Study of Epidemiology of Cancer in Bangladesh

A Thesis paper submitted to the Department of Pharmacy, East West University in partial conformity with the requirements for the Degree of Masters of Pharmacy.

Supervised by

Dr. Chowdhury Faiz Hossain

Professor & Chairperson

Department of Pharmacy

East West University

Submitted by

Sumi Bhattacharjee

ID: 2013-1-79-019

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Declaration by the research candidate

I, Sumi Bhattacharjee declare that the dissertation entitled **"Study of epidemiology of cancer in Bangladesh"** submitted by me to the department of pharmacy, East West University, in the partial fulfillment of the requirement for the award of the degree of Masters of pharmacy, is a record of original research work carried out by me during 2013-2014 under the supervision and guidance of **Dr. Chowdhury Faiz Hossain,** Professor & Chairperson, Department of Pharmacy, East West University and it was not found the basis for the award of any Degree/Diploma/Fellowship or other similar title to any candidate of any University.

Date: **Signature of the candidate**

(Sumi Bhattacharjee)

CERTIFICATE

This is to certify that, the thesis **"Study of epidemiology of cancer in Bangladesh"** submitted to the department of pharmacy, East West University, Aftabnagar, Dhaka for the partial fulfill of the requirement for the award of the degree of Masters of pharmacy, (M.Pharm) was carried out by Sumi Bhattacharjee (ID: 2013-1-79-019) under our guidance and supervision and that no part of the thesis has been submitted for any other degree. We further certify that all of the sources of information and other facilities available of this connection are duly acknowledged.

……………………………………

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ENDORSEMENT BY THE CHAIRPERSON

This is to certify that the dissertation, entitled "Study of Epidemiology of Cancer in Bangladesh " , is a thesis work done, by the Sumi Bhattacharjee (ID-2013-1-79-019), in partial fulfillment of the requirements for the degree of Masters of Pharmacy , I further certify that all the sources of information availed in this connection is duly acknowledged.

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INTRODUCTION

1. Cancer:

1.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.

1. More dangerous, or malignant, tumors form when two things occur:

2. a cancerous cell manages to move throughout the body using the blood or lymph systems, destroying healthy tissue in a process called invasionthat cell manages to divide and grow, making new blood vessels to feed itself in a process called angiogenesis.

3. 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.   **H**

ow cancer spreads:- scientists reported in *Nature Communications* (October 2012 issue) that something to do with their adhesion (stickiness) properties. Certain molecular interactions between cells and the scaffolding that holds them

in place (extracellular matrix) cause them to become unstuck at the original tumor site, they become dislodged, move on and then reattach themselves at a new site.

4. The researchers say this discovery is important because cancer mortality is mainly due to metastatic tumors, those that grow from cells that have traveled from their original site to another part of the body. Only 10% of cancer deaths are caused by the primary tumors.

5. The scientists, from the Massachusetts Institute of Technology, say that finding a way to stop cancer cells from sticking to new sites could interfere with metastatic disease, and halt the growth of secondary tumors.

In 2007, cancer claimed the lives of about 7.6 million people in the world. Physicians and researchers who specialize in the study, diagnosis, treatment, and prevention of cancer are called oncologists.

1.2.

Malignant cells are more agile than non-malignant ones:scientists from the Physical Sciences-Oncology Centers, USA, reported in the journal *Scientific Reports*Malignant cells can pass more easily through smaller gaps, as well as applying a much greater force on their environment compared to other cells.

6. CTP professor Robert Austin and team created a new catalogue of the physical and chemical features of cancerous cells with over 100 scientists from 20 different centers across the United States.

7. T he authors believe their catalogue will help oncologists detect cancerous cells in patients `early on thus preventing the spread of the disease to other parts of the body. Prof. Austin said "By bringing together different types of

experimental expertise to systematically compare metastatic and non-metastatic cells, we have advanced our knowledge of how metastasis occurs."

What causes cancer:

Cancer is ultimately the result of cells that uncontrollably grow and do not die. Normal cells in the body follow an orderly path of growth, division, and death. Programmed cell death is called apoptosis, and when this process breaks down, cancer begins to form. Unlike regular cells, cancer cells do not experience programmatic death and instead continue to grow and divide. This leads to a mass of abnormal cells that grows out of control.

1.3.

Genes - the DNA type

Cells can experience uncontrolled growth if there are damages or mutations to DNA, and therefore, damage to the genes involved in cell division. Four key types of gene are responsible for the cell division process:

Oncogenes tell cells when to divide, tumor suppressor genes tell cells when not to divide, suicide genes control apoptosis and tell the cell to kill itself if something goes wrong, and DNA-repair genes instruct a cell to repair damaged DNA.

Cancer occurs when a cell's gene mutations make the cell unable to correct DNA damage and unable to commit suicide. Similarly, cancer is a result of mutations that inhibit oncogene and tumor suppressor gene function, leading to uncontrollable cell growth.

1.5. **Carcinogens**: Carcinogens are a class of substances that are directly responsible for damaging DNA, promoting or aiding cancer. Tobacco, asbestos, arsenic, radiation

such as gamma and x-rays, the sun, and compounds in car exhaust fumes are all examples of carcinogens. When our bodies are exposed to carcinogens, free radicals are formed that try to steal electrons from other molecules in the body. Theses free radicals damage cells and affect their ability to function normally.**(American Cancer Society, 2009)**

1.6. Genes - the family type

Cancer can be the result of a genetic predisposition that is inherited from family members. It is possible to be born with certain genetic mutations or a fault in a gene that makes one statistically more likely to develop cancer later in life.

1.7. Other medical factors

As we age, there is an increase in the number of possible cancer-causing mutations in our DNA. This makes age an important risk factor for cancer. Several viruses have also been linked to cancer such as: human papillomavirus (a cause of cervical cancer), hepatitis B and C (causes of liver cancer), and Epstein-Barr virus (a cause of some childhood cancers). Human immunodeficiency virus (HIV) anything else that suppresses or weakens the immune system - inhibits the body's ability to fight infections and increases the chance of developing cancer.

1.8. What are the symptoms of cancer:

Cancer symptoms are quite varied and depend on where the cancer is located, where it has spread, and how big the tumor is. Some cancers can be felt or seen

through the skin - a lump on the breast or testicle can be an indicator of cancer in those locations. Skin cancer (melanoma) is often noted by a change in a wart or mole on the skin. Some oral cancers present white patches inside the mouth or white spots on the tongue.

Other cancers have symptoms that are less physically apparent. Some brain tumors tend to present symptoms early in the disease as they affect important cognitive functions. Pancreas cancers are usually too small to cause symptoms until they cause pain by pushing against nearby nerves or interfere with liver function to cause a yellowing of the skin and eyes called jaundice. Symptoms also can be created as a tumor grows and pushes against organs and blood vessels. For example, colon cancers lead to symptoms such as constipation, diarrhea, and changes in stool size. Bladder or prostate cancers cause changes in bladder function such as more frequent or infrequent urination. cancer cells use the body's energy and interfere with normal hormone function, it is possible to present symptoms such as fever, fatigue, excessive sweating, anemia, and unexplained weight loss. For example, coughing and hoarseness can point to lung or throat cancer as well as several other conditions

hen cancer spreads, or metastasizes, additional symptoms can present themselves in the newly affected area. Swollen or enlarged lymph nodes are common and likely to be present early. If cancer spreads to the brain, patients may experience vertigo, headaches, or seizures. Spreading to the lungs may cause coughing and shortness of breath. In addition, the liver may become enlarged and cause jaundice and bones can become painful, brittle, and break easily. Symptoms of metastasis ultimately depend on the location to which the cancer has spread.

There are five broad groups that are used to classify cancer.

Carcinomas are characterized by cells that cover internal and external parts of the body such as lung, breast, and colon cancer

Sarcomas are characterized by cells that are located in bone, cartilage, fat, connective tissue, muscle, and other supportive tissues.

Lymphomas are cancers that begin in the lymph nodes and immune system tissues. Leukemia's are cancers that begin in the bone marrow and often accumulate in the bloodstream.

Adenomas are cancers that arise in the thyroid, the pituitary gland, the adrenal gland, and other glandular tissues.

Cancers are often referred to by terms that contain a prefix related to the cell type in which the cancer originated and a suffix such as -sarcoma, -carcinoma, or just -oma. Common prefixes include:

- ❖ Adeno- = gland

- ❖ Chondro- = cartilage

- ❖ Erythro- = red blood cell

- ❖ Hemangio- = blood vessels

- ❖ Hepato- = liver

- ❖ Lipo- = fat

- ❖ Lympho- = white blood cell

- ❖ Melano- = pigment cell

- ❖ Myelo- = bone marrow

- ❖ Myo- = muscle

- ❖ Osteo- = bone

- ❖ Uro- = bladder

❖ Retino- = eye

❖ Neuro- = brain

2. How is cancer diagnosed and staged

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.

2.1. How is cancer treated

Cancer treatment depends on the type of cancer, the stage of the cancer (how much it has spread), age, health status, and additional personal characteristics. There is no single treatment for cancer, and patients often receive a combination of therapies and palliative care. Treatments usually fall into one of the following categories: surgery, radiation, chemotherapy, immunotherapy, hormone therapy, or gene therapy.

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. Innovations continue to be developed to aid the surgical process, such as the [iKnife that "sniffs" out cancer](). Currently, when a tumor is removed surgeons also take out a "margin" of healthy tissue to make sure no malignant cells are left behind. This usually means keeping the patients under general anesthetic for an extra 30 minutes while tissue samples are tested in the lab for "clear

margins". If there are no clear margins, the surgeon has to go back in and remove more tissue (if possible). Scientists from Imperial College London say the iKnife may remove the need for sending samples to the lab.

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.**(American Cancer Society, 2009)**

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.

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.

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.

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.

2.2. Using cancer-specific immune system cells to treat cancer

Scientists from the RIKEN Research Centre for Allergy and Immunology in Yokohama, Japan, explained in the journal Cell Stem Cell (January 2013 issue) .

The authors added that their study has shown that it is possible to clone versions of the patients' own cells to enhance their immune system so that cancer cells could be destroyed naturally.

New Cancer drug:

Imbruvica (ibrutinib) is an orally available, selective inhibitor of Bruton's tyrosine kinase (Btk), a gene that is disrupted in the human disease X-linked agammaglobulenemia (XLA). BTK is a signaling molecule of the B-cell antigen receptor (BCR) and cytokine receptor pathways.

Imbruvica is specifically approved for chronic lymphocytic leukemia in patients who have received at least one prior therapy.Imbruvica is supplied as a capsule for oral administration.(**FDA approved drugs, 2014**)

Zykadia (ceritinib) is a highly selective inhibitor of anaplastic lymphoma kinase (ALK). ALK is a key gene implicated in the development of some lung cancers.

Zykadia is specifically indicated for the treatment of patients with anaplastic lymphoma kinase (ALK)-positive metastatic non-small cell lung cancer who have progressed on or are intolerant to crizotinib.

Zykadia is supplied as a capsule (150 mg) for oral administration. The recommended initial dose is 750 mg orally once daily. Administer Zykadia on an empty stomach.

2.3. How can cancer be prevented

Cancers that are closely linked to certain behaviors are the easiest to prevent. For example, choosing not to smoke tobacco or drink alcohol significantly lower the risk of several types of cancer - most notably lung, throat, mouth, and liver cancer. Even if you are a current tobacco user, quitting can still greatly reduce your chances of getting cancer.

Skin cancer can be prevented by staying in the shade, protecting yourself with a hat and shirt when in the sun, and using sunscreen. Diet is also an important part of cancer prevention since what we eat has been linked to the disease. Physicians recommend diets that are low in fat and rich in fresh fruits and vegetables and whole grains.

Certain vaccinations have been associated with the prevention of some cancers. For example, many women receive a vaccination for the human papillomavirus because

of the virus's relationship with cervical cancer. Hepatitis B vaccines prevent the hepatitis B virus, which can cause liver cancer.

Some cancer prevention is based on systematic screening in order to detect small irregularities or tumors as early as possible even if there are no clear symptoms present. Breast self-examination, mammograms, testicular self-examination, and Pap smears are common screening methods for various cancers.

Researchers from Northwestern University Feinberg School of Medicine in Chicago reported in the journal Circulation that the 7 steps recommended for protection against heart disease can also reduce the risk of developing cancer,. They include being physically active, eating a healthy diet, controlling cholesterol, managing blood pressure, reducing blood sugar and not smoking.

2.4. Epidemiological study of cancer in Bangladesh:

The National institute of cancer research and hospital NICRH, Dhaka started cancer registry in 2005 for the first time in Bangladesh with technical assistance from the World Health Organization. Current report covers three years from 2005 to 2007.Data were collected from 24,847 cancer patients who attended the NICRH for the first time.Essential information (confirmed diagnosis) could be made available for 18,829 cases, and theyare included in this analysis.

Among them 10,847 (57.6%) were males. Lung cancer was theleading cancer (17.3%), followed by cancers of breast (12.3%), lymph nodes and lymphatics(8.4%) and cervix (8.4%) for sexes combined in all ages. In males lung (25.5%) and in femalesbreast (25.6%) and cervical (21.5%) cancers were predominant. In children

aged 14 years oryounger (n=657) lymphoma, retinoblastoma, osteosarcoma, leukaemia and kidney cancers weremost prevalent.

Lung cancer in males, and cervical and breast cancer in females constitute 38% ofall cancers in Bangladesh. Therefore their prevention warrants serious attention. Addressingthese three cancers could bring two in five cancers in Bangladesh under control through tobaccocontrol, breast self examination and visual inspection under acetic acid (VIA) for cervical cancer

According to the latest World Health Organization data published in April 2011 Oral Cancer Deaths in Bangladesh reached 11,562 or 1.21% of total deaths. The age adjusted Death Rate is 12.52 per 100,000 of population ranks Bangladesh #4 in the world. At present, there are one million (10 lakh) cancer patients in Bangladesh while approximately 200,000 new patients, mostly women, are added every year creating a social burden on the country. The country's women are now in danger of being affected by cervical cancer, one of the sexually transmitted diseases that claim the life of 18 women every day in the country for lack of awareness.

Cancer is one of the major causes of morbidity and mortality among the non communicable diseases in Bangladesh. Each year more then 200,000 people develop cancer and 150,000 die of the disease. Cancer is the sixth cause of mortality in Bangladesh and more than half of the of cancer patients die with in five years of diagnosis. The number of people developing cancer is expected to increase in huge number mainly because of ageing population and lifestyle factors. Cancer load is more than 1,200,000 in Bangladesh. Bangladesh is still lacking a national cancer registry.

According to Bangladesh Bureau of Statistics cancer is the sixth leading cause of death in Bangladesh. A few decades ago, a hospital based registry was initiated in 1967 at Radiotherapy Department of Dhaka Medical College Hospital and continued till 1971. A few years back, hospital based cancer registry was instituted at National Institute of Cancer Research Hospital and Oncology Department of Bangabandhu Sheikh Muijb Medical University. International Agency for Research on Cancer (IARC) has been estimated death from cancer in Bangladesh is 7.5 % in 2005 and projected that it would be increased up to 13 % in 2030. IARC has been projected (2002) death from 10 leading cancers in women are mouth and oro-phyrangeal cancer, cervical, breast, esophageal cancer, ovarian cancer, lung cancer, lymphoma, stomach, liver, colo-rectal cancer and in men are mouth and oro-phyrangeal, lung cancer, esophageal cancer, lymphoma, stomach, bladder, liver cancer, leukemia, colo-rectal cancer and prostate.

A recent WHO study has been estimated that there are 49,000 oral cancer, 71,000 pharynx and laryngeal cancer and 196,000 lung cancer cases in Bangladesh among those aged 30 years or above. The same study observed that 3.6% of the admissions in medical college hospitals for the same age group are due to cancers of oral cavity, larynx and lungs (WHO 2007).

At present we have enough knowledge to prevent at least one-third of cancers. Depending on the availability of resources, early detection and effective treatment of a further third of cancers are also possible. And when cancer cannot be cured, or held in remission, prevention and relief of suffering can greatly improve the quality of life of people with cancer and their families. The whole field of cancer is complex, and achieving what is possible poses significant challenges. Cancer includes over a hundred diseases with different causes. It can arise in any organ and at any age. Also,

there is a wide range of organizations and health professionals, both government and non-government, involvein the many aspects of cancer prevention, detection, diagnosis, treatment and care.

Government of Bangladesh with technical support from WHO has been formulated 'National Non Communicable Diseases Strategy and Plan of Action' in 2007. Government has expressed its commitment to formulate 'National Cancer Control Strategy and Plan of Action, public policy document such as Strategic Investment Plan and Revised Programme Implementation Plan of HNPSP (2003-11) include reduction of incidence and impact of cancer as one of the health goal chosen for implementation. Along with other South- East Asian countries, we have accepted the conclusion of WHO that development and implementation of a national cancer control strategy is the most effective way of reducing the incidence and impact of cancer.

The Cancer Control Strategy is the first phase in the development and implementation of a comprehensive andcoordinated programme to control cancer in Bangladesh. The strategy includes purposes, principles and goalsto guide existing and future actions to control cancer. It also includes objectives and broad areas for action. Thenext phase will involve identifying priorities of action, planning implementation, and defining processes tomanage, monitor and review implementation.

The Goals of the Bangladesh Cancer Control Strategy are to:

➢ Reduce the incidence of cancer throughprimary prevention;

> ➢ Ensure effective screening and early detection to reduce cancer incidence and mortality;

> ➢ Ensure effective diagnosis and treatment to reduce cancer morbidity and mortality;

> ➢ improve the quality oflife for those with cancer and their family through support;

> ➢ rehabilitation and palliative care;

> ➢ improve thedelivery of services across the continuum of cancer control through effective planning, co-ordination andintegration of resources and activity, monitoring and evaluation;

> ➢ improve the effectiveness of cancer controlin Bangladesh through research and surveillance.

2.5. Population Pyramid

A population pyramid illustrates the age and sex structure of a country's population and may provide insights about political and social stability, as well as economic development. The population is distributed along the horizontal axis, with males shown on the left and females on the right. The male and female populations are broken down into 5-year age groups represented as horizontal bars along the vertical axis, with the youngest age groups at the bottom and the oldest at the top. The shape of the population pyramid gradually evolves over time based on fertility, mortality, and international migration trends.

Figure 2.1: Bangladesh population pyramid (0-100+) according to 2013 age and sex structure.

2.6. Leading cancer at NICRH

Lung cancer:

Lung cancer was the leading cancer among the patients who attended NICRH. 5135 lung cancer patients seek treatment here of them 87.7% (4505) are males. It can be noted that the number of lung cancer patients was increasing tear by year; in 2008 there was 1361 lung cancer patients which increased to 1794 and 1980 in two successive years. About 29.5% (1515) of them belonged to 55-64 year age group. About 77% patients was ever smoker and more than 98% of them were males. Forty four percent lung cancer patients had squamous cell carcinoma and 27.4% had adenocarcinoma. Before coming to NICRH 641 lung cancer patients received anticancer treatment of them about 61% received chemotherapy, about 28% underwent surgery. For about 50% lung cancer patients Tumor Board decided to give chemotherapy, radiotherapy is opted for more than 37% lung cancer patients.

Breast cancer:

Among the female patients of NICRH breast cancer topped the list, which formed the second most common cancer as a whole. About 97% of the breast cancer patients are married. More than 62% ofmarried female breast cancer patients are multipara and about one in five were grand multipara. A total of 1199 breast cancer patients received treatment prior to NICRH; more than half of them underwent surgery. Tumor board of NICRH decided to give radiotherapy for 43.3%, chemotherapy for 36.5% and surgery for 12.1% patients.

Cervical cancer:

Carcinoma cervix is the second most common cancer among female and ranked third among the whole group. About 97.2% of the cervical cancer patients were married. About 542 cervical cancer patients received treatment prior to NICRH; of them 78% got surgical treatment. Tumor board of NICRH decided to give radiotherapy for about 82% and chemotherapy for 8.7%.

Retinoblastoma

Retinoblastoma in children is a rare cancer, occurring in about one in 20,000. It originates in a part of the eye called the retina, a thin layer of nerve tissue that coats the back of the eye, allowing a person to see. Retinoblasts (immature cells of the retina) multiply during gestation and early life to make enough cells to create the retina. As children age, the cells mature and are no longer able to divide and multiply, a process called differentiation.

Scientists do not know what causes the immature retinoblasts to turn into cancer cells (a process called transformation), but do know that in order for retinoblastoma to develop, there must be a change or mutation in both copies (one from each parent) of

a gene called RB1. In most children with retinoblastoma, this change occurs in only one cell, leading to a single tumor. The change occurs in more than one cell, and if more than one tumor is detected (in one or both eyes) it means that a change had already occurred in one copy of the gene before conception. What precisely triggers this change or mutation is not known.

Table 1: Distribution of patients by systemic diagnosis of National Institute of Cancer Research and Hospital

System wise topography	% of incidence (2008)
Digestive system	1832 (6.7)
Respiratory system and intrathoracic organs	2266 (8.3)
Bones, joints and articular cartilage	55 (0.2)
Haemopoetic and reticuloendothelial system	40 (0.1)
Peripheral nerve and autonomic nervous system	4 1196 (4.4)
Retroperitoneum and peritoneum	30 (0.1)
Connective, subcutaneous and other soft tissues	319 (1.2)
Female genital organs	1112 (4.2)
Male genital organs	147 (1.5)
Urinary tract	249 (0.9)
Eye, brain and other parts of CNS	178 (0.7)
Thyroid and endocrine glands	104 (0.4)

Table 2: Distribution of patients by top ten malignancies

Cancer sites	n (%)
Lung	1708 (17.5)
Breast	1189 (12.2)
Cervix	849 (8.7)
Oesophagus	448 (4.6)
Stomach	380 (3.9)
Liver	298 (2.1)
Gall bladder	192 (2.0)
Rectum	206 (2.1)
Larynx	186 (1.9)

Cheek / buccal mucosa	181 (1.9)

Table 3: Top ten malignancies among male patients

Cancer sites	n (%)
Lung	1429 (26.7)
Oesophagus	319 (6.0)
Stomach	278 (5.2)
Liver	221 (4.1)
Larynx	160 (3.0)
Rectum	137 (2.6)
Pyriform fossa	111(2.1)
Bladder	111(2.1)
Tongue	97 (1.8)

Table 6: Top ten Geriatric cancer

Cancer sites	n (%)
Lung	1679 (31.2)
Oesophagus	384 (7.1)
Cervix	275 (5.1)
Stomach	247 (4.6)
Liver	237 (4.4)
Breast	188 (3.5)
Bladder	142 (2.6)

Prostate	129 (2.4)
Larynx	120 (2.2)

Rational of research

Selected National institute of cancer research and hospital (NICRH) because it is government hospital so lots of people come here to treat their disease easily. At that time, most of the patients came outside of dhaka because of poverty. Cancer drug and Chemotherapy cost was so high so that most of the patients could not effort. NICRH provide drugs and chemotherapy with cheapest rate. Data is not available in Bangladesh. Hence, 2009 retrospective data will help to reach our goal. Only NICRH has data that will help research purpose. NICRH published 2005 to 2008 data. Any university and NICRH collaborate Published research with the help of that data. Different types of rare cancer has seen at NICRH such as retinoblastoma, rhabdomyosarcoma, ewing sarcoma, surprisingly 1.5 years to below 10 years age cancer patients included my data. With the help of NICRH management data collection completed properly.

Literature review

Article review

"….no person with cancer should be forced to spend more time fighting their

way through the health care system than fighting their disease"

Freeman (2002) in Schwaderer and Itano (2007: 638).

The study of cancer, called *oncology*, is the work of countless doctors and scientists around the world whose discoveries in anatomy, physiology, chemistry, epidemiology, and other related fields made oncology what it is today. Technological advances and the ever-increasing understanding of cancer make this field one of the most rapidly evolving areas of modern medicine.

Cancer in the sixteenth to eighteenth centuries

During the Renaissance, beginning in the 15th century, scientists developed greater understanding of the human body. Scientists like Galileo and Newton began to use the

scientific method, which later was used to study disease. The famous Scottish surgeon John Hunter (1728-1793) suggested that some cancers might be cured by surgery and described how the surgeon might decide which cancers to operate on. A century later the development of anesthesia allowed surgery to flourish and classic cancer operations such as the radical mastectomy were developed.

Cancer in the nineteenth century

The 19th century saw the birth of scientific oncology with use of the modern microscope in studying diseased tissues. Rudolf Virchow, often called the founder of cellular pathology, provided the scientific basis for the modern pathologic study of cancer. As Morgagni had linked autopsy findings seen with the unaided eye with the clinical course of illness, so Virchow correlated microscopic pathology to illness. This method not only allowed a better understanding of the damage cancer had done, but also aided the development of cancer surgery. Body tissues removed by the surgeon could now be examined and a precise diagnosis could be made. The pathologist could also tell the surgeon whether the operation had completely removed the cancer.

Early theories about cancer causes

From the earliest times, physicians have puzzled over the causes of cancer. Ancient Egyptians blamed cancers on the gods.

Humoral theory

Hippocrates believed that the body had 4 *humors* (body fluids): blood, phlegm, yellow bile, and black bile. When the humors were balanced, a person was healthy. The belief was that too much or too little of any of the humors caused disease. An excess of black bile in various body sites was thought to cause cancer. This theory of cancer was passed on by the Romans and was embraced by the influential doctor

Galen's medical teaching, which remained the unchallenged standard through the Middle Ages for over 1,300 years.

In 1911, Peyton Rous, at the Rockefeller Institute in New York, described a type of cancer (sarcoma) in chickens caused by what later became known as the Rous sarcoma virus. He was awarded the Nobel Prize for that work in 1968. Several viruses are now linked to cancer in humans, for example:

Long-standing infection with the hepatitis B or C viruses can lead to Cancer of the liver.

One of the herpes viruses, the Epstein-Barr virus, causes infectious mononucleosis and has been linked to non-Hodgkin lymphomas and nasopharyngeal Cancer.

People with human immunodeficiency virus (HIV) have greater increased risk of developing several Cancers especially Kaposi sarcoma and non-Hodgkin lymphoma.

Human papilloma viruses (HPVs) have been linked to many cancers, especially those of the cervix, vulva, vagina, anus, and penis. Some head and neck cancers (mostly the tongue and tonsils) are linked to the high-risk types of HPV, too. Today there are vaccines to help prevent HPV infection.

As of 2014, the World Health Organization's International Agency for Research on Cancer (IARC) has identified more than 100 chemical, physical, and biological carcinogens. Many of these associations were recognized long before scientists understood much about how cancer develops. Today, research is discovering new carcinogens, explaining how they cause cancer, and providing insight into ways to prevent cancer. By the middle of the 20th century, scientists had the instruments they needed to work on some of the complex problems of chemistry and biology that remained unsolved. James Watson and Francis Crick, who received a Nobel Prize in 1962 for their work, had discovered the exact chemical structure of DNA, the basic

material in genes. DNA was found to be the basis of the genetic code that gives orders to all cells. After learning how to translate this code, scientists were able to understand how genes worked and how they could be damaged by mutations (changes or mistakes in genes). Scientists discovered that sometimes defective genes are inherited, and sometimes these inherited genes are defective at the points where certain chemicals also tend to cause damage. In other words, most of the things that caused cancer (carcinogens) caused genetic damage (mutations) that looked a lot like the mutations that could be inherited and could result in the same types of cancer if more mutations were introduced.

History of cancer epidemiology

During the 18th century, 3 important observations launched the field of cancer epidemiology (epidemiology is the study of causes, distribution, and control of diseases):

In 1713, Bernardino Ramazzini, an Italian doctor, reported the virtual absence of cervical cancer and relatively high incidence of breast cancer in nuns and wondered if this was in some way related to their celibate lifestyle. This observation was an important step toward identifying and understanding the importance of hormones (like the changes that come with pregnancy) and sexually-transmitted infections and cancer risk.In 1775, Percival Pott of Saint Bartholomew's Hospital in London described an occupational cancer in chimney sweeps, cancer of the scrotum, which was caused by soot collecting in the skin folds of the scrotum. This research led to many more studies that identified a number of occupational carcinogenic exposures and led to

public health measures to reduce a person's cancer risk at work. Thomas Venner of London was one of the first to warn about tobacco dangers in his *Via Recta*, published in London in 1620. He wrote that "immoderate use of tobacco hurts the brain and the eye and induces trembling of the limbs and the heart." And 150 years later, in 1761, only a few decades after recreational tobacco became popular in London, John Hill wrote a book entitled *Cautions Against the Immoderate Use of Snuff*. These first observations linking tobacco and cancer led to epidemiologic research many years later (in the 1950s and early 1960s) which showed that smoking causes lung cancer and led to the US Surgeon General's 1964 report *Smoking and Health*. Epidemiologists continue to search for factors that cause cancer (like tobacco use, obesity, ultraviolet radiation), as well as those things that can help protect against cancer (such as physical activity and a healthy diet). This research provides evidence to guide public health recommendations and regulations. As molecular biologists learn more about how factors cause or prevent cancer, this information is used to study molecular epidemiology, which is the study of interactions between genes and external factors.(**Ferlay, J. et al. 2013**)

History of cancer screening and early detection

Screening refers to tests and exams used to find a disease, such as cancer, in people who do nothave any symptoms. The first screening test to be widely used for cancer was the Pap test. The testwas developed by George Papanicolaou as a research method in understanding the menstrual cycle. Papanicolaou soon recognized its potential for finding cervical cancer early and presented his findings in 1923.

At first, most doctors were skeptical, and it was not until the American Cancer Society (ACS) promoted the test during the early 1960s that this test became widely used. Since that time, the cervical cancer death rate in the United States has declined

by about 70%. Modern mammography methods were developed late in the 1960s and first officially recommended by the ACS in 1976.

Current American Cancer Society guidelines include methods for early detection of cancers of thecervix, breast, colon and rectum, endometrium, lung, and prostate, as well as a cancer-relatedcheck-up which, depending on a person's age and gender, might include exams for cancers of the thyroid, mouth, skin, lymph nodes, testes, and ovaries.

New classes of drugs (such as aromatase inhibitors, LHRH [luteinizing hormone-releasing hormone] analogs and inhibitors, and others) have greatly changed the way prostate and breast Cancers are treated Research to better understand how hormones influence cancer growth has guided progresdeveloping many new drugs for cancer treatment. It's also helping researchers look at new ways to use drugs to reduce the risk of developing breast and prostate cancer. **(Devita& Rosenberg, 2012)**

The International Agency for Research on Cancer (IARC), the specialized cancer agency of the World Health Organization, today released the latest data on cancer incidence, mortality, and prevalence worldwide.1 The new version of IARC's online database, GLOBOCAN 2012, provides the most recent estimates for 28 types of cancer in 184 countries worldwide and offers a comprehensive overview of the global cancer burden. **GLOBOCAN 2012** reveals striking patterns of cancer in women and highlights that priority should be given to cancer prevention and control measures for breast and cervical cancers globally. Global burden rises to 14.1 million new cases and 8.2 million cancer deaths in 2012.According to **GLOBOCAN 2012**, an estimated 14.1 million new cancer cases and 8.2 million cancer-related deaths occurred in 2012, compared with 12.7 million and 7.6 million, respectively, in 2008. Prevalence

estimates for 2012 show that there were 32.6 million people (over the age of 15 years) alive who had had a cancer diagnosed in the previous five years. The most commonly diagnosed cancers worldwide were those of the lung (1.8 million, 13.0% of the total), breast (1.7 million, 11.9%), and colorectum (1.4 million, 9.7%). The most common causes of cancer death were cancers of the lung (1.6 million, 19.4% of the total), liver (0.8 million, 9.1%), and stomach (0.7 million, 8.8%). Based on the **GLOBOCAN 2012** estimates predict a substantive increase to 19.3 million new cancer cases per year by 2025, due to growth and ageing of the global population. More than half of all cancers (56.8%) and cancer deaths (64.9%) in 2012 occurred in less developed regions of the world, and these proportions will increase further by 2025. Sharp rise in breast cancer worldwide: In 2012, 1.7 million women were diagnosed with breast cancer and there were 6.3 million women alive who had been diagnosed with breast cancer in the previous five years. Since the 2008 estimates, breast cancer incidence has increased by more than 20%, while mortality has increased by 14%. Breast cancer is also the most common cause of cancer death among women (522 000 deaths in 2012) and the most frequently diagnosed cancer among women in 140 of 184 countries worldwide. It now represents one in four of all cancers in women. Generally, worldwide trends show that in developing countries going through rapid societal and economic changes, the shift towards lifestyles typical of industrialized countries leads to a rising burden of cancers associated with reproductive, dietary, and hormonal risk factors. Incidence rates remain highest in more developed regions, but mortality is relatively much higher in less developed countries due to a lack of early detection and access to treatment facilities. For example, in western Europe, breast cancer incidence has reached more than 90 new cases per 100 000 women annually, compared with 30 per 100 000 in eastern Africa (**Ferlay, J. et al. 2013**). With 528 000 new

cases every year, cervical cancer is the fourth most common cancer affecting women worldwide, after breast, colorectal, and lung cancers; it is most notable in the lower-resource countries of sub-Saharan Africa. It is also the fourth most common cause of cancer death (266 000 deaths in 2012) in women worldwide.. In sub-Saharan Africa, 34.8 new cases of cervical cancer are diagnosed per 100 000 women annually, and 22.5 per 100000 women die from the disease. These figures compare with 6.6 and 2.5 per 100000 women, respectively, in North America. "These findings bring into sharp focus the need to implement the tools already available for cervical cancer, notably HPV vaccination combined with well-organized national programs for screening and treatment," Lung cancer in Australia is the leading cause of death due to cancer and is the second leading cause of all deaths in men and the fifth highest cause of all deaths amongst women. In 2006 there were 9563 cases and 7397 deaths due to lung cancer in Australia and only 12% of patients survived 5 years. As the population ages it is likely that the incidence of lung cancer will rise among older people. Lung cancer in the elderly, as at all ages, may occur in those who have never smoked, currently smoke or were previous smokers and in those exposed to second hand smoke.In response to the increasing disease burden, there have been improvements and innovations in diagnosis, management and models of care delivery for lung cancer.The increase in complexity has implications for professional training and for the way in which health care services are organised, funded and delivered in primary, secondary and tertiary care. A major obstacle in achieving improvements in outcomes for lung cancer is that patients often present late when disease is advanced. The absence of an effective screening tool is one of the factors challenging earlier diagnosis. Although low-dose spiral computed tomography (CT) has proven to be effective in the early detection of lung cancer, the role of regular CT screening to reduce lung cancer mortality in heavy

smokers has yet to be demonstrated and concerns remain about radiation exposure through repeated scanning. Numerous ongoing large-scale randomized trials are under way in high-risk individuals to determine whether CT and other novel approaches to screening improve survival. The cost effectiveness of screening tests, should they be demonstrated to improve survival, will also need to be considered. Therefore, in the short term, it is likely that the greatest improvements in health outcomes for lung cancer will be leveraged through obtaining an earlier diagnosis. (Report on Lung Cancer in Australia). Breast cancer, along with cervical cancer, is one of the most commonly diagnosed cancers of pregnancy. Most would define gestational breast cancer as breast cancer that is diagnosed during pregnancy, lactation, and up to 12 months post-partum. The diagnostic and therapeutic implications in this clinical setting are special. These women typically present with a more advanced- stage disease that carries an associated poorer prognosis. Physicians thus are challenged to balance aggressive maternal care with appropriate modifications that will ensure fetal protection. Based on the National Cancer Institute's Surveillance, Epidemiology, and End Results Program Cancer Statistics Review and rates from 2001 to 2003, 12.67% of women will develop breast cancer during their lifetime. This lifetime risk translates into one in eight women. Additionally, this review notes that the mean age at diagnosis for breast cancer from 2000 to 2003 was 61 years, and only approximately 12.7% of women were between the ages of 20 and 44. Of women diagnosed with breast cancer younger than 40 years, only approximately 10% will be pregnant. These data certainly suggest a low incidence of pregnancy-associated breast cancer. In fact, historically, the incidence is estimated at 1 in 3000 pregnancies. Despite the overall low incidence, however, gestational breast cancer is one of the most common

CHAPTER   : 2

MATERIAL   &

METHOD

1. Number of study centre: One

2. Number of patients: Male :181, Female:62

 3.Study center: National Institute of Cancer research and Hospital

4. Duration of study: 6 months

5. Study type: Retrospective study

6. Inclusion and exclusion criteria:

Cancer registries are systems of collection, storage, analysis and interpretation of data from the people with cancer. There are two main types of cancer registries: Population-based and Hospital-based cancer registries (PBCR and HBCR). Hospital-based registries use information abstracted from medical records to assess the number of diagnoses per year and frequencies by sites. The information collected consists of demographics, site of cancer, type of cancer, type of treatments, stage of disease at diagnosis and vital status. Hospital registry data are used to evaluate diagnostic and treatment practices; assess quality of patient care and hospital programmes and track outcomes.

This study is done on hospital-based cancer registry at National cancer and research institute at mohakhali. A structured questionnaire was developed through different

stages of cross check and analysis following the registry form made by NICRH (National Institute of Cancer Research and Hospital) that was used to collect and analyze data from patient's hospital record. Collecting data in this study was retrospective process and in this survey collected data for both male and female patients and their information was analyzed from January 2009 to December 2009 from the hospital registry files, total 250 both male and female patients were registered at the oncology department of NICRH and among them male patients were 185 male and 62 were female patients. The data was collected from March 2014 to September 2014, from 9am to 3pm of every working day. The visited hospital (NICRH) is delivered chemotherapy and radiotherapy.

Study Protocol:

For both male and female cancer patients:

At first selected the hospital for study and applied for permission from the authorized body(Director or Chairman) of the oncology department of the hospital to conduct the research work.

Then selected the patients by discussing with my respected teacher and supervisor Dr.ChowdhuryFaiz Hossain and data were collected from them.

A structured questionnaire was developed through different stages of cross check and analysis following the registry form made by NICRH (National Institute of Cancer Research and Hospital) that was used to collect and analyze data from patient's hospital record.collected data for both male and female patients and their information was analyzed from January 2009 to December 2009 from the hospital registry files, total 250 both male and female patients were registered at the oncology department of NICRH and among them male patients were 185 male and 62 were female patients.

The data was collected from March 2014 to September 2014, from 9am to 3pm of every working day.

Then the data were analyzing using Microsoft Excel.

Data collection form:

Study of Epidemiology of Cancer in Bangladesh

M.   Pharm   Research   Project   Work

1	Name	
2	Hospital registration number	
3	Gender	
4	Date of birth	
5	Religion	
6	Marital status	
7	Address	
8	Occupation	
9	Income	
10	Habit	
11	Date of hospitalization	
12	Date of diagnosis	
13	Type of cancer	
14	Stage of cancer at the time of diagnosis	
15	Method of diagnosis	
16	Drug regime	
17	Radiotherapy	
18	Present status	
19	Treatment of duration	
20	Cost	
21	Miscellaneous	

Date   :

    Signature   :

Chapter: **03**

Results and discussion

The study is done on both male and female patients the data covered only one year that is 2009. Among 261 patients at the NICRHof the year 2009 the female patient number was 65 and male patient number was 196. The majority of patients were from outside of Dhaka and most of the patients included in the study were Muslim (95.12%) and married (96.95%). Most of the patients are coming from middle or lower class of families.

Cancer is mainly a disease of older people, with incidence rates increasing with age for most cancers. But in Bangladesh older people are so neglected that diagnosing and treatment of cancer for older people are not given importance. As a result most type of cancers are diagnosed at advanced age when the tumor cells already affects other parts of the body. The common thoughts used to be that it wasn't worth treating cancer in older patients, that they'd lived their lives, they might be dying anyway, they couldn't tolerate the treatment, the treatment might adversely affect their quality of life, or that they didn't want to live with the side-effects of treatment.

Often the cancer is the least of their problems-they have severe heart disease or other conditions that have to be managed, and the cancer impacts those problems as those problems impact the cancer. They all have to be managed these problems together. Early detection makes a modest contribution to cancer control and more generally to the health of the patients.

1. Percentage (%) of incidence of male cancer patients according to their age:

The compiled results of incidences of cancer in male patients according to their age are shown in Table 7. This incidence is observed from the diagnosing year of the cancer of the patient. It is clear from the Table 7 that 19.44% of cancers are diagnosed in male aged 35 to 54 and 18.33% cancers are diagnosed in the elderly aged 54to 74. Cancer is least prevalent in the geriatric patients (>84 years) which comprised only o.56%.

Table 7: Percentage (%) of incidence of male cancer patients according to their age:

GENDER	CRITERIA	TOTAL	%_OF_CANCER
Male	< 14	24	13.33
Male	15 to 24	7	3.89
Male	25 to 34	23	12.78
Male	35 to 44	35	19.44
Male	45 to 54	35	19.44
Male	55 to 64	33	18.33
Male	65 to 74	33	18.33
Male	75 to 84	5	2.78
Male	> 84	1	0.56

Ref: Data for this table are obtained from National Institute Of Cancer Research and Hospital of the year 2009

Figure 2: On the basis of diagnosis the incidence of male cancer patients at NICRH

Table 8: Percentage (%) of incidence of female cancer patients according to their age:

GENDER	CRITERIA	TOTAL	%_OF_CANCER
Female	< 14	4	6.25
Female	15 to 24	4	6.25
Female	25 to 34	9	14.06
Female	35 to 44	15	23.44
Female	45 to 54	21	32.81
Female	55 to 64	6	9.38
Female	65 to 74	6	9.38
Female	75 to 84	0	0
Female	> 84	0	0

Ref: Data for this table are obtained from National Institute Of Cancer Research and Hospital of the year 2009

From the table 8 we can see that 32.81% of cancers are diagnosed in female aged 45 to 54 and 23.44% are diagnosed in aged 35 to 44. Cancer is least prevalent in the pediatric patients (<14) and young patients (15 to 24) which comprised only 6.25%

Figure 3: On the basis of diagnosis the incidence of female cancer patients at NICRH, 2009.

2. The incidence of male and female cancer patients at NICRH, 2009 on the basis of diagnosis rate:

Figure 4. It clearly shows that the diagnosis age group of male cancer patients is highest in 65 to 74 year range than female cancer patients and female cancer patients is highest in 20 to 35 year range. so male cancerpatients is increased because of sedentary life style.

Table   9:

GENDER	TOTAL	% OF CANCER
Male	**180**	**73.77**
Female	**64**	**26.23**

Ref: Data for this table are obtained from National Institute Of Cancer Research and Hospital of the year 2009
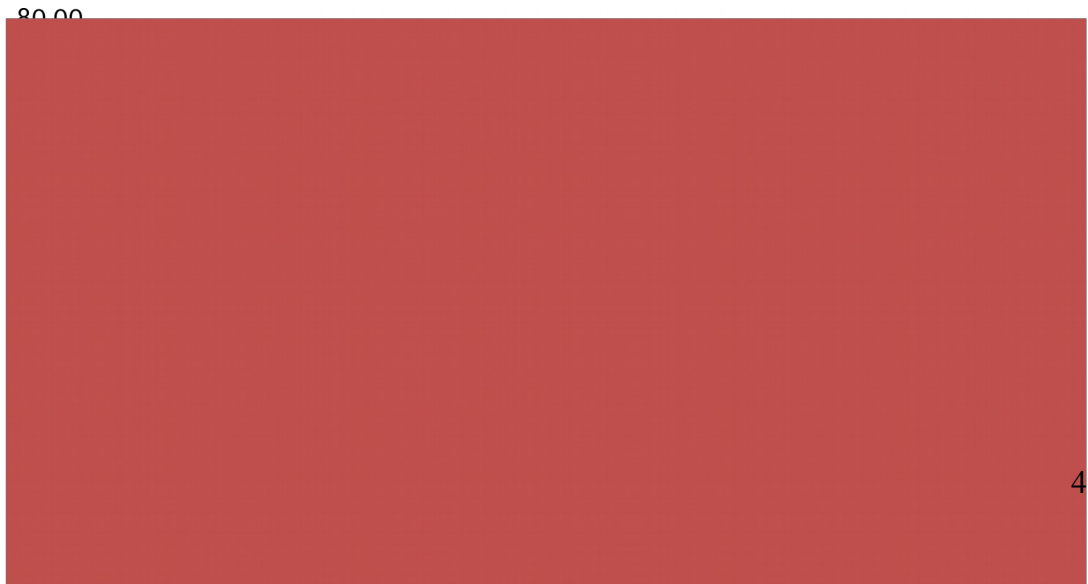
80.00

Figure 4: On the basis of diagnosis the incidence of male and female cancer patients at NICRH, 2009

2. Use of drug regime of male and female cancer patients at NICRH, 2009.

Figure 5. It clearly shows that operation is higher than drug regime. But gemcitabin, carboplatin, doxorubicin, cisplatin, 5 FU is randomly used of cancer patients at NICRH (8.20%).Holoxan and mesna is least prevalent.such as (0.81%)

Table 10:

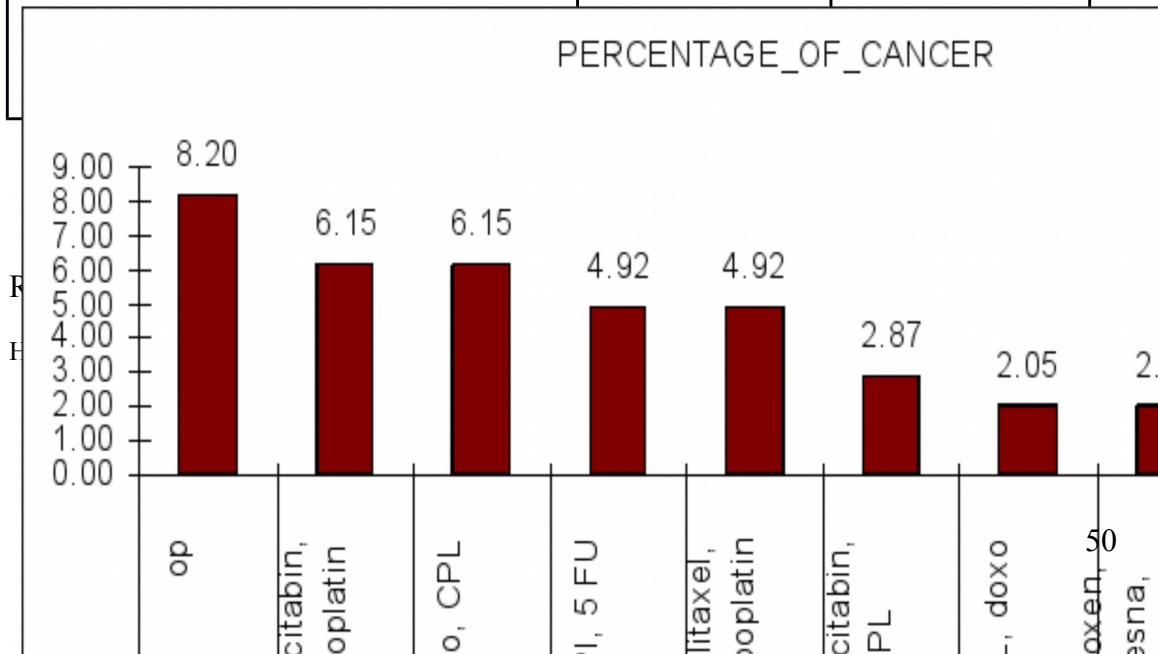| Drug Regime	TOTAL	%_OF_CANCER
Surgical intervention (OP)	**20**	**8.2**
Gemcitabin, carboplatin	**15**	**6.15**
doxo, CPL	**15**	**6.15**
CPl, 5 FU	**12**	**4.92**
paclitaxel, carboplatin	**12**	**4.92**
germicitabin, CPL	**7**	**2.87**

Figure 5: Onthe basis of drug regime of male and female cancer patients

at NICRH, 2009.

Figure 6. It clearly shows thatgencitabin, carboplatin is used in male cancer patients (7.78%). vincristine and cyclophosphamide is used less in male cancer patients (0.56%).Mesna is the drug which is Prevention of ifosfamide-induced hemorrhagic cystitis (syndrome of bleeding and irritation of the bladder). Prevention of high-dose cyclophosphamide-induced hemorrhagic cystitis.

Table: 11

Drug Regime	TOTAL	MALE_PERCENTAGE_OF_CANCER

Surgical intervention (OP)	**15**	**8.33**
Gemcitabine, carboplatin	**14**	**7.78**
doxo, CPL	**12**	**6.67**
CPl, 5 FU	**9**	**5.00**
paclitaxel, carboplatin	**7**	**3.89**
CPL, doxo	**5**	**2.78**
CPL,etoposide	**4**	**2.22**
Vincristine, cyclophosphamide	**1**	**0.56**

Ref: Data for this table are obtained from National Institute Of Cancer Research and

Hospital of the year 2009
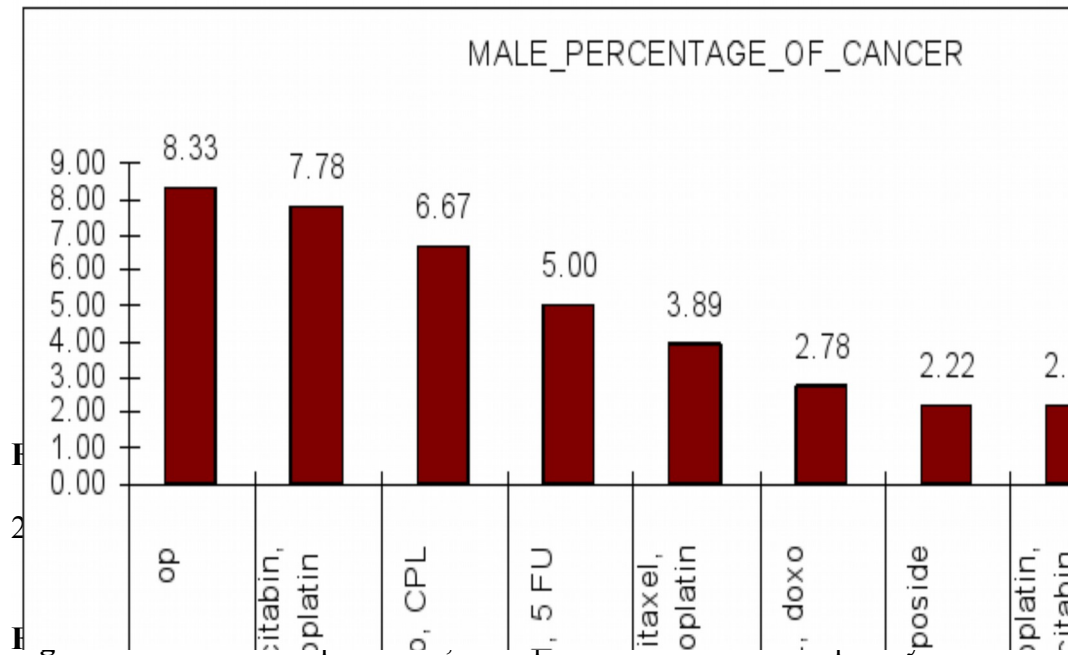
female cancer patients (7.81%). Cisplatin, 5 FU is used less (1.56%).

Table   **12:**

Drug Regime	TOTAL	FEMALE_DRUG_REGIME_ %OF_CANCER
Surgical intervention (OP)	5	7.81
paclitaxel, carboplatin	5	7.81
gemicitabin, CPL	4	6.25
CPl, 5 FU	3	4.69
doxo, CPL	3	4.69
bleomycin, etoposide	2	3.13
Paclitaxel, CPL, 5 FU	1	1.56

Ref: Data for this table are obtained from National Institute Of Cancer Research and
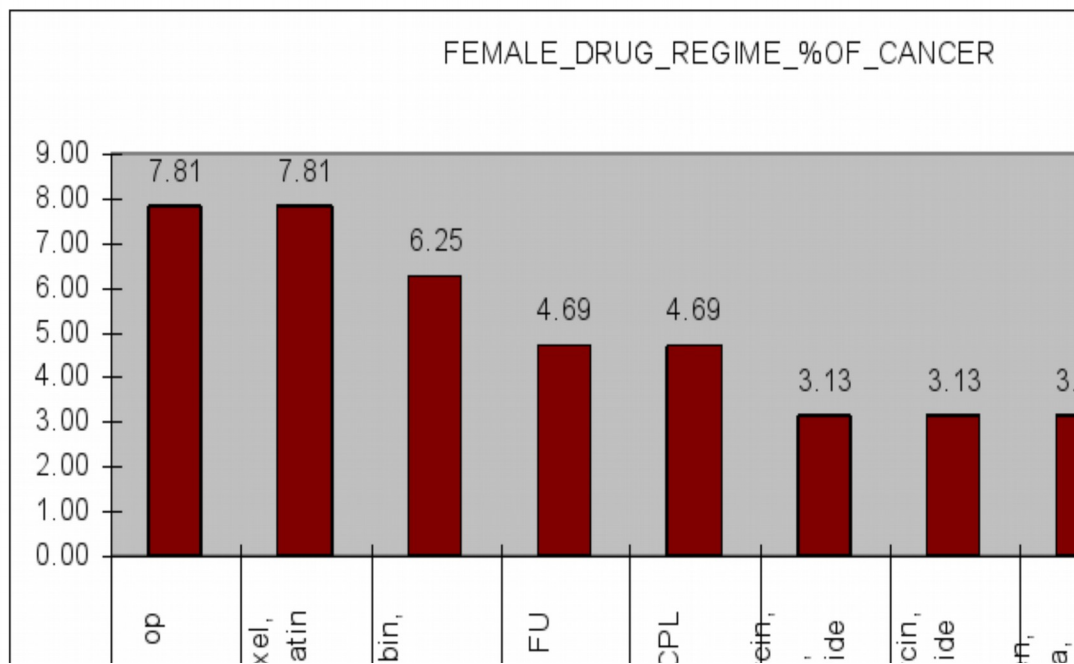
Hospital of the year 2009

Figure 7: On the basis of drug regime of female cancer patients at

NICRH, 2009.

3. Top ten leading sites of cancer of male and female cancer patients at NICRH of the year 2009.

We can get a clear concept about the top twelve malignancies of male and female

patients from figure 8, lung (rt lung) is the main leading sites of cancer (7.38%) of

male cancer patients and ovary, breast second leading sites of cancer of female cancer

patients (5.33%). Cervix and stomach is the third sites of cancer (3.69%). esophagus

and pancreas is the fourth leading cause (2.46%). and at last Ewing sarcoma is the last

leading cause of very young aged patients such as <14.

Table 13:

Site of cancer	Total	PERCENTAGE_OF_CANCER
Rt lung	**18**	**7.38**
Lung	**14**	**5.74**
Ovary	**13**	**5.33**
Breast	**11**	**4.51**
Cervix	**9**	**3.69**
Stomach	**9**	**3.69**
Testis	**7**	**2.87**
Esophagus	**6**	**2.46**
Pancreas	**6**	**2.46**
Ewing sarcoma	**5**	**2.05**

Ref: Data for this table are obtained from National Institute Of Cancer Research and
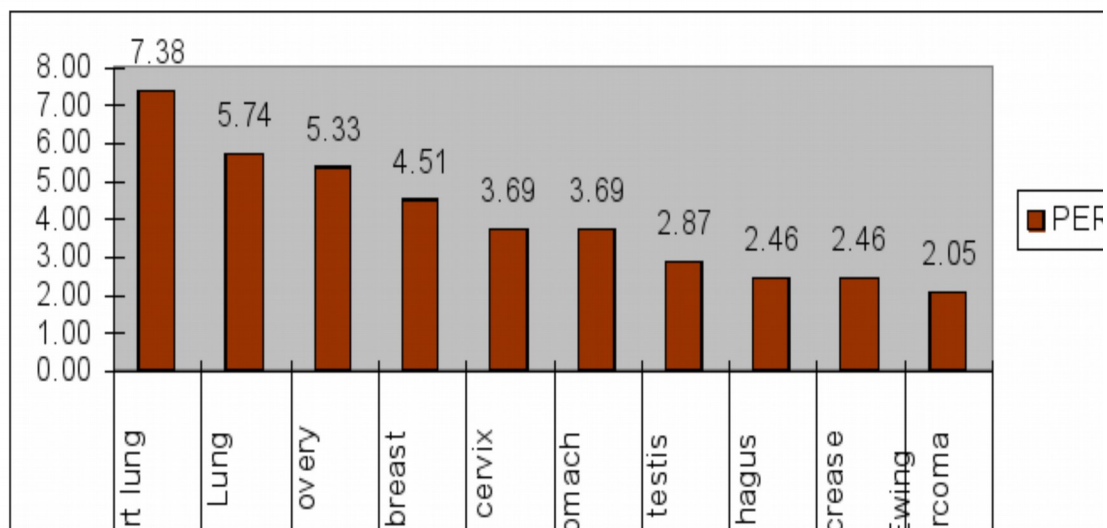
Hospital of the year 2009

Figure 8: On the basis of leading sites of cancer of male and female cancer patients at NICRH, 2009.

3. Top seven leading sites of cancer of male cancer patients at NICRH of the year 2009.

Figure 9. Itshows that Rt lung Cancer is the first leading cause of Cancer of male patients (10%). Stomach is second leading cause of Cancer (3.89%). and retinoblastoma is the least prevalent of Cancer (2.78%).

Table 14:

Site of cancer	Total	Male_%_of_CANCER
Rt lung	18	10
Lung	14	7.78
stomach	7	3.89
Testis	7	3.89
lt lung	5	2.78
esophagus	5	2.78
Retinoblastoma	5	2.78

Ref: Data for this table are obtained from National Institute Of Cancer Research and Hospital of the year 2009
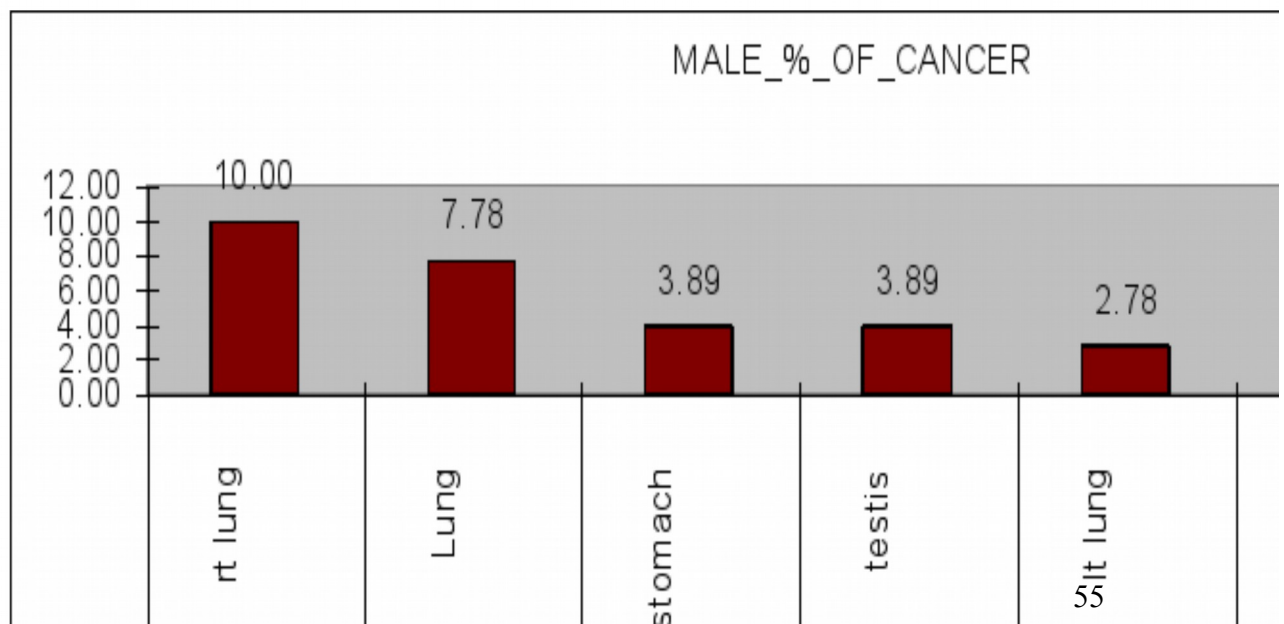
Figure 9: On the basis of leading sites of cancer of malecancer patients at

NICRH, 2009.

4. Top ten leading sites of cancer of female cancer patients at NICRH

of   the   year   2009.

Figure 10. It clearly shows that breast, ovarian patientsis higher in Bangladesh

(18.75%) based on NICRH data. Cervix is the second position of female cancer

patients (7.81%). Gallbladder, rectum is the third position (4.69%). Ewing sarcoma is

least in Bangladesh (1.56%).

Table 15:

Site of cancer	TOTAL	Female_%_of_CANCER
Breast	12	18.75
Ovary	12	18.75
Cervix	5	7.81
gall bladder	3	4.69
Rectum	3	4.69
Thyroid	3	4.69
Pancreas	2	3.13
Stomach	2	3.13
Ewing sarcoma	1	1.56

Ref: Data for this table are obtained from National Institute Of Cancer Research and

Hospital   of   the   year   2009

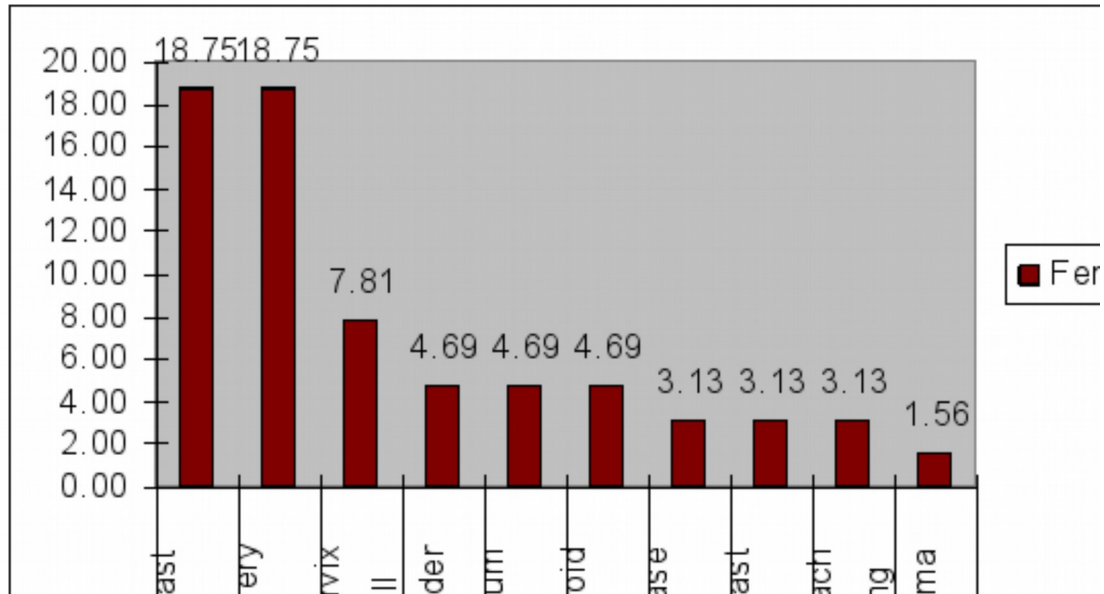**Figure 10:** Most common malignant neoplasm's of females in NICRH of

the   year   2009.

5. On the basis of site of cancer patients according to their age.

According to age, breast and ovarian patient is higher 35 to 54 year age of female

cancer patients (3.69%). Lung is the most prevalent of elderly male patients 55 to 64

year age (2.05%). But Rt lung patient is the least prevalent 65 to 74 year age

(1.64%).Retinoblastoma. Ewing sarcoma is higher in children aged 14 years or

younger were most commonly found (2.05%)

Table 16:

CRITERIA	Site of cancer	TOTAL	%_OF_CANCER
35 to 44	Breast	9	3.69
45 to 54	Ovary	8	3.28
55 to 64	Lung	5	2.05
< 14	retinoblasto	5	2.05

	ma		
45 to 54	rt lung	5	2.05
< 14	Ewing sarcoma	4	1.64
45 to 54	Cervix	4	1.64

Ref: Data for this table are obtained from National Institute Of Cancer Research and

Hospital of the year 2009

Figure 11: Most common malignant neoplasm's of females in NICRH of

the   year   2009

6. On the basis of male and femalecancer patients according to their

age.

Table   **17:**

CRITERIA	Male_%_OF_CANCER	Female_%_OF_CANCER
< 14	9.84	1.64
15 to 24	2.87	1.64
25 to 34	9.43	3.69
35 to 44	14.34	6.15
45 to 54	14.34	8.61
55 to 64	13.52	2.46
65 to 74	6.97	1.64
75 to 84	2.05	0.00
> 84	0.41	0.00

Ref: Data for this table are obtained from National Institute Of Cancer Research and
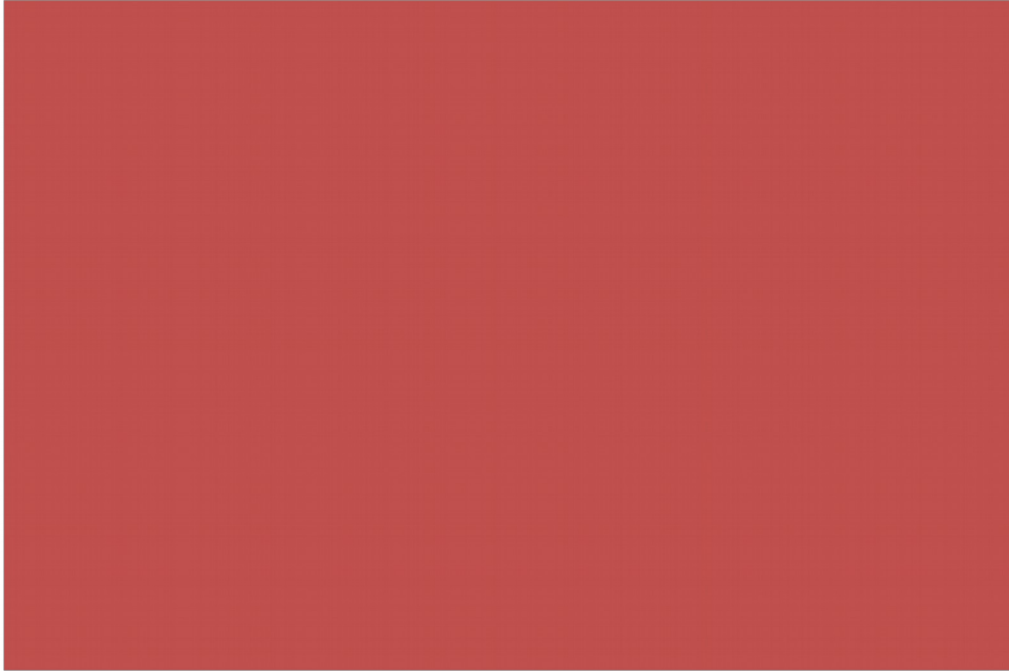
Hospital of the year 2009

Figure 12: Male and female criteria according to their age

CONCLUSION:

In my study, the study is done on both male and female patients the data covered only one year that is 2009. Among 261 patients at the NICRH of the year 2009 the female patient number was 65 and male patient number was 196. The majority of patients were from outside of Dhaka and most of the patients included in the study were Muslim (95.12%) and married (96.95%). Most of the patients are coming from middle or lower class of families. We can get a clear concept about the top twelve malignancies of male and female patients from figure 7, lung (rt lung) is the main leading sites of cancer (7.38%) of male cancer patients and ovary, breast second leading sites of cancer of female cancer patients (5.33%). Cervix and stomach is the third sites of cancer (3.69%). esophagus and pancreas is the fourth leading cause

(2.46%). and at last Ewing sarcoma is the last leading cause of very young aged patients such as <14. In this study, trying to focus on the scenario of incidence risk of both male and female cancer patients of the year 2009 through a hospital based survey of a particular hospital, National institute of cancer and research hospital. (NICRH)Surgical intervention (OP) is higher than drug regime. But gemcitabine, carboplatin, doxorubicin, cisplatin, 5 FU is randomly used of cancer patients at NICRH (8.20%). Holoxan and mesna is least prevalent. Such as (0.81%).According to age, breast and ovarian patient is higher 35 to 54 year age of female cancer patients (3.69%). Lung is the most prevalent of elderly male patients 55 to 64 year age (2.05%). But Rt lung patient is the least prevalent 65 to 74 year age (1.64%). Retinoblastoma, Ewing sarcoma is higher in children aged 14 years or younger were most commonly found (2.05%). Breast, Ovarian patients is higher in Bangladesh (18.75%) based on data. Cervix is the second position of female cancer patients (7.81%). Gallbladder, rectum is the third position (4.69%). Ewing sarcoma is least in Bangladesh (1.56%). The most interesting finding of this study from **Figure 6** clearly shows that gencitabin, carboplatin is used in male cancer patients (7.78%). Vincristine and Cyclophosphamide is used less in male cancer patients (0.56%). **Figure 7** shows that Paclitaxel, Carboplatin is used more frequently of female cancer patients (7.81%). Cisplatin, 5 FU is used less (1.56%). Drugs used in Chemotherapy, such as gemcitabine and paclitaxel albumin-stabilized nanoparticle formulation, work in different ways to stop the growth of tumor cells, either by killing the cells, by stopping them from dividing or by stopping them from spreading. pregnancy-associated malignancies, second only to cervical cancer.Notably, many have offered that this incidence will only increase as more women delay childbearing until later in life . This concern is based onthe fact that pregnancy-associated breast cancer is age-

related, and women. who have their first term pregnancy after the age of 30 years have a two tothree times higher risk of developing breast carcinoma than women whohave their first pregnancy before the age of 20 years. Presently, most studies support a mean age at diagnosis of 32 to 34 years.**(Newman, L.A. &Mamounas, E.P. (2007)** Prostate cancer (PC) is the second most incident cancer and the sixth cause of death by cancer in men worldwide. Despite extensive research efforts, no modifiable risk factors have been consistently identified for PC risk. A number of studies have focused on possible relationships between sexually transmitted infections (STIs) and PC. We performed a meta-analysis to explore the association between infection caused by Neisseria gonorrheae, Treponema pallidum, Chlamydia trachomatis, Trichomonasvaginalis, Ureaplasmaurealyticum, Mycoplasma hominis, Herpes Simplex Virus types 1 and 2, Human Herpes Virus 8 and Cytomegalovirus, and PC. We included 47 studies published between 1971 and 2011. Men who reported having ever had any STI in lifetime had an increased. We found a significantly increased PC risk in men having had gonorrhoea (SRR 1.20, 95% CI 1.05−1.37). No other single STI was significantly associated with PC. Due to high incidence of both STIs and PC worldwide, prevention of STIs may help preventing a considerable number of PC cases.**(Caini, S., Gandini, S., et al. 2014)**

CHAPTER: 4

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