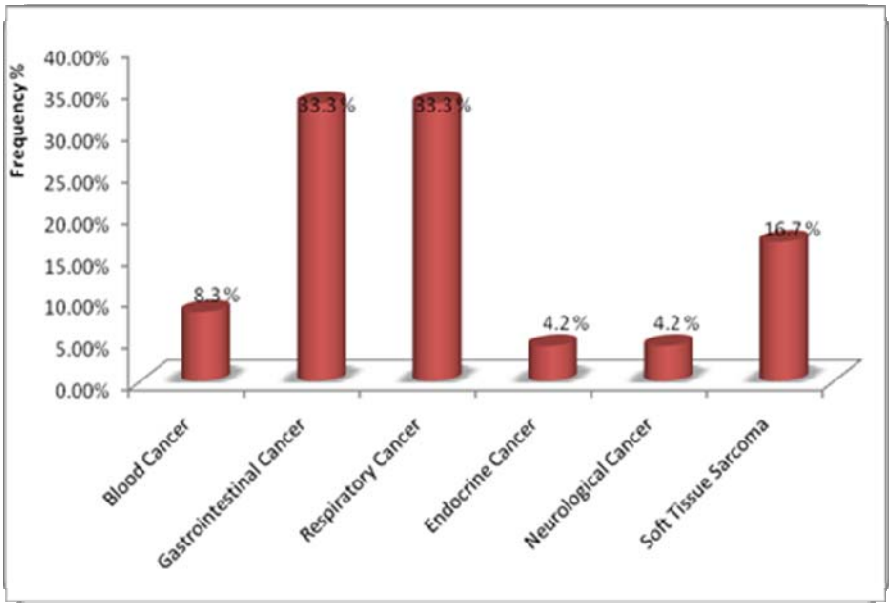

Figure 3.17 Distribution of patient according to their Smoking Habit and type of cancer

During this study, most of the patients were male and they were smoker, Ex-smoker or other. For their smoking habit they were suffered from various types of cancer. Like 8.3% blood cancer, 33.3% gastrointestinal cancer, 33.3% respiratory cancer, 4.2% endocrine cancer, 4.2% neurological cancer,16.7% soft tissue sarcoma cancer patients. From this percentage it can be said that, smokers were mainly affected by gastrointestinal cancer and respiratory cancer.

3.18 Type of cancer and habit of taking Betel Nuts & Jorda:

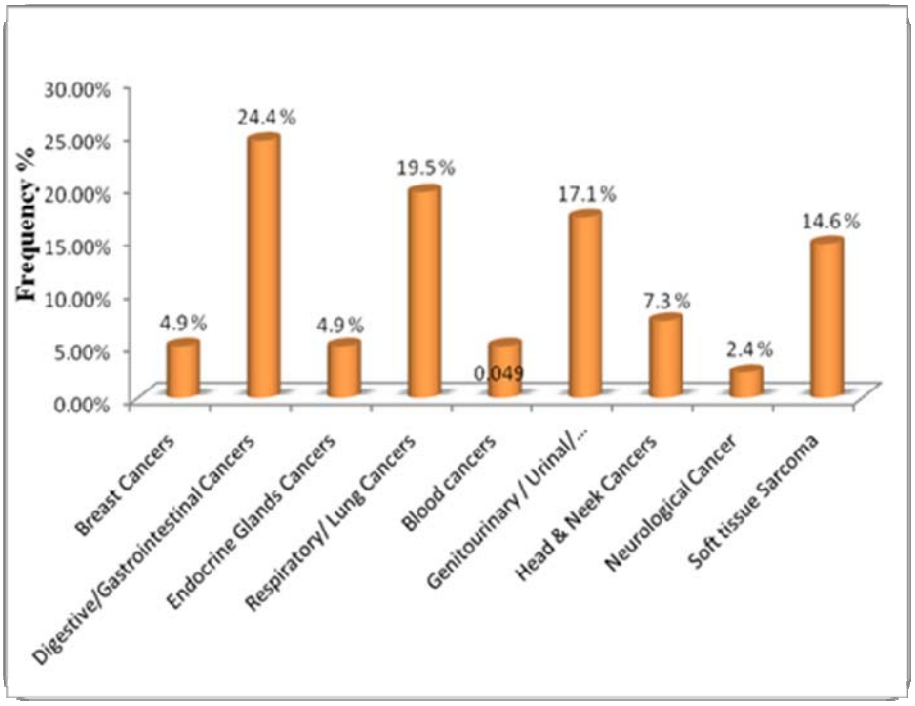

Figure 3.18 Type of cancer and habit of taking betel nuts & jorda.

The correlation of cancer and betel nuts and jorda were studied. During this study, about I was found that patients were affected by breast cancer (4.9%), gastrointestinal cancer (24.4%), endocrineglandcancer (4.9%), lungcancer (19.5%), bloodcancer (0.049%), gastrourinarycancer (17.1%), head or neck cancer (7.3%), neurological cancer (2.4%), soft tissue sarcoma cancer (14.6%). Gastrointestinal cancer was mostly found in case of taking betel nuts or jorda.

3.19: Distribution of patient according to Blood Group:

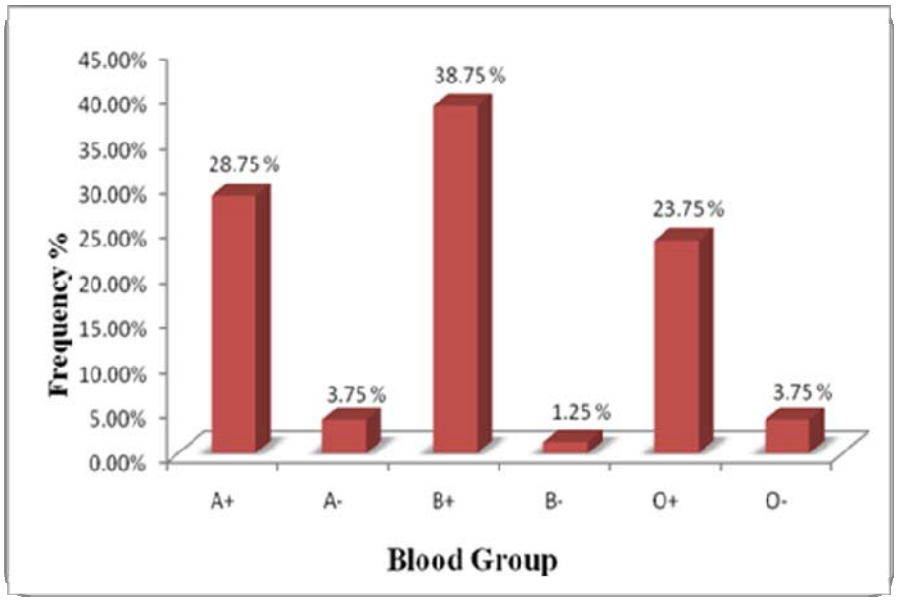

Figure 3.19 Type of cancer according to blood group.

According to blood group, the percentage of patient is blood group A+ was (28.75%), A-(3.75%), B+ was (38.75%), B- was (1.25%), O+- was (23.75%).O- was (3.75%). From this percentage itcan be seen that the number of B+ patient are in highest. Mostly B+ patients were affected by cancer.

Chapter 4 : Conclusion

CONCLUSION

At current situation, number of cancer patient increased day by day. The present study merely gives an idea that there may be some correlation between cancer and different risk factors (Age, Sex, Environmental Risk factors, Occupation, Bad habit etc.) and the number of chemo patients in poverty level patients in Bangladesh.

The higher percentage of cancer cases was found for male as compared to female. The high frequency of Stomach Cancer, Lung Cancer, Blood Cancer, Esophageal cancer etc may be associated with chemical exposure that lived near different chemical industry. Chemotherapy mainly givesto large number of cancer patients. Some general chemo drugs are given to the patients that are included here. Avoiding tobacco may be one of the best health decisions to prevent cancer. Here mainly poverty level people are included who are suffering from cancer. There is a limitation of this research that all classes of cancerous patients are not included here for time consuming. At early stage, treatment of cancer is one of the best ways to stop spread of cancer. In future there should be research done among the all class’s cancer patients. So that, identification of these factor will be more meaningful and give broad idea.

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Appendices

East West University
Department of Pharmacy
43 Mohakhali C/A, Dhaka-1212

A Diseases Based Study: Cancer
(A Project Report to Be Submitted in the Department of Pharmacy for the Partial Fulfillment of the Degree of Bachelor of Pharmacy)

Date: **Report no:**

Personal Information

1. Name

2. Age yrs

3. Gender: □ Female Male

4. Marital Status □ Married □ Unmarried

□ Others

4. Living area: □ City □ Rural □ Urban □ Others

5. Site of the living area: □ Industrial

□ Chemical area

□ Tannery area □ N/A

6. Education: □ Illiterate □ Primary

□ High School □ College

□ Graduate or higher

7. Occupation: □ Student □ Business

□ Service holder □ Clinical

□ Housewife □ Others:

8. Stress on work □ Physical □ Mental □ Social

9. Social class □ Poor □ Lower middle

□ Upper middle □ Rich

10. Source of water used daily

11. Source of food intake daily □ Home made

□ Hotel □ Street

□ Others

12. Smoking habit □ Non smoker □ Ex-smoker

□ Smoker

13. Other addiction □ Betel nuts □ Tea □ Coffee

□ Gull □ Jorda □ Others

14. How long time on sleep

15. Types of sleep □ Normal □ Light sleep □ sound sleep

16. Awareness about Cancer: □ No □ Yes

Diseases Information:

17. Family History □ No □ Yes

18. Type of cancer?

19. Physical problem you may faced

A)…… **B)……** **C)……**

D)…… **E)……**

20. How long you are faced these

21. How long you know that it is cancer

22. Patient status □ Out-patient □ In-patient

23. Length of hospital stay

24. Impact of disease on income □ Small □ Large □ None

25. Are you satisfied by treatment? □ Yes □ No

Investigation

26. Physical Investigation:

Height	
Weight	
Pulse/min	
Temperature	
Blood pressure	
Complexion	

27. Haematological and Biochemical Investigation:

Blood Group	
RBC	
ESR	
Hb%	
WBC	
Platelets	
Biochemical	

28. Histopathological Investigation:

29. Radiological Investigation:

Disease Stage and Treatment:

30. Stage:

31. Treatment Cycle:

32. Duration of taking chemo-drugs:

33. Chemo-drugs details (Name, dose, name and amount of infusion)

34. Ancillary drugs: