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Environmental Risk Factors Associated with Breast Cancer-Gaza Governorates

Submitted by

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قال رسول الله صلى الله عليه و سلم:

"إذا عمل أحدكم عملاً فليتقنه"

صدق رسول الله صلى الله عليه و سلم

Dedication

I dedicate this study..

To the soul of martyrs, who sacrificed their lives for us to reach some dreams and rights.

To the Palestinian women who suffered and still suffering from breast cancer.

To my parents, my brothers and sisters.

To my son Baraa, and my wife Nihal, for her endless support during this study and for her great effort during data collection.

Asad Said M. Ashour

Date:

Declaration

I certify that this thesis submitted for the degree of master is the result of my own research, except where otherwise acknowledged, and that this thesis or any of its parts has not been submitted for higher degree to any other university or institution.

Signed

Asad Said M. Ashour

Date: / /2011

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List of Abbreviations

ACS	American Cancer Society
AICR	American Institution for Cancer Research
ATSDR	Agency for Toxic Substances and Disease Registry
BCF	Breast Cancer Fund
CDC	Centers for Disease Control and Prevention
EDCs	Endocrine Disruptors Chemicals
EGH	European Gaza Hospital
EHIB	Environmental Health Investigation Branch
IARC	International Agency for Research on Cancer
MEnA	Ministry of Environmental Affairs
MOH	Ministry of Health
NCI	National Cancer Institute
NPIC	National Pesticide Information Center
NRDC	National Resources Defense Council
OC	Oral Contraceptive
PCBS	Palestinian Central Bureau of Statistics
PHC	Primary Health Care
PNA	Palestinian National Authority
UNRWA	United Nation Relief and Works Agency
US-EPA	United States-Environmental Protection Agency
US-FDA	United States-Food and Drug Administration
WCRF	World Cancer Research Fund
WHO	World Health Organization

Abstract

The study aimed to identify possible environmental risk factors for breast cancer among women in Gaza Strip and conducted in 2010. A case- control study design was used with face to face interviews by structured questionnaire with breast cancer patient women as well as healthy women. Statistical Package of Social Science (SPSS) was used to analyze the collected data. The study population was 288 women, 144 were women with breast cancer (cases) and 144 were healthy women (controls) with response rate 100% for cases as well as controls. The study was carried out in the two main hospitals in Gaza Strip (El-Shifa & EG) and on cases who had a regular follow up in each hospital from August to December 2010, while controls have been chosen from women who had no history of breast cancer by mammogram or by self examination. In this study the main statistically significant risk factors were; marital status, educational status, physical trauma on breast, medication for infertility treatment, eating red meat 500g or more weekly, eating canned food, eating chicken skin, eating raw and cooked vegetables, using oils with saturated fats in cooking, living beside solid waste disposal sites, exposing to source of pollution during work such as fertilizers, pesticides, and dusts, living in or beside a farm, dealing with crops with naked hands, working in a farm during pesticides application or during 24 hours of pesticides application, cleaning pesticides' equipments, living with people working in a farm or a agricultural field, and application of pesticides personally. In contrary, no statistically significant differences were found between cases and controls in relation to area of residency, exposure to X-ray in the past, having radiation therapy, getting contraceptive pills, using hair dyes, using antideoderant underarm, using facial cosmetics, using hair removal ointment, smoking, washing vegetables and fruits, living near factory, living near waste incinerators, exposing to toxic gases and tires fire, occupation for more than six months, buying and transporting pesticides, and wearing protective tools during pesticides mixing and application.

The study recommended early screening for breast cancer detection, implement more health education or health awareness targeting women projects, avoiding dealing with pesticides without protective measurements, avoiding working in a farm while pesticides applied or during 24 hours of pesticides application, and avoiding as possible red meat eating more than 500g weekly.

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Chapter1: Introduction

This chapter aims to illustrate the study's background, which include the research background, problem statement, and the study objectives. Moreover, this chapter presents the context of the study.

1.1 Background

Breast cancer is the most prevalent cancer in females worldwide and still the most common cause of death in women, with more than 327,000 deaths each year, every year there are 1.35 million new cases and about 4.4 million women are believed to be living with breast cancer, an estimated 1.7 million women will be diagnosed with breast cancer in 2020 – a 26% increase from current levels – mostly in the developing world (The Lancet, 2009). The reported incidence rate for breast cancer varies enormously between countries, it was highest in USA, Europe, New Zealand, Canada and Australia, and lowest in Asia and Africa (IARC, 2002). Breast cancer remains one of the most common cancer in the Eastern Mediterranean region like the whole world, with incidence rate not higher than the developed world, however it affects women in younger ages and is detected at a late stages. Breast cancer still impact the developing low and middle income countries more than the high income countries (Sarhan, 2009). Now breast cancer occupies the number one position in all countries of the Arab World, even if absolute rates are relatively low (Salim et al., 2009). Cases tend to be young and almost half of patients are below 50, with a median age of 49-52 years as compared to 63 in industrialized nation (Elsughier et al., 2007).

In Palestine, according to cancer registry center (CRC), the total reported new cases of cancer were 1,623 (72% in West Bank and 28% in Gaza Strip) with incidence rate of 43.1 per 100,000 population. Distribution by sex showed that incidence rate for male was 37.7 per 100,000 and incidence rate among female was 48.3 per 100,000. Breast cancer occupied the first type of cancer among population, it represented 17.3% of total cancer morbidity, and 31.4% of female cancer, the reported incidence rate per 100,000 population was 7.5 in general population. Additionally, breast cancer is the first leading cause of cancer death in Palestinian females, it constituted 21.1% of female mortality with a mortality rate of 5.2 per 100,000 females (MOH, 2005). In Gaza Strip, according to the published data in 2002, breast cancer is the most common cancer among women from

1990-1999, and ranked as number one of all types of cancer in women, with incidence rate of 19.3 per 100,000 population. It was accounted about 32.3% among female cancer and 16.7% of cancer morbidity among the total population, more than one third of the women ages with breast cancer were less than 44 years (Safi, 2002).

There are several factors, both endogenous and exogenous, which are known to affect the risk of breast cancer in the population such as lifestyle, hormonal status, anthropometric characteristics, radiation and genetic predisposition (Key et al., 2001). Some reviewers have linked the increasing in incidence of breast cancer to synthetic chemicals, noting that the increasing incidence of breast cancer has paralleled the proliferation of synthetic chemical since World War II (Gray, 2010). It has been estimated that more than 80% of breast cancer are associated with environmental factors that include exposure to contaminants, lifestyle, and diet (Charlier and Dejardin, 2007). There is considerable international concern that some of the 70,000 synthetic chemicals in our environment today me be directly linked to a large percentage of breast cancer cases, but there are no epidemiological studies to determine this (Watts, 2007). However, there are no previous studies in Gaza Strip related to the effect of environmental risk factors on breast cancer among females; therefore this study aims to identify the most common environmental risk factors associated with breast cancer among women in the Gaza Strip.

1.2 Problem statement

Globally, the incidence rate of breast cancer varies greatly, breast cancer comprises about 16% of all female cancers, and it is thought to be a disease of the developed worlds (WHO, 2004). In Gaza Strip, breast cancer was the most common cancer among women from 1990-1999 with an incidence rate of 19.3 per 100,000 population. It was constituted about 16.7% of cancer morbidity among total population, and 32.3% among females, more than one third of the women ages with breast cancer were less than 44 years (Safi, 2002). Females in Palestine constitute half of the population (50.7% male, 49.3% female) (PCBS, 2007). This means that any hazardous agent affects women, mostly will impact the half of the population, also women in Palestinian society play a crucial role in the socialization process, so it is very important to put hand in hand to fight against these hazards like breast cancer in order to get a very healthy present and future generation.

Additionally, little is known about the relationship between environment and female's breast cancer in Gaza Strip, so this study tries to highlight the environmental risk factors associated with breast cancer among women in order to encourage the decision and policy makers to take into account woman's health into their agenda in away to help them in improving their lives.

1.3 Objectives of the study

The general objective of this study is to identify possible environmental risk factors for breast cancer among women in Gaza Strip.

1.3.1. Specific objectives:

- To identify the relationship between the physical environmental risk factors and female breast cancer in Gaza Strip.
- To investigate the association between chemical risk factors in the environment and breast cancer.
- To suggest recommendations to the policy and decision makers and professionals for the adoption of creative methods to control the disease among women.

1.4 Research questions

1. What is the relationship between physical risk factors in the environment and breast cancer?
2. Is there any association between chemical risk factors in the environment and breast cancer?
3. Is there any statistically significant relation between risk factors in the environment and breast cancer?
4. What are the adequate suggestions needed to encourage decision makers and professionals to adopt creative methods to control the disease?

1.5 Geographical distribution

Geographically, Palestine includes two separated areas: the West Bank and Gaza Strip, West Bank constitutes an area of 5,655 Km^2 west to the Jordanian river, Gaza Strip is one of the most densely populated area in the world with an area of 365 Km^2. The population in Gaza Strip are concentrated mainly in cities, small village and eight refugee camps which contain two third of the population, however in West Bank more than 60% of the population lives in approximately 400 villages and rural refugee camps. Gaza Strip remains one of the most weak economic situation compared with the neighboring areas which adversely affect the public health (PCBS, 2007).

1.5.1. Age and sex distribution:

According to the annual report of Ministry of Health (2007), 45.7% of population is under 15 years, 48.8% in Gaza Strip and 43.9% in West Bank. The age group under five years old still the largest age group in Palestine which constitutes 17.3% of the whole Palestine population, 19.0% in Gaza Strip and 16.2% in West Bank. The age 60 years and over constitute 4.4% of the population (4.4% in Gaza Strip and 4.8% in West Bank), which means that Palestine population is still a society of young people. In age group of 50-54 years and above there is a clear change in the gender predominance, in which females more predominant than males, females constitute 49.3% of the total population, 22.3% of females are under 15 years, and 22.4% are between 15-49 years old, means that, one fourth of Palestinian females are in reproductive age (MOH, 2007).

1.5.2. Population growth:

The total population of Palestine is 3,767,126 (1,416,543 in Gaza Strip and 2,350,583 in West Bank, the male/female sex ratio totaled 103 per 100 females, in Palestine the natural increase rate is 3.3% (3.8% in Gaza Strip and 3% in West Bank) (PCBS, 2007).

1.5.3. Crude birth rate and total fertility rate:

The crude birth rate per 1000 population in Palestine is 34 in Gaza Strip and 24.7 in West Bank (MOH, 2007). The total fertility rate in Palestine is very high compared to those dominant in other countries, data reported from PCBS indicated that 5.4 in Gaza Strip and 4.2 in West Bank (PCBS, 2007).

1.5.4. Life expectancy and mortality:

The average life expectancy among Palestinian males is 71.8 but among Palestinian females is 73.3 (PCBS, 2007). The ten leading cause of death were (in rank order), heart disease (20.8%), cerebrovascular disease (12.2%), malignant neoplasm (10.3%), condition in the perinatal period (7.8%), pneumonia and other respiratory disorders (6.1%), hypertension (5.6%), senility (4.5%), renal failure (3.8%), diabetes mellitus (3.7%), and transport accident (1.4%), these disease are responsible for 79.1% of the total death in Palestine according to the findings of MOH in 2007.

1.6 Health care system

1.6.1. Primary health care (PHC) centers:

In Palestine there are 665 centers of PHC (532 PHC centers in West Bank and 133 in Gaza Strip), out of which 356 of PHC centers are belonging to Ministry of Health, which constitutes 53.5% of the total PHC centers in Palestine. In Gaza Strip the governmental PHC centers provide many of health care services, 18 centers provide family planning, 55 centers provide specialized services, 12 centers have x-ray units, 23 centers are oral clinic, and also 33 centers have laboratories. In West Bank, 94 centers provide family planning services, 117 centers provide specialized services, 24 centers are oral clinics, 99 centers have laboratories, and however, there are no X-Ray units in all the West Bank PHC centers (MOH, 2007).

1.6.2. Hospitals:

In Palestine, there are 77 hospitals with 4,824 hospitalization beds, the ratio of population per hospital is 47,241 and the average bed capacity per hospital is 62.65 beds. In Gaza Strip, there are 22 hospitals of (28.57%) with ratio of population per hospital 60,783 and 76.9 beds as the average bed capacity per hospital, but in West Bank, there are 55 hospitals (71.43%) with ratio of population per hospital 41,824 and 51.55 beds as the average bed capacity per hospital. MOH owns and operates 22 hospitals (10 in Gaza Strip and 12 in West Bank) with 2,735 hospitalization beds (1,491 in Gaza Strip and 1,244 in West Bank). The Ministry of Health hospitals are distributed as 17 general hospitals, 2 psychiatric hospitals, one ophthalmic hospital, and two pediatric hospitals (MOH, 2007).

1.6.2.1. Al-Shifa hospital:

Al-Shifa hospital is the biggest hospital in Gaza Strip, which contains different departments and units. It is the first hospital to receive patients and critical cases, especially during emergency situations. It was established on 1946 on an area of 45,000 m^2, the hospital contains 540 hospitalization beds distributed in different sections, such as burn unit, intensive care unit, internal medicine, neonatal department, and obstetric/gynecology (MOH, 2009). The bed occupancy rate reached 77.4% and the average duration of stay was 2.8 days in general (PCBS, 2007).

1.6.2.2. The European-Gaza hospital (EGH):

The EGH is located in KhanYunis governorate at the Southern area of Gaza Strip. The hospital was built in 1993 and started to provide services on July 2000 to Southern area in particular and the Gaza Strip in general. The EGH provide services to 500.000 catchment populations which make it as one of the biggest health investments in the area, it was conceived by UNRWA and funded by European countries to be a center of excellence providing much need secondary plus care services to the Southern area of Gaza Strip, and played a very important role in health services development process through introducing new systems such as; appointment systems and computerizes networking system (MOH, 2009). An average of 13,231 patients per year were admitted to different hospital units, in general, the bed occupancy rate in the hospital during 2007 was 87.6% and the average duration of stay was 3.8 days (PCBS, 2007).

1.7 Cancer Registry Center in Gaza Strip

Palestinian people lived in transitional epidemiological period where health services will not be able to meet the challenges of non communicable diseases without a detailed precise knowledge of the prevalence, incidence and severity of these diseases. In Palestine no or weak national data are available on the over all incidence and prevalence of CVD, DM, and accidents, which lead to inability to estimate the direct and indirect cost, resources required, policy and decision making regarding prevention and treatment. This is not the case in malignant disease, so in 1998 Cancer Registry Center was established in corporation between Ministry of Health and Middle East Cancer Consortium (MECC) in both Gaza Strip and West Bank which play important role in reporting and classifying the malignant diseases. The main sources of data collection are; Governmental hospitals,

histopathological laboratories, private radiology centers and UNRWA, referral office for treatment abroad, and death certificates (El-Sakka, 2006).

1.8 Environmental status in Gaza strip:

Gaza Strip is a semi-arid region of roughly 365 square kilometers which lies on the Mediterranean Sea. The main source of water in Gaza Strip is the underground water in the coastal aquifer. The groundwater is used for domestic, as well as for agricultural irrigation, and industrial purposes. A "Catastrophic" water shortage, water pollution with high salinity and micro-pollutants, lack of sewage and solid waste treatment, marine pollution, overcrowding, poverty and uncontrolled use of pesticides are the most pressing environmental problems in Gaza Strip. Internationally suspended, banned and canceled pesticides which are considered mutagenic and carcinogenic are still used in the agricultural environment. Therefore the environment in Gaza Strip requires a more thoughtful and comprehensive policy and planning of awareness and conservation (Safi, 1993; Safi et al., 1998; Shomar et al., 2006).

Gaza Strip as one of the most densely populated areas in the world, has limited and declining resources and has already started to experience deterioration of environmental quality. One of these problems is waste water pollution, by which high percentage of it generated in Gaza Strip and currently discharged without adequate treatment into the sea (50,000 cubic meters per day). Only 40% of the sewage generated is properly treated. Another environmental problem that Gaza Strip suffered is pesticides, in which more than 900 metric tons of formulated pesticides are used annually. Some of these pesticides are restricted, cancelled, or banned in the most of the developing countries, but they still enter the Gaza Strip and widely used (Safi, 2002). Fertilizers also constituted as a public health problem especially in Gaza Strip where more than 10,000 tons of organic fertilizers are used annually. They can reach the coastal and marine environment and make public health problems (MEnA,2001).

The improper industrial practices and the industry may impose a real threat to the environment in the future, these polluting industries include the textile, dyeing, jeans washing factories, and painting and most of these industries are located in the area that has the best fresh groundwater. Most of the factories discharge their waste water without adequate treatment to the municipal sewerage system (MEnA, 2001).

Chapter 2: Literature review

In this chapter, the researcher provides the conceptual framework and identifies the main concepts and variables related to the study.

2.1 Conceptual framework

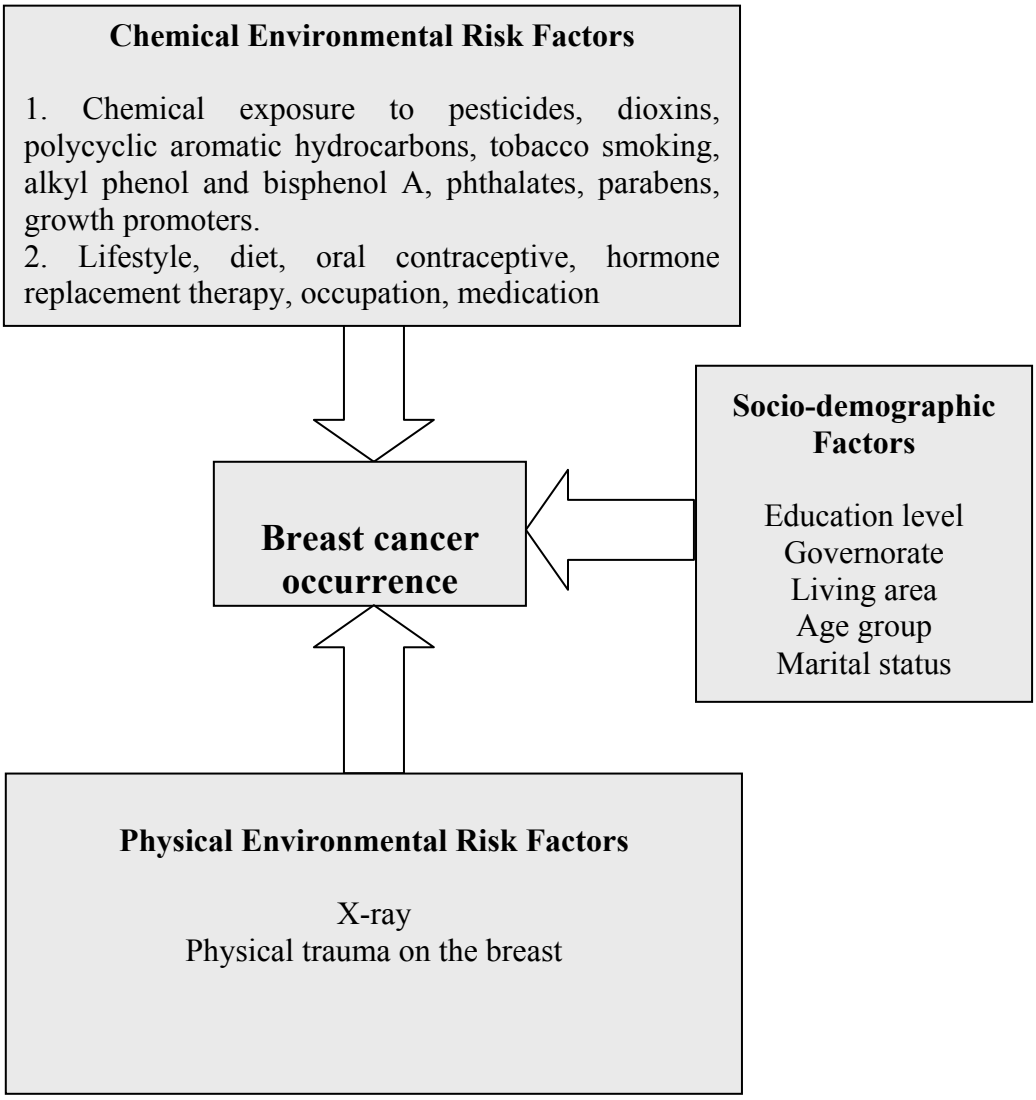

Figure 2.1: Conceptual framework of the study "self developed"

As shown in figure 2.1, the conceptual framework, the study highlights two environmental risk factors; chemical and physical, and more focusing and concentration on chemical environmental risk factors. In physical environmental risk factors the study focus on X-rays and physical trauma as the most important factors that might be have a clear impact on breast cancer as shown in the literature review.

In chemical environmental risk factors the study focus on several factors that expected to be correlated to breast cancer disease such as chemical exposure, diet, lifestyle, occupation, smoking, and pesticides. During this study the researcher used some factors indirectly to highlight the impacts of some chemicals on breast cancer disease used during women life activities.

2.2 Female breast

The breast is consisting of fatty tissues that contain the glands responsible for milk production in late pregnancy and after childbirth. Each breast has 15-29 lobes; each one is made up of many smaller structures called lobules that are arranged around ducts, which carry milk toward the dark area of skin in the center of the breast (areola), they joined together into larger ducts ending at the nipple, where milk becomes available to the infant (Slowik, 2009). Lymph is drained from the breast tissue by a rich supply of vessels; these lymphatic vessels are connected with a network of lymph nods which located around the breast's edges. These lymph nods play a central role in the spread of breast cancer like axillary lymph nodes which are among the first places where cancer will be found if it spreads from the breast (Slowik, 2009).

2.3 Types of breast cancer

According to Stephan in 2009, breast cancer is divided into five types:

- Ductal carcinoma: starts in the cells which line the breast's duct, beneath the nipples and areola. About 90% of all breast cancer is ductal. If the cancer is ductal carcinoma in situ, it is well contained, not invasive, and can be treated successfully.
- Lobular carcinoma: begins in the lobes, or glands which produce milk in the breast. These lobes are located deeper inside the breast. Under the duct. About 8% of breast cancer is lobular. If the cancer is lobular carcinoma in situ it is limited within the lobe and has not spread.
- Invasive (Infiltrating) breast cancer: here the tumor has the potential to spread out of the original tumor site and invade other parts of breast and body.

- Inflammatory breast cancer: it is the least common, but most aggressive of breast cancer, taking the form of sheets or nests, instead of lumps. It can start in the soft tissue of the breast, just under the skin, or it can appear in the skin.
- Paget's disease of the nipple areola: often looks like a skin rash, or rough skin. It resembles eczema.

2.4 Stages of breast cancer

National Cancer Institute in 2009 defined staging as the process where breast cancer spread within or to other parts of the body.

- Early breast cancer

- Stage 0: Carcinoma in situ or disease that has not invaded the basement membrane.
- Stage I: Small primary tumor without lymph node involvement.
- Stage II: Involvement of regional lymph nodes.

- Locally advanced breast cancer

- Stage III: Usually a large tumor with extensive nodal involvement in which node or tumor is fixed to the chest wall; also includes inflammatory breast cancer, which is rapidly progressive.

- Advanced or metastatic breast cancer

- Stage IV: Metastases in organs distant from the primary tumor.

2.5 Environmental risk factors of breast cancer

Actually, the researcher intends to highlight the main risk factors presented in the environment depending on its definition by the International Summit on Breast Cancer and Environment in 2002.

Environment definition

> "The living and working conditions as well as physical, biological, social and cultural responses to these condition and environmental exposure that involve activities which subject people to agents that they, as individuals, cannot control, such as pesticides, dioxins, passive tobacco smoke, and other chemicals and ionizing radiation. Some of these agents may present in air, food, water, and soil. Environmental exposure can occur at home, at school, in the work place, in the health care facilities and other setting at daily life" (International Summit on Breast Cancer and Environment, 2002).

Risk factor: Is anything affecting chance of getting a disease, risk factors don't tell us every thing. Having a risk factor or more, doesn't mean that you will get the disease. Most women who have one or more risk factors never develop the disease, while many women with breast cancer have no apparent risk factors. There are different types of risk factors, like reproductive risk factors, age or race that cannot be changed; others are linked to cancer-causing factors in the environment (American Cancer Society, 2009a).

2.5.1. Physical environmental risk factors:

Radiation: Refers to the description of any process, in which energy is emitted by one body and travels through a medium or through space to be absorbed by another body (Wikipedia, 2010). Among the many sources of ionizing radiation, X-rays, and gamma rays are the only forms of radiation that have ability to penetrate and damage body tissue below the surface of the skin (Gray, 2008).

X-Rays: Are a form of electromagnetic radiation with wavelength that range from 10^{-7} to about 10^{-15}meter, these wavelengths are much shorter than visible light (wavelengths of visible light range from about $3.5_{\times}10^{-9}$meter to $7.5_{\times}10^{-9}$meter). They also able to penetrate substantial thickness of matter, and can ionize matter. Since their discovery in 1895, X-rays have become an extremely important tool in physical and biological sciences and the field of medicine and engineering (Science Clarified, 2010).

Medical applications of X-rays

The earliest uses of X-rays were to distinguish bone and teeth from flesh in X-ray photographs, so when an X-ray beam focused on a person's hand or jaw, the beam passes through flesh rather easily but is absorbed by bones or teeth. The picture produced in this case consists of light areas that represent bone and teeth and dark areas that represent flesh, some of these applications in medicine are the diagnosis of broken bones and torn a ligaments, the detection of breast cancer in women, or the discovery of cavities, and can be used to kill cells, which is done in some types of cancer therapy. Unfortunately, too much exposure of normal cells to X-rays can cause the development of cancer, so great care must be taken by physicians and dentists when taking X-rays of any type to be sure that the exposure to the rest of the patients body is kept at an absolute minimum. A relatively new technique for using X-rays in the field of medicine is called computerized axial tomography, producing what is called CAT scans, which produces a cross-sectional picture of a part of the body that is much sharper than a normal X-ray (Science Clarified, 2010).

In 2005, the National Toxicology Program classified X-radiation and gamma radiation as known human carcinogens. Many published studies found that, people who are exposed to sufficient large doses of ionizing radiation can get breast cancer disease. Cornell University on its website (2005) published much information about the characteristics of radiation-induced breast cancer such as; young women are more susceptible than older, about 5-10 years after exposure to radiation breast cancer would develop, and dose of radiation plays crucial role in inducing breast cancer.

In a cohort study of 1,600 women with high risk BRCA1 and 2 gene mutation, recognized as increasing the risk of both ovarian and breast cancer, it was found that having a chest X-ray could double or even triple the risk that increased in carrier women aged 40 years and younger and in women whose exposed only before the age of 20 years (Nadine et al., 2006). A published study concerned in evaluation of the effect of low-dose radiation from medical procedures on risk of breast cancer overall and by joint estrogen and progesterone receptor (ER/PR) status in 1,742 population- based case patients aged 20-49 years found an elevated breast cancer risk among women who reported having had multiple chest X-ray or 7 or more mammograms. Risk was also increased among women received dental X-rays without lead apron protection before age 20 years. Also women who had their first exposure to these medical radiation procedure during childhood, had greater increase in risk than those who were first exposed at older ages (Hill et al., 2007).

In Gaza strip, there is an excessive use of X-ray in all health sectors without proper control and monitoring; anybody in Palestinian society can get the permission to have X-ray easily. Therefore the researcher think that it is very important to take this expected risk factor into account and to highlight if it might be one of the main risk factors associated with breast cancer risk in Gaza Strip.

Breast physical trauma: Physical damage to a breast. After the breast injured by trauma**,** tiny blood vessels may rupture to cause localized bleeding (a hematoma). The hematoma can be felt as a lump, moreover; trauma to the breast can damage the fat cells in the breast tissue, a condition called fat necrosis which can form a lump in the breast (Medicine Net, 2011).

A case-control study with 67 cases and 134 controls took place at the North Lancashire Breast Screening Service. The study closely matched the two groups (cases and controls)

on known risk factors for breast cancer including age, family history, age at menarche, parity, age at first birth and menopausal status. The study found that there were no significant differences in a wide range of other lifestyle indicators including factors relevant to social class, education, residence, smoking and alcohol consumption, but the researcher conclude that the models of epithelial cell generation indicate that a causal link between physical trauma and breast cancer is plausible, and the most likely explanation of the finding is that physical trauma can cause breast cancer (Rigby et al., 2002).

2.5.2. Chemical environmental risk factors:

2.5.2.1. Pesticides:

Pesticides are chemical compounds that are used to kill pests, including insects, rodents, fungi and unwanted plants, they also used in public health to kill vectors of disease, such as mosquitoes, and in agriculture, to kill pests that damage crops (WHO, 2010a). They also defined as any substance or mixture of substances that are used for preventing, destroying, repelling, or mitigating any pests, also it refers to insecticides, herbicides, fungicides, and various other substances used to control pests (US-EPA, 2010). The physical and chemical properties of the pesticides determine how likely it is to travel through soil (soil mobility), how well it dissolved in water (water solubility), and how likely it is to become airborne (volatility), once a pesticide has been released into the environment, it can be broken down by exposure to sunlight (photolysis), exposure to water (hydrolysis), exposure to other chemicals (oxidation and reduction), by microbial activity, and by plants or animal metabolism (NPIC, 2010).

Exposure to pesticides may be correlated with both acute and chronic health affects, depending upon the type of pesticide and the amount of exposure. Signs of acute poisoning may include diarrhea, pinpoint pupils, rashes, nausea and vomiting but the signs of chronic exposure to some types of pesticides may aggravate asthma symptoms; other types may increase the risk for certain types of cancer and cause damage to the genetic and immune systems (EHIB, 2010).

Types of pesticides

According to the US-EPA (2010) pesticides could be divided due to the common source they derived from as follow:

Organophosphate and carbamate pesticides: the term organophosphate is often refer to a group of insecticides that has any organic phosphorus (V)-containing compound,

especially when dealing with neurotoxic compound (Wikipedia, 2010). Most of these pesticides are insecticides; this group of pesticides affects the nervous system by disrupting acetylcholinesterase (irreversible inhibition)**,** carbamate also affect the nervous system by disrupting acetylcholinesterase (reversible inhibition). Many reviewers indicated that**,** the effects of organophosphate or carbamate on breast cancer risk are less than the effects of organochlorine because of their short period persistence in the environment, but do frequently contaminate food as residues. Some authors report no oestrogenic activity (Chen et al., 2002); others do report positive oestrogenic activity (Anderson et al., 2002). Malathion as one of these types which used widespread in agriculture, vector control, household application and personal health treatment did not found to be as a carcinogenic by many cancer's institutions but some studies have found malathion and its metabolite malaoxon to be genotoxic in human cells (Giri et al., 2002). It has been found to cause mammary tumors in rats (Cabello et al., 2001).

It is important to note that many organophosphate or carbamate did not found to be a carcinogenic to humans but accordingly they might be, so its very important to taken into consideration during the study.

Organochlorine insecticides: they are one of the older class of pesticides that were introduced in the 1940s, and many of their uses have been cancelled or restricted by the US-EPA because of their environmental persistence and potential adverse effects on wildlife and human health. Organochlorine pesticides can enter the environment after pesticides application, disposal of contaminated wastes into landfills, and release from manufacturing plants that produce these chemicals. Some of these chemicals are volatile, and some can adhere to soil or particles in the air**,** and sediments in aquatic system adsorb organochlorine which can accumulate in fish and other aquatic mammals (CDC, 2010a). Organochlorine can be classified into 5 groups, as follows; DDT and structurally related compounds, hexachlorocyclohexane, toxaphene, cyclodien, and dimerization products of hexachlorocyclopentadiene (Jennifer, 2010).

More epidemiological studies have been carried out to assess the association and the links between breast cancer and organochlorine and other pesticides because their residues are easily measured in adipose tissue, serum and breast milk, due to their persistence and because many of them have been shown in the laboratory to be endocrine disruptors influencing oestrogen levels and carcinogens (Watts, 2007).

In Spain, Ibarluzea et al. (2004) found higher levels of DDE, aldrin, endosulfan and lindane in adipose tissue of women with breast cancer cases (198) than in controls (260), and an increased risk of breast cancer especially among learner postmenopausal women- in a hospital- based case- control study. In Mexico, Waliszewski et al, (2005) found higher levels of (DDT, HCB, beta- HCH) in women with malignant breast tumors than in the abdominal adipose tissue of women who died in car accidents. In USA, Cassidy et al, (2005) found an association between levels of heptachlor peroxide in biobsy tissue and incidence of breast cancer in 34 women evaluated for breast abnormality.

Pyrethroid pesticides: the use of pyrethroids has increased during the past decade with the decline use of organophosphate pesticides, which are more acutely toxic to birds and mammals than pyrethroids, many of them are used widely in and around household, including on pets, in mosquito control, and in agriculture. Pyrethroids are derived from chrysanthemum flowers that work by altering nerve function, which cause paralysis in target insect pests, eventually resulting in death (US-EPA, 2010). Synthetic pyrethroids whose chemical structure are adapted from the chemical structure of the pyrethrins act in a similar manner to Pyrethrins. They are modified to increase their stability in sunlight as well as in the addition of chlorine molecules which make the compounds lipophilic and persist, and increase the likelihood of accumulation in human tissue. Many of synthetic pyrethroids are endocrine disruptors, mimicking oestrogen and promoting the growth of human breast cancer cells (Watt, 2007).

Permethrin, cyfluthrin, cypermethrin, deltamethrin, and sigma-pyrethroid have been found recently in breast milk in South Africa (Bouwman et al., 2006). Cypermethrin as one of the pyrethroids has endocrine disrupting properties that increase the risk of breast cancer, it is oestrogenic (Kojima et al., 2004), and it induced MCF-7 human breast cancer cell proliferation significantly in three different assays (Chen et al., 2002). El-Sebae and Safi (1998) reported that pesticide residues and environmental pollutants were considered as cytotoxic endocrine disruptors in human and wildlife. Fenvalerate also appears to have significant endocrine effects that increase the risk of breast cancer, in which it stimulated MCF-7 human breast cancer cell proliferation (Chen et al., 2005). Obviously, pyrethroids seem to be one of the suspected chemical environmental risk factor of breast cancer. So the researcher included it in his study.

There are a number of ways that make pesticides to be as an expected risk factor associated with breast cancer (Fig. 2.2):

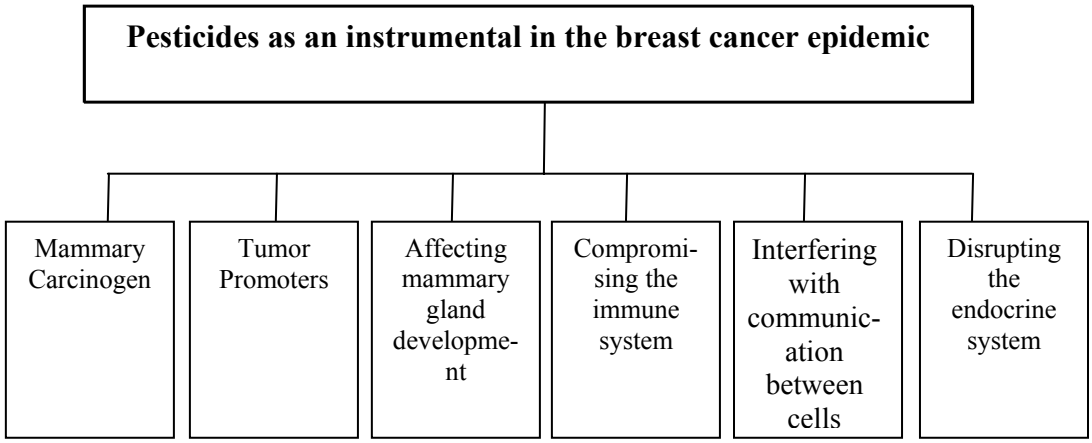

Figure 2.2: Ways make pesticides as an expected risk factors for breast cancer

Mammary carcinogens by a number of different mechanisms such as mutations in a gene including tumor suppressor genes, chromosomal damage, DNA damage, and disruption of the mitochondrial membrane potential, moreover; tumor promoters that promote the growth of breast cancer cells and hormonally sensitive tumors, and pesticides could affect the mammary gland development in ways that increase susceptibility to carcinogens or hormonally active agent and affecting a women's defenses against cancer such as DDT. Pesticides has the ability to interfere the communication between cells and affecting the development of mammary glands tissue as an endocrine disrupter (Watts, 2007).

Many studies have found a positive link between exposure to pesticides and increased risk of breast cancer in over the entire world: In Canada Brophy et al. (2002) compared the life time occupational histories of 299 women newly diagnosed with breast cancer and 237 women with other cancers, they found a 3-9 fold increase in incidence of breast cancer amongst women with history in agriculture. In Colombia, a case control study conducted in 2002 by Band et al. who matched 1,018 women with breast cancer with 1,020 controls; there were significant associations in both premenopausal and postmenopausal women between breast cancer and involvement in crop farming and fruit and vegetable production that was likely to have entailed exposure to pesticides. In USA, Engel et al. (2005) examined the association between pesticides use and breast cancer incidence among 30,454 farmers' wives in a prospective cohort study. They found that the risk of breast

cancer was modestly elevated among women whose their homes were closest to area of pesticides application.

In North Carolina; a population- based case- control study conducted by Duell et al. (2000) showed a possible increased risk of breast cancer in women who likely to be exposed to pesticides- in particular women present in field during or shortly after pesticides application, and who did not use protective clothing. Oleary et al. (2004) found an increased breast cancer risk for women residing within one mile of hazardous waste sites containing organochlorine pesticides. In Belgium Janssens et al. (2002) analyzed 1998 data on crops, pesticides and cancer static. They noted a correlation between mortality from breast cancer and use of defoliants and potato cultivation in Belgium. In China, Petralia et al. (1998) found a medium probability of increased incidence of breast cancer with high levels of occupational exposure to pesticides in China. Watts (2007) in his book pesticides and breast cancer showed that there is an association between exposure to pesticides and breast cancer disease.

In Gaza Strip, pesticides are known as one of the most pollutant especially with the extensive growing use of green houses that depends on chemical pesticides and fertilizers. Many reports in Gaza Strip identified the misuse of pesticides by shop owners, farmers and agricultural worker (Issa, 2000; Safi et al., 2001 and 2002). Similarly, several of extremely toxic pesticides that are banned or restricted in many countries are still used in Gaza Strip (Safi, 2002). Poor medical records and absence of legislation and control system for pesticides have resulted in a lack of awareness of potential hazards associated with pesticides handling and use among shop owner, farmers, and public (Safi et al., 2002). Moreover, there are no protocols to monitor pesticide residues in agricultural crops that might endanger the health of the whole population in Gaza (Safi et al., 2001 and 2002). Since there are no restrictions on the sale and use of pesticides in Gaza, farmers have easy access to all pesticides including banned, highly toxic and restricted species.

Egypt also is a source of pesticides in Gaza Strip where farmers and agricultural workers can easily reach all the types of pesticides through tunnels which might negatively impact the health of the users and the public. So the researcher think that the study of pesticides as an expected risk factor associated with breast cancer among women as a sample from the total population is very important especially during these circumstances in Gaza Strip.

2.5.2.2. Hormones and endocrine disrupting compounds:

The foundation of endocrine system are hormones and glands which responsible for regulation the body. Mood, growth and development, tissue function and metabolism are functions regulated by hormones. The endocrine system is an information signal system like nervous system (Wikipedia, 2010). Endocrine disruptors are any synthetic chemicals when absorbed into the body either mimic or blocks hormones and disrupts the body normal functions (NRDC, 1997). This disruption can happen through; altering normal hormone level, halting or stimulating the production of hormones, and changing the way hormones travel through the body. Means affecting the functions these hormones control (NRDC, 1997; El-Sebae and Safi, 1998).

Another definition of endocrine disruptors which is very important to be mentioned here is the definition of the US-EPA (2010);

> "They are basically chemicals with potential to interfere with the function of endocrine system, they are chemicals that have been defined as exogenous agent that interfere with the production, release, transport, metabolism, binding, action, or elimination of the natural hormones in the body responsible for the maintenance of homeostasis and regulation of developmental process, they also can include man- made chemicals such as pesticides and plasticizers, natural chemicals found in plants (phytoestrogens), pharmaceuticals, or hormones that are excreted in animal or human waste".

Endocrine disruptor's hypothesis was postulated in the early of 1990s when the only evidence for developmental carcinogenicity of estrogen in human was the very rare clear-cell carcinoma of the vagina, endocrine disruptor chemicals (EDCs) one of the most factors that has a growing interest today, results from animal models, human clinical observations, and epidemiological studies converge to implicate EDCs as a significant concern of public health, their mechanisms involved divergent pathways including estrogenic, antiandrogenic, peroxisome proliferator- activated receptor γ, retinoid; and actions through other nuclear receptors; steroidogenic enzymes; neurotransmitter receptors and systems; and many other pathways that are highly conserved in wildlife and human, and which can be modeled in laboratory in vitro and in vivo models (Evanthia et al., 2009).

In 2009 Gore and Crew mentioned many issues in endocrine disruption which known to be a key to full understanding of mechanisms of action and consequences of exposure to endocrine disruptions as follow;

Age at exposure: adult exposure to endocrine disruptors' chemicals may have different consequences from developing fetus or infant exposure.

Latency from exposure: there is a lag between the time of exposure and the manifestation of a disorder, in other words the consequences of developmental exposure may not immediately apparent early in life but may be manifested in adulthood or during aging.

Importance of mixture: if any individual exposed to EDCs, it is likely that other environmental pollutants are involved because contamination of environment is rarely due to single compound.

Nontraditional dose-response dynamics: there are several properties of EDCs that have caused controversy such as; low doses may even exert more potent effect than higher doses especially during a critical developmental window.

Transgenerational, epigenetic effects: EDCs may affect not only the exposed individual but also the children and subsequent generation. Effects may be transmitted not due to mutation of the DNA sequence, but throughout the modification of factors that regulate gene expressions.

Hormone Replacement Therapy (HRT): It is a treatment used to replace the female hormones that a women's body is no longer producing because of the menopause. Estrogen and progesterone have very important role in a woman's body so when level become fall this cause a wide range of physical and emotional symptoms, therefore; HRT can restore these hormone levels and enable the body to function normally again (Need health Services, 2010). Additionally it is a medical treatment with one or more female hormones, commonly estrogen plus progestin (synthetic progesterone), and sometimes testosterone. HRT is mostly used to treat symptoms of menopause, such as hot flashes, vaginal dryness, mood swings, sleep disorders, and decreased sexual desire. It comes as a pill, patch, injection, or vaginal cream (Medline Plus, 2010). In a million women study in 2003, the findings indicated that, there is association between HRT by women and breast cancer risk, the magnitude of the association risk was greater for estrogen-progesterone than the other type of HRT (estrogen alone) and the risk of breast cancer increased with increasing total duration of use (The Lancet, 2003).

Louis et al. (2008) found that among thin women (body mass index less than 25kg/m^2), ET use was associated with a significant 60% excess breast cancer risk after 10 year of use, but EPT was associated with a significantly increased breast cancer risk among women

with intact uteri, with the highest risk among users used it more than 10 years. Also the risks were slightly higher when progestin were prescribed continuously than sequentially (less than 15 day/month) and EPT association were strongest in thin women, but elevated risks persisted among heavy women.

Tracy et al. (2009) showed during their study that hormone therapy use was associated with more favorable breast cancer characteristics for ductal tumors but had less effect on prognostic characteristics in women with lobular tumors. Both histologic type and estrogen receptor/progesterone receptor status seem to be important in explaining the role of hormone therapy in the etiology of breast cancer subtypes.
It is important to note that HRT might to be an expected risk factor for breast cancer according to the previous studies, but here in Gaza Strip there is no enough data regarding the use of HRT among women. Therefore the researcher tried to highlight the impact of this risk factor on breast cancer.

2.5.2.3 Oral contraceptive pills:

A pill used to prevent pregnancy. It contains hormones that block the release of eggs from the ovaries. Most oral contraceptives include estrogen and progestin. Also called control pill (National Cancer Institute, 2010). In a population-based study of women younger than 45 years of age, the findings showed that breast cancer risk increased with either higher estrogen dose or higher progestin or oestrogen potency pills used within 5 years and the findings were more marked among women younger than 35 years of age (Althuis et al. 2003). Another hospital-based case-control study found the opposite findings, in which the oral contraceptive used was associated with decreased breast cancer risk among Turkish women in Istanbul (Ozmen et al. 2009).

Roger et al. (2005) reported during their study that there was no evidence that use of low-dose of oral contraceptive formulation increase risk of early- onset breast cancer for mutation carriers, and there may be a reduced risk for BRCA1 mutation carriers. Oral contraceptive use for at least 12 months was associated with decreased breast cancer risk for BRCA1 mutation carriers, but not for BRCA2 mutation carriers.

In Palestine; according to PCBS in 2007, contraceptive prevalence rate was 50.6% (55.1% for the West Bank and 43.0% for Gaza Strip), rural women use more family planning

methods compared with urban and refugee camps women. There is significant increase in the use of contraceptive methods, the most popular which has used by new clients in Palestine was pills, which constitute 38.4% of all contraceptive models. Regarding to regional distribution, the most methods used in West Bank was IUDs while in Gaza Strip the most method used was pills. So the researcher thought that it is very important to pay our attention toward the effects of these methods on women health and it is very necessary to conduct more studies on these devices' impacts on women health.

On the other hand a little is known about the effects of fertility hormonal drugs on the risk of breast cancer, despite the well known effect on ovulation and endogenous hormone production of this group of exogenous hormones. Limited information is known about the possible association between use of fertility drugs and in vitro fertilization (IVF) and risk of breast cancer.

Ovulation stimulation medications: are used in conjunction with assisted reproductive technologies or ART, such as in vitro fertilization. In United States nearly 32,000 multiple-birth infant in 2005 were conceived using a non- ART ovulation treatment. These infants constituted about 22.8% of the total multiple births in the United States, thus infants accounted for 4.6% of the total U.S. births, together, ART and non- ART account for nearly 6% of U.S. births annually (CDC, 2010b). According to Health-Care Network in 2010, fertility drugs include:

- **Clomiphene:** triggers the release of FSH and LH, which needed to help the ovaries release a monthly egg.
- **Bromocrptine**: suppresses prolactin hormone, which, if released in excessive amounts may cause a woman to stop ovulating.
- **Human Menopausal Gonadtrophines (HMG):** this drug contain large amount of LH or FSH.
- **Luteinizing Hormone-Releasing Hormones (LH-RH):** used when the pituitary or hypothalamus gland is not producing hormones.
- **Human Chorionic Gonadtrophines (hCG):** often prescribed with other drugs to stimulate the release of the egg.
- **Urofollitropin (FSH):** this drug is made up of FSH; it can be used with other drugs to bring on the release of an egg.

Salhab et al. (2005) reviewed 15 studies (11 were cohort studies and 4 were case-control study) about the impacts of fertility drugs on breast cancer risk and they concluded that

non of the individual studies reflected a significant association between IVF and breast cancer and, only one study showed that treatment with hCG significantly reduced the risk of breast cancer in women whose maximum non-pregnant body mass index was less than 27.5. The cohort studies included about 60,050 women who treated with ovulation induction/IVF showed no significant association between these drugs and increased risk of breast cancer, while in the case-control studies which included about 11,303 women with breast cancer and 10,930 controls, women of breast cancer were slightly less likely to have received IVF.

Brinton et al. (2005), who involved a large number of cases in their study reported no overall increase in breast cancer after exposure to Clomiphene and Gonadtrophines, but found a significantly elevated risk of breast cancer after 20 years of follow-up since first use of Clomiphene.
The researcher finds these findings controversial and tried to investigate whether this risk factor affects female breast cancer in Gaza Strip negatively or positively.

2.5.2.4. Phytoestrogens (Plant estrogen):

Phytoestrogens or (dietary estrogens), the name comes from phyto=plant and estro (period of fertility for female mammals) + gen= to generate. Because of their structural similarity with estradiol, they have the ability to cause estrogenic or/and antiestrogenic effect (Wikipedia, 2010). There are many phytoestrogen food sources such as soy beans, soy milk, blueberry, corn, and watermelon. A published study examined the risk of breast cancer, colorectal and prostate cancer relative to phytoestrogene intake, found phytoestrogen intake did not associated with breast cancer among women but dietary Phytoestrogens may contributed to the risk of colorectal cancer among women and prostate among men (Ward et al., 2010). On the other hand, another study reported that genistein as a type of phytoestrogen found in some soy products and daidzein, another phytoestrogen, and their metabolites cause oxidative DNA damage, which is thought to play a role in tumor initiation (Murata et al., 2004).

Larissa et al. (2009) discussed the childhood soy intake and breast cancer risk in Asian American women. They reported that soy intake during childhood, adolescence and adult life was associated with decreased breast cancer risk, with the strongest, most consistent for childhood intake. It is clear that epidemiologic studies of adult soy intake and breast

cancer risk have reported mixed results so the researcher think that, the evidences on whether dietary phytoestrogens increase or decrease breast cancer risk in adult women remains incomplete. Thus during this study the researcher tried to identify whether this risk factor influence female breast cancer in Gaza Strip women or not.

2.5.2.5. Dioxins:

The name dioxin is often used for the family of structurally and chemically related polychlorinated dibenzodioxin (PCDD), and polychlorinated dibenzfurans (PCDFs). Some 419 types of dioxin-related compounds have been identified, but only about 30 of them are considered to have significant toxicity, with 2,3,7,8-Tetrachlorodibenzodioxin (TCDD) being the most toxic. Dioxins are presented in the environment as a byproduct of a wide range of manufacturing processes including smelting, chlorine bleaching, and the manufacturing of some herbicides and pesticides. Waste incinerations are often the worst culprits, due to incomplete burning. Worldwide, many evidences ensure that a high level of dioxins were found in poultry and eggs, milk sold, meat, fish, shellfish, chickens, and catfish because of its ability to accumulate in fat tissue. Long term exposure is linked to impairment of the endocrine system (WHO, 2007).

La Merril et al. (2010) concluded that high- fat diet (HFD) may increase breast cancer in offspring with maternal TCDD exposure by altering estrogen metabolism in humans. The authors showed that maternal TCDD exposure doubled mammary tumor incidence in high-fat diet fed mice. Maternal TCDD exposure caused rapid mammary development with increased cytochrome P450 1B1 and decreased catechol-o-methyltransferase expression in mammary tissue. Also the author concluded that these results provide a mechanism to explain epidemiological data linking early-life TCDD exposure and diet high in fat to increase risk for breast cancer in human.

Warner et al. (2002) carried out their study by using a data from the Seveso Women's Health Study (SWHS). They examined the association between individual serum TCDD level and breast cancer risk in women residing around Seveso, Italy, in 1976, at the time of an industrial explosion that resulted in the highest known population exposure to TCDD. They observed a statistically significant, dose-response increased risk for breast cancer incidence with individual serum TCDD level among women in the Seveso Women's

Health Study. Also the study showed that breast cancer incidence increases steadily with age, with the most rapid increase between ages 40- 55 years.

In Gaza Strip during the first intifada, the Palestinian people have burned thousand of vehicles' tires and solid wastes. Due to the absence of law and regulation, all types of solid wastes which collected in random landfill are burned in open air exposing the people to the hazards of emitted gases and particulate matter which may adversely affect the health of people. So it is very important to highlight this suspected risk factor and study its relation with breast cancer risk among women in Gaza Strip.

2.5.2.6. Polycyclic aromatic hydrocarbons (PAHs):

PAHs are groups of over 100 different chemicals formed during the incomplete burning of coal, oil, and gas, garbage or other organic substances like tobacco or charbroiled meat (ATSDR, 1996). Exposure to (PAHs) could be by;

- Breathing air containing PAHs from cigarette smoke, wood smoke, vehicle exhausts, and agricultural burn smoke,
- Eating grilled meats,
- Drinking contaminated water or cow's milk,
- Nursing infants of mother's living near hazardous waste sites may be exposed to PAHs through their mother's milk.

As pollutants, PAHs are of concern because some compounds have been identified as carcinogenic, mutagenic, and teratogenic (Wikipedia, 2011). Many studies suggested that, exposure to PAHs is associated with increased risk of breast cancer. A case-control study established by Bonner et al. (2005) in New York indicated that, very early life exposure to high levels of total suspended particulates of PAHs is associated with increased risk of breast cancer in post-menopausal women. Another occupational study by Petralia et al. in 1999 assessed the relationship between regular exposure to gasoline fumes and vehicular exhaust, as major sources of PAHs. These occupational exposures were associated with an increased risk of breast cancer for pre-menopausal woman.

Grilling meat over a direct flame results in fat dropping on the hot fire and the production of polycyclic aromatic hydrocarbon-containing flames. Polycyclic aromatic hydrocarbons adhere to the surface of food, and the more intense the heat, the more polycyclic aromatic

hydrocarbons are presents which are widely believed to play a significant role in human cancers (Norat and Riboli, 2001).

Red meat is very important to be mentioned here and in all over the study as one source of endocrine disruptors, in which these endocrine disruptors might be accumulated and it is a source of iron, protein, creatine, zinc, phosphorous, vitamins such as niacin, vitamin B12, thiamin, riboflavin, and it's the richest source of alpha-lipoic acid. Many prospective studies showed that, there was an association between high saturated fat intake and breast cancer risk (Thiebaut et al., 2007; Sierris et al.,2008). American Institution for Cancer Research recommended that, to reduce our cancer risk, we should eat no more 18 OZ per week (510.291g) of red meat (AICR, 2011). Polycyclic aromatic hydrocarbons and heterocyclic amines are chemicals formed when muscle meat, including beef, fish, and poultry is cooked using high temperature methods (National Cancer Institute, 2011). Kabat et al. in 2009 designed a cohort study with 120,755 postmenopausal women with a mean of 6 months follow-up to asses the association between meat, meat-cooking methods, and meat-mutagen intake and postmenopausal breast cancer in the NIH-AARP. The results showed that intake of total meat, red meat, meat cooked at high temperature, and meat mutagens had no association with breast cancer risk.

Linose et al. (2008) examined the incidence of invasive premenopausal breast cancer in 39,268 who followed for 7 years from 1998 to 2005. Results showed that the higher red meat intake in adolescence the increase in breast cancer risk. Many reviewers showed that Haemoglobin and Myoglobin molecules that are presented in red meat, when they ingested, they trigger a process called Nitrosation in the gut which leads to the formation of carcinogens. It is very important to note that every study has its own limitations, and regarding to PAHs it is clear that some studies confirmed that these compounds affect the risk of breast cancer and others had no effects. Therefore, during this study the researcher tried to know which effects do these compounds have on women in Gaza Strip through women lifestyle.

2.5.2.7. Tobacco smoke: active and passive exposure:

Tobacco use is one of the most public health problems worldwide. Tobacco kills more than half of all users (100 million deaths were caused by tobacco in the 20th century) and it is a risk factor for six of the eight leading causes of deaths in the world (WHO, 2010b).

Tobacco smoke contains many chemicals that are associated with increased cancer risk; one of these chemicals is PAHs which is associated with increased risk of breast cancer as shown before. A population-based prospective study examined the association between tobacco smoke and the risk of female breast cancer found that, both active and passive smoking were increased the risk of breast cancer in pre-menopausal women (Hanoaka et al. 2005).

Rynolds et al. (2009) conducted a large prospective study on women, the California Teacher Study. Detailed life time information on passive smoke exposure had been collected in 1997 from 57,523 women who were lifetime nonsmokers and had no history of breast cancer. The results showed that cumulative exposures to high levels of side stream smoke may increase breast cancer risk among postmenopausal women who themselves have never smoked tobacco products. Brown et al. (2010) carried out a case-control study on 597 incident cases of breast cancer of Chinese, Japanese, and Filipino women living in San Francisco-Oakland, Los Angeles, and Oahu, Hawaii with 966 population controls to asses the association between smoking and alcohol use and breast cancer risk. The researcher reported that neither alcohol nor cigarette contributed to the elevated risks of breast cancer in Asian-American women.

In Palestine, nearly 31.6% and 1.47% of Palestinian males and females are smokers respectively (frequently cigarettes) , so exposure to smoking passively or actively is very high and could be affect women's' health in Palestine. Therefore, it is very important to investigate if this risk factor influence the cause of breast cancer among women especially in a very high level smoking population like Palestinian (PCBS, 2004).

2.5.2.8. Alkyl phenols and bisphenol A (BPA):

Alkyl phenols: are family of organic compounds formed by alkylation of phenol. The most commercially products of this family are propylphenol, butyl phenol, amyl phenol, heptylphenol, octylphenol, nonylphenol, and long chain alkyl phenol. They are used as intermediate chemicals in the manufacture of other chemicals, such as detergents, fuel, and lube additive. Alkyl phenols are found in personal care products specially hair products in addition to rubber products (Wikipedia, 2009). A published studies on mice, found that mice treated with 4-nonyl phenol led to an increased synthesis of estradiol by the liver,

comparing with mice treated with equivalent amount of estradiol, they had an increased risk of mammary cancer (Acevedo et al. 2005).

A cohort study on 70,336 Chinese women with a mean of 7 years of follow up designed to examine the association between personal use of hair dye and cancer risk, the results showed no significant association was observed for several common cancers, including cancers of the breast, lung, stomach, and colorectum, generally the study found no evidence of an association between personal use of hair dye and cancer risk (Mendelsohn et al., 2009). So the interesting to study alkyl phenol as an environmental risk factor comes from animal studies, means that, these chemicals may become a risk factor of human breast cancer.

Bisphenol A: found in some hard, clear, light weight plastics and resins. BPA is also used in a various types of food and drinking containers, compact discs, electronics, and as a liner in some metal cans (CBC News, 2009). BPA was developed in 1930 as a synthetic estrogen, means it acts like an estrogen in human, which had the ability to increase the risk of breast cancer. Many studies of human breast cancer showed that BPA acts as a natural estrogen specially in inducing the cell growth and proliferation (BCF, 2008). According to the above the researcher tried to identify if BPA could be one of these factors that influence breast cancer risk among women in Gaza Strip.

2.5.2.9. Phthalates:

Phthalates are known as phthalate esters that are mainly used as plasticizers (substances added to plastic to increase their flexibility), transparency and durability. Phthalate are used widely in a variety of products from entering coating of pharmaceutical pills and nutritional supplements to viscosity control agents, gelling agent, stabilizers, emulsifying agents, and suspending agents (Wikipedia, 2010). Additionally phthalate used as a part included in adhesives and clues, building materials, personal care products, medical devices, detergents and surfactants, children toys, modeling clay, waxes, paints, printing inks, pharmaceuticals, food products and textiles. Also they frequently used in a variety of household applications such as shower curtains, floor tiles, cleaning materials and personal care items such as perfume, eyes shadow, moisturizer, nail polish, liquid soap, and hair spray. Simply, phthalate can easily leachate into the environment because they have no covalent bond with plastics they mixed with (Wikipedia, 2010).

A study examined the effect of phthalate types on cell proliferation found that benzyl phthalate, di(n-butyl)phthalate, and di(2-ethylhexyl)phthalate used as plasticizer and found in cosmetics formulation had the ability to mimic estrogen and binding to estrogen receptor. These phthalates are significantly increased cell proliferation in MCF-7 cell (Kim et al. 2004).

Lopez et al. (2010), examined the association between urinary concentration of nine phthalate metabolites and breast cancer in Mexican women, they detected phthalate metabolites in at least 82% of women who participated in the study. During the study the concentration of mono-ethyl phthalate (MEP) was higher in cases than in controls, so the authors concluded that mono-ethyl phthalate urinary concentration were positively associated with breast cancer.

Its important to note that phthalates have the ability to increase the proliferation of cancer cells in breast according to the previous studies. That's why the researcher highlights it as an environmental risk factor that may relate to breast cancer risk increasing.

2.5.2.10. Parabens:

Chemically, parabens are esters of p-hydroxybenzoic acid that are commonly used in cosmetic products. Typically, more than one paraben is used in a product with a combination with other types of preservatives to provide preservation against microorganisms. Parabens also used in a wide variety of cosmetics, such as make up, moisturizers, hair care products, shaving products, and underarm deodorants. They are absorbed through intact skin and from the gastrointestinal tract and blood (US-FDA, 2007).

Grath (2003) showed that the age of breast cancer diagnosis was significantly earlier in women who used the products of underarm deodorants and shaving their underarm frequently. However women who began used these products before 16 years of age were diagnosed with breast cancer at an earlier age than those who began these habits later. The study also did not demonstrate a conclusive link between these underarm hygiene and breast cancer. So the researcher find these risk factors are very important to be involved during his work in away to reach the main risk factors associated with breast cancer among women in Gaza Strip.

2.5.2.11. Growth promoters used in food production:

Bovine growth hormone (rBGH): is a synthetic hormone used by farmers to increase milk production. Bovine somatotropin is the naturally occurring form of this hormone in cattle. Both synthetic and naturally forms of the hormone stimulate milk production by increasing the level of another hormone known as insulin-like growth factor (IGF-1) (American Cancer Society, 2009b). A German study published by Furstenberger et al. in 2003 showed that the elevation of serum level of IGF-1 associated with increased risk of breast cancer and IGF-1 had a strong influence on cell proliferation and its a potent inhibitor of apoptosis.

Zeranol (Ralgro): is one of the most chemicals used in U.S beef industry. It is a non-steroidal growth promoter that mimics many of the effects of the natural hormone estradiol. Zeranol is produced from the mold of a fungus often found in cereal and animal feed. Cattle grower use zeranol to help fatten the animal more quickly (BCF, 2008). A study published by Jen et al. (2009) showed that exposure to zeranol may lead to initiation of transformation of normal breast cell to breast preneoplastic cells. The study suggested that obese individuals may be at greater risk of developing zeranol-induced breast cancer. So the researcher will try to use these suggestions in order to investigate if beef consumers are at high risk of breast cancer or not.

Chapter 3: Methodology

This chapter illustrates the study methodology, which was used to conduct this study. This chapter presents study design, study population, study setting, and the ethical procedures that were considered in the study. Instruments, data collection, data analysis, selection criteria, and limitation of the study are also presented by this chapter.

3.1 Study design

The study designed to be a case-control study, which is very useful to investigate the possible environmental risk factors of breast cancer among women in Gaza Strip. This study is a type of observational analytic epidemiological investigation in which subjects are selected on the basis of whether they do (breast cancer cases) or do not (breast cancer free/controls) have a particular disease under study. In case-control study the researcher starts with a group of subjects who have already experienced a problem of concern (breast cancer cases), and then selects a second group of people who have not (breast cancer free/controls), then both groups are compared for history of exposures

3.2 Period of the Study

The study started in the period from the first of May, 2010 to the end of January 2011.

3.3 Place of the Study

The study was carried out in El-Shifa hospital, European Gaza hospital, El- Remal clinic, general population and some of schools that were participated with the Ministry of Health in the project of screening for early detecting of breast cancer.

3.4 Study population

The study population has been selected from the two main hospitals El-Shifa and European Gaza hospitals (case and controls), which deal with oncology patients, and from El-Remal Clinic (controls), general population (controls) and some of governmental schools that were participated with Ministry of Health in the project of screening for early detecting of breast cancer (controls).

3.5 Sample Size

It was a census study in which all the entire patients of breast cancer (cases) who had a follow up in the two main hospitals "El- Shifa and European Gaza" from August 2010 till December 2010 were included. The study included 288 women, both cases and controls. Cases were women (144) with histopathologically confirmed breast cancer from the two main hospitals "El- Shifa and EG" in Gaza Strip. Controls (144) were healthy women matched with cases by living area and age and without known diagnosis of cancer selected from European Gaza hospital, El-Remal Clinic, general population, and the governmental schools that were participated in the screening for early detecting of breast cancer project.

3.6 Eligibility

3.6.1. Inclusion criteria:

3.6.1.1. Cases:

Cases were women with histopathologically confirmed breast cancer reside in Gaza Strip and regularly followed up in the two main hospitals (El-Shifa and EG) from August 2010 till December 2010.

3.6.1.2. Controls:

Controls were healthy women without known diagnosis of cancer reside in the same geographical area of the cases from European Gaza hospital, general population, and from governmental schools that were participated in the screening for early detecting of breast cancer project.

3.6.2. Exclusion criteria:

3.6.2.1. Cases:

Any histopathologically confirmed breast cancer women who had not a follow up in the two main hospitals (El-Shifa and EG) in Gaza Strip during August 2010 till December 2010. Also cases were excluded from the study if they were with known diagnosis of other types of cancer.

3.6.2.2. Controls:

Women who had not a mammogram or did not use a regular self examination for breast cancer, also who had a mammogram or did a regular self examination for breast cancer but pathologically confirmed breast cancer patients.
Women are excluded from the study if they have malignant, hormonal, pregnancy, and gynecological condition.

3.7 Ethical considerations

The study had been carried out in accordance with the directions of the Institutional Review Board for Ethics in Human's Medical Studies (The Helsinki Committee). An informed consent attached to each questionnaire obtained from each participant in the study. The researcher explained the purpose and the objectives of the study to all the participants, and the inclusion in the study was optional and confidential. Neither name nor personal data had been published. Official letters has been sent to the Palestinian Ministry of Health, the two intended hospitals, El-Remal clinic, Palestinian Ministry of Education, and schools that participated in the screening for early detecting of breast cancer to obtain the request approval for the study.

3.8 Data collection

In the interview, the researcher used the structured face to face questionnaire. Great care had been taken to ensure the confidentiality; the researcher gave the participant enough time to answer the questions and encouraged them to be open in answering. The researcher explained the purpose of the questionnaire to the women before obtaining consent. During the interview any vague information had been simplified by the researcher to ensure exact and real answer by the participants.

3.9 Questionnaire

The study questionnaire designed and prepared to compile information relating to the objectives of the study. An Arabic version of the questionnaire had been used during interviews with participants, the questionnaire had been reviewed by 7 experts who are qualified in many fields related to the study. Generally the questionnaire was included

many variables that are directly and indirectly reflects the outcomes needed for the study as follow:

- Personal profile,
- Physical environmental risk factors,
- Chemical environmental risk factors.

3.10 Statistical analysis

The researcher used the Statistical Package for Social Sciences version 15 (SPSS, 2007) for data coding, entry and analysis. Simple distribution and frequencies of the study variables, the cross tabulation, and normal chi square had been applied. P value had been calculated for the ordinal level measures ($P< 0.05$), variables that are statistically significant by chi square test had been analyzed using odds ratio and 95% confidence interval.

3.11 Pilot study

Pilot testing had been done prior to the beginning of data collection to check validity of the questionnaire. Refining of questionnaire had been done according to the result of the pilot study.

3.12 Response rate

There were 144 incident cases of breast cancer included in the study, all over of them are responding. The study taken into account the confidentiality of all participants and the participation in the study was optional. So the response rate of cases was calculated manually and it was 100%.

Controls also were 144 healthy women and all of them were responded, so their response rate were also 100%.

3.13 Limitation of the study

There were two limitations of this study as follow;

- Budget,
- Shortage of new version of books and articles.

Chapter 4: Results and Discussion

This chapter presents the results of the study and shows the descriptive and inferential analysis of the study findings in general.

In general, 288 questionnaire had been filled from the interviewees during face to face interview with the participants, of which 144 were case samples (women with breast cancer) and 144 were control sample (women free from breast cancer).

4.1 Distribution of subjects by sociodemographic variables

Table (4.1): Distribution of subjects by sociodemographic variables

Variable		Case (n= 144)		Control (n= 144)	
		No.	%	No.	%
Governorate	North Gaza	25	17.4	25	17.4
	Gaza Strip	37	25.7	35	24.3
	Middle Zone	16	11.1	17	11.8
	Khan Yunis	34	23.6	34	23.6
	Rafah	32	22.2	33	22.9
Living area	City	53	36.8	52	36.1
	Camp	51	35.4	57	39.6
	Village	40	27.8	35	24.3
Age group	25-35	16	11.1	15	10.4
	36-46	34	23.6	39	27.1
	47-57	44	30.6	52	36.1
	58-68	38	26.4	28	19.4
	≥ 69	12	8.3	10	6.9
Education	Less than secondary	79	54.9	46	31.9
	Secondary	37	25.7	18	12.5
	Diploma	10	6.9	36	25.0
	University	18	12.5	44	30.6
Marital status	Married	121	84.0	97	67.4
	Single	7	4.9	14	9.7
	Divorced	3	2.1	15	10.4
	Widowed	13	9.0	18	12.5

Table (4.1) shows the distribution of both cases and controls regarding the sociodemographic variables. Both cases and controls mostly have the same numbers of subjects in each Governorate. In both cases and controls Gaza Governorate had the largest number of cases (n =37, 25.7%) as well as controls (n =35, 24.3%), while Middle Governorate had the smallest number of both cases (n =16, 11.1%) and controls (n= 17,

11.8%). As seen from the table, mostly cases and controls have the same numbers in each Governorate because the researcher matched both of them by the area of residence and the age of the onset of the breast cancer disease. Northern Governorate, Khan Younis , and Rafah Governorates constitute 17.4%, 23.6%, 22.2% from the total percent of cases as well as controls respectively.

According to the kind of living area, the researcher also matched cases and controls, so subjects living in cities were 53 (36.8%) cases from the total number of cases and 52 (36.1%) controls from the total number of controls. Subjects whose living in camps were 51 (35.4%) cases from the total number of cases and 57 (39.6%) controls from the total number of controls, while 40 (27.8%) cases from the total number of cases and 35 controls (24.3%) from the total number of controls were living in villages.

Age groups were divided into five groups, in which 30.6% of cases and 36.1% of controls were located in the age group from 47-57 years, which constitute the largest age group in the study. It is clear from the data that breast cancer disease affects women in younger ages which congruent with both Safi in 2002 and Elsughier et al. in 2007 studies. 8.3% of cases and 6.9% of controls were located in the age group > 69 years which constitutes the smallest age group in the study. The other three age groups 25-35, 36-46, 58-68 constitute 11.1% of cases and 10.4% of controls, 23.6% of cases and 27.1% of controls, and 26.4% of cases and 19.4% of controls, respectively.

Regarding distribution of the subjects according to their educational characters, 54.9% of cases and 31.9% of controls had less than secondary, 25.7% of cases and 12.5% of controls had a secondary certificate, 12.5% of cases and 30.6% of controls hold a university degree, and 10% of cases compare with 25% of controls hold a diploma degree. Finally, 84% of cases and 67.4% of controls were married, 4.9% of cases and 9.7% of controls were singles, 2.1% of cases and 10.4% of controls were divorced, and 9% of cases and 12.5% of controls were widowed.

4.2 Distribution of the cases by age at diagnosis and methods of disease discovery

This part illustrates the distribution of cases regarding to the age at diagnosis of breast cancer disease and the way this disease discovered by.

Table (4.2): Distribution of the cases by age at diagnosis and methods of disease discovery

Variable		Case (n= 144)	
		No.	%
Age at diagnosis	Less than 35	16	11.1
	35-45	34	23.6
	46-56	48	33.3
	57-68	36	25.0
	More than 68	10	3.5
Methods of disease discovery	Accidentally	29	20.1
	Self examination	106	73.6
	Health professional	9	6.2

As shown in Table (4.2), the age at diagnosis of breast cancer disease was divided into five age groups; group from 46-56 were the largest one with 33.3% of the cases, and the age group which were more than 68 years were the smallest group with 3.5% of cases, while the other three groups less than 35, from 35-45 and from 57-67 were 11.1%, 23.6% and 25% of the cases, respectively.

According to distribution of cases regarding to the methods of breast cancer discovery, 73.6% of the total cases discovered the disease by routine self examination, 20.1% discovered the disease accidently, and 6.2% discovered it by routine physical examination by health professional.

4.3 Beast cancer and sociodemographic variables

Table (4.3): Breast cancer and sociodemographic characteristics

Variable		Case (n= 144)		Control (n= 144)		Total		P. value
		No.	%	No.	%	No.	%	
Governorate	North Gaza	25	17.4	25	17.4	50	17.4	0.999
	Gaza	37	25.7	35	24.3	72	25.0	
	Middle Zone	16	11.1	17	11.8	33	11.5	
	Khan Yunis	34	23.6	34	23.6	68	23.6	
	Rafah	32	22.2	33	22.9	65	22.6	
Living area	City	53	36.8	52	36.1	105	36.5	0.713
	Camp	51	35.4	57	39.6	108	37.5	
	Village	40	27.8	35	24.3	75	26.0	
Age group	25-35	16	11.1	15	10.4	31	10.8	0.603
	36-46	34	23.6	39	27.1	73	25.3	
	47-57	44	30.6	52	36.1	96	33.3	
	58-68	38	26.4	28	19.4	66	22.9	
	≥ 69	12	8.3	10	6.9	22	7.6	
Education	Less than secondary	79	54.9	46	31.9	125	43.4	0.001
	Secondary	37	25.7	18	12.5	55	19.1	
	Diploma	10	6.9	36	25.0	46	16.0	
	University	18	12.5	44	30.6	62	21.5	
Marital status	Married	121	84.0	97	67.4	218	75.7	0.003
	Single	7	4.9	14	9.7	21	7.3	
	Divorced	3	2.1	15	10.4	18	6.2	
	Widowed	13	9.0	18	12.5	31	10.8	

Table (4.3) presents the relationship between sociodemographic variables and breast cancer among cases and controls. Regarding Governorates where cases and controls have been lived, the difference between the two groups did not reach a statistical significant level (P = 0.999). This means that the Governorate does not affect the chance of getting breast cancer because the two groups have been matched in regards to governorates.

Regarding to the kinds of living area and its relationship with breast cancer, the difference between the two groups did not reach a statistical significant level also (P= 0.713). This means that neither governorate nor kind of living area in this study affect the chance of

getting breast cancer because the two groups have been matched in regards to the living area.

As indicated in Table (4.3), there is a difference between two groups in terms of educational status of both cases and controls and more educated women had lower breast cancer than those graduated from elementary and secondary schools. The difference between the two groups reach a statistical significant level (P= 0.001). Therefore, education is considered as one of the risk factors that affects the chance of getting breast cancer among women.

The difference between the two groups in marital status also reach a statistical significant level (P= 0.003), indicating that marital status affects the chance of getting breast cancer disease and classified as one of the risk factors that affect breast cancer disease among women. These results are congruent with Pakseresht case-control study (2009) conducted in Delhi and showed that there was a significant difference between breast cancer cases and controls in relation to the marital status. However, these results do not congruent with another study that has been conducted in West Bank by Darweesh (2009) who found that there was no association between marital status and breast cancer.

4.4 Physical environmental factors and breast cancer

This part presents the distribution of study samples according to the exposure to physical environmental risk factors such as X-rays, Radiation Therapy and breast physical trauma, as well as the relationships between these factors and breast cancer disease among women.

Table (4.4): Breast cancer and physical environmental factors

Variable		Case (n= 144)		Control (n= 144)		P. value	CI	Odds ratio
		No.	%	No.	%			
Have x-ray in the past	Yes	64	44.4	62	43.1	0.812	0.65 -1.73	1.06
	No	80	55.6	82	56.9			
Radiation therapy in the past	Yes	2	1.4	2	1.4	1.00	0.139 – 7.197	1.00
	No	142	98.6	142	98.6			
Exposed to trauma on the breast	Yes	22	15.3	2	1.4	0.001	0.018 -0.339	12.80
	No	122	84.7	142	98.6			

As shown in Table (4.4), 44.4% of cases were exposed to X-rays in the past, while 43.1% of controls were exposed, 55.6% of cases did not expose to X-rays compared to 56.9% of controls. The difference between the two groups did not reach a statistical significant level (P= 0.812, OR 1.06). Therefore exposure to X-ray does not affect the chance of getting breast cancer and it dose not one of the risk factors that affect breast cancer among women in Gaza Strip. These data do not congruent with other studies that the exposure to X-ray plays an important role in increasing the risk of breast cancer (Nadine et al., 2006; Hill et al., 2007). Actually, from the literature review the age at exposure, and the sufficient dose of ionizing radiation could be the factors that lead women to get breast cancer disease, so the researcher think that the study need more precise details about the dose of X-ray and the age at exposure to judge if the risk of breast cancer affected by X-ray exposure or not.

1.4% cases and 1.4% controls getting radiation therapy in the past, while 98.6% cases and 98.6% controls did not get radiation therapy in the past, the difference between the two groups does not reach a statistical significant level (P= 1.00). This means that radiation therapy also has not the ability to affect the chance of getting breast cancer among women and has no association with breast cancer among women in Gaza Strip.

Regarding breast physical trauma, data revealed that 22 (15.3%) cases and 2 (1.4%) controls were exposed to physical trauma on breast in the past but 122 (84.7%) cases and 142 (98.6%) controls did not. The data indicated statistical significant difference between cases and controls (P= 0.001, OR 12.80). This difference affects the chance of getting breast cancer among women and those who exposed to physical trauma on breast have the chance of getting breast cancer 12.80 times more than women who did not. Obviously physical trauma on breast is a physical environmental risk factor associated with breast cancer among women in Gaza Strip which supported by Rigby study (2002) who concluded that the physical trauma can cause breast cancer.

4.5 Chemical environmental factors and breast cancer

This part presents the relationship between breast cancer and some chemical environmental risk factors.

4.5.1. Distribution of breast cancer by OC pills and infertility treatment medication:

Table (4.5): Breast cancer and OC pills and medication for infertility treatment

Variable		Case (n= 144)		Control (n= 144)		P. Value	CI	Odds ratio
		No.	%	No.	%			
Contraceptive pills	Yes	34	23.6	37	25.7	0.682	0.50 -1.58	0.89
	No	110	76.4	107	74.3			
Infertility treatment medication	Yes	52	36.1	12	8.3	0.001	3.01 -13.0	6.22
	No	92	63.9	132	91.7			

Table (4.5) shows the relationship between breast cancer and OC and medication for infertility treatment. There are 23.6% of the total cases have been taken contraceptive pills in the past compared to 25.7% of the total controls, and 76.4% of the total cases did not take contraceptive pills in the past compared to 74.3% of the total controls. The difference between the two groups did not reach a statistical significant level (P= 0.682). This means that contraceptive pills have no effects on the chance of getting breast cancer so it has no association with breast cancer among women in Gaza Governorate.

As the researcher indicated in the literature review, this part is controversial, means that some studies suggested that contraceptive pills used was associated with decreased breast cancer risk among women in Istanbul (Ozmen et al., 2009), while others suggested that contraceptive pills used was increased the risk of breast cancer (Althuis et al., 2003). Another published study in 2005 by Roger et al. reported that there were no evidence that the use of low doses of oral contraceptive formulation increase the risk of early onset breast cancer which mainly support this study. Finally the researcher suggests that this risk factor (contraceptive pills) need more precise details especially on the dose of contraceptive pills used and the age when used contraceptive pills to make an accurate judgment on the effects of contraceptive pills on breast cancer risk among women in Gaza Governorates.

Statistical analysis showed that 36.1% of the total cases were taken a medication for infertility treatment compared with 8.3% of the total controls, and 63.9% of the total cases did not take any medication for infertility treatment compared with 91.7% of the total controls. The difference between the two groups reach a statistical significant level (P= 0.001, OR= 6.22), this difference affect the chance of getting breast cancer so there is a

positive a association between medication for infertility treatment and the risk of breast cancer.

In fact, there is a little information about the effects of infertility medication on breast cancer. Brinton et al. (2005) reported that there were no overall increase in breast cancer after exposure to Clomiphene and Gonadtrophines as a medication for infertility but they found a significant elevated risk of breast cancer after 20 years of follow up since a first use of Clomiphene which may congruent with the results of our study if we suppose that women in the study take these medication for long time. Actually to have more accurate results about the effect of infertility medication we need more precise details about the age at exposure and type of medication women used before the onset of breast cancer disease.

4.5.2. Distribution of breast cancer by lifestyle:

Table (4.6): Breast cancer and life style

Variable		Case (n= 144)		Control (n=144)		P. value	CI	Odds ratio
		No.	%	No.	%			
Using hair dyes	Yes	72	50.0	71	49.3	0.906	0.63 -1.68	1.03
	No	72	50.0	73	50.7			
Using anti-deodorants	Yes	50	34.7	46	31.9	0.617	0.67 -1.91	1.13
	No	94	65.3	98	68.1			
Using facial cosmetics	Yes	101	70.1	106	73.6	0.512	0.49 -1.45	0.842
	No	43	29.9	38	26.4			
Using hair removal ointments	Yes	12	8.3	9	6.2	0.497	0.51 -3.65	1.36
	No	132	91.7	135	93.8			

As seen from Table (4.6) there were 50% of cases used hair dyes in the past compared with 49.3% of controls. On the other hand 50% of cases did not use hair dyes compared with 50.7% of controls. The difference between two groups did not reach a statistical significant level (P= 0.906). This means that this factor have not the ability to affect the chance of getting breast cancer among women and it does not consider as one of the risk factors that have been associated with breast cancer among women in Gaza Governorate.

Mendelsohn (2009) examined the association between personal use of hair dyes and cancer risk. His results showed that no significant association was observed for several common cancer including cancer of breast. This study mainly support our results if we suppose that

our collected details from the interviews are enough to present the effect of using hair dyes on breast cancer disease.

The second variable "using anti-deodorants" shows that 34.7% of cases used anti-deodorants in the past compared with 31.9% of controls, while 65.3% of cases did not use anti-deodorants compared with 68.1% of controls. The difference between two groups did not reach a statistical significant level (P= 0.617, OR= 1.13). Obviously, such risk factor is taken in this study just to investigate the effects of some chemicals "Parabens" involved in the content of underarm deodorants on breast cancer indirectly. Our study supported by some studies such as Grath (2003) study who did not demonstrate a conclusive link between these underarm hygiene and breast cancer.

Concerning facial cosmetics, 70.1% of cases used facial cosmetics in the past compared with 73.6% of controls, while 29.9% of cases did not use facial cosmetics compared with 26.4% of controls. The difference between the two groups did not reach a statistical significant level with (P= 0.512, OR= 0.842) which means that there is no association between this factor and breast cancer among women in Gaza Governorates.

Table (4.6) indicates the relationship between using hair removal ointment and breast cancer; 8.3% of cases used hair removal ointment in the past compared with 6.2% of controls, but 91.7% of cases did not use hair removal ointment compared with 93.8% of controls. Clearly, the difference between two groups did not reach a statistical significant level with P= 0.497 that means it does not affect the chance to getting breast cancer among women and it is not associated with breast cancer.

4.5.3. Distribution of breast cancer by smoking:

Table (4.7): Breast cancer and smoking

Variable		Case (n= 144)		Control (n= 144)		P. value	CI	Odds ratio
		No.	%	No.	%			
Any person smoke in your presence	**Yes**	83	57.6	71	49.3	0.156	0.86 -2.29	1.39
	No	61	42.4	73	50.7			

Table (4.7) showed that 57.6% of cases exposed to smoking compared to 49.3% of controls, while 42.4% of cases did not exposed to smoking compared to 50.7% of controls.

It is very clear that the difference between the two groups did not reach a statistical significant level (P= 0.156), which means that it may be not affect the chance of getting breast cancer and may be not consider to be a risk factors of breast cancer among women.

Many studies worldwide studied the association between active and passive smoking and breast cancer. Some of these studies showed that both active and passive smoking increased the risk of breast cancer in both pre-menopausal and post-menopausal (Hanoaka et al., 2005; Rynold et al., 2009) which are not congruent with our study. However, Brown et al. (2010) showed that neither alcohol nor cigarette contributed to the elevated risks of breast cancer in Asian- American women which support the results of our study.

4.5.4. Distribution of breast cancer by types of diets:

Table (4.8a): Breast cancer and types of diet

Variable		Case		Control		P. Value	CI	Odds ratio
		No.	%	No.	%			
Type of diet	Vegetarian	1	0.7	5	4.2	0.001	-	-
	Animal	15	10.4	0	0.0			
	Normal	128	88.9	138	95.8			
Total		**144**	**100**	**144**	**100**			
Eating 500gm/week of red meat	Yes	59	41.0	23	16.0	0.001	-	-
	More than 500gm/week	18	12.5	1	0.7			
	Less than 500gm/week	67	46.5	120	83.3			
Total		**144**	**100**	**144**	**100**			
Eating chicken skin	Yes	51	35.7	7	5.3	0.001	4.12 -25.28	9.98
	No	92	64.3	126	94.7			
Total		**143**	**100**	**133**	**100**			

Table (4.8a) reveals the relationship between types of diet used by subjects and breast cancer. In part one, types of diet divided into three categories vegetarian, animal meat, and normal. Cases depend more on animal meats (10.4%) than vegetables (0.7%), while the majority of cases have a normal diet (88.9%). On the other hand, controls who depend on vegetables in their diet (4.2%) are more than who depends on animal meat in their diet and the majority of controls have a normal diet (95.8%). The difference between the two groups (case and controls) reach a statistical significant level (P= 0.001), means that this

factor affects the chance of getting breast cancer, and type of diet considered as a risk factor that associated with breast cancer disease among women.

Regarding red meat, there were 41% and 16% of cases and controls, respectively eat 500gm red meat per week, 12.5% and 0.7% eat more than 500gm red meat per week, and 46.5% of cases eat less than 500gm red meat per week compared to 83.3% of controls. The difference between the two groups reach a statistical significant level (P= 0.001) and affects the chance of getting breast cancer disease among women. So we can judge that this factor have the criteria to be one of the risk factors of breast cancer among women in Gaza Governorates.

As indicated in Table (4.8a), more than half of cases ate 500gm of red meat and more/week which is not congruent with the limited amount recommended by American Institution for Cancer Risk (2011) who recommended that to reduce cancer risk we should eat no more 510.291gm of red meat/week. Red meat characterized by a rich source of fats where many chemicals could be accumulated there, this could be a justification for why eating more than 500gm red meat have a chance to get breast cancer which is supported by Linsoe et al in 2008 who reported that the high red meat intake in adolescence lead to the increase in breast cancer risk. Also Sierris et al. (2008) reported an association between saturated fat intake and breast cancer risk.

Others reported that the temperature used for meat cooking plays a significant role in affecting breast cancer risk where amino acids could react with creatine at high temperature to produce heterocyclic amine which is known as a carcinogenic compound (NCI, 2011). The methods of preparing meat is playing a significant role in human cancers as Norat et al in 2001 said, where polycyclic aromatic hydrocarbons adhere to the surface of meat, and the more intensive the heat, the more polycyclic aromatic hydrocarbons are presents.

Regarding chicken's skin, 35.7% of the total cases (n= 143) eat the skin of chicken compared to 5.3% of controls (n= 133), while 64.3% of cases did not eat the skin of chicken compared with 94.7% of controls. The difference between the two groups reach a statistical significant level (P= 0.001, OR= 9.98), which affect the chance of getting breast cancer, so eating the skin of chicken is considered to be a risk factor that positively associated with breast cancer. The data also suggested that subjects who had been eaten the

skin of chicken have the chance of getting breast cancer more than who did not eat the skin of chicken ninth time.

As well known, chicken typically are raised in factory farms under extremely confined and unsanitary conditions that require use of antibiotics and antimicrobial drugs to maintain their health and maximize their growth. Palestinian society depends in their diets on chicken as a source of protein and other vitamins such as B 12, but the majority of the population like a small weight chicken more than the big one which exposed them to more accumulated chemicals in chicken especially in fats under the skin like dioxins (WHO, 2007). Also the preparation methods of chicken plays an important role in the production of a well known carcinogenic compound (Heterocyclic Amines) which is produced by the reaction between amino acids and creatine under high temperature (National Cancer Institute, 2011). Polycyclic aromatic hydrocarbons also can adhere to the skin of chicken during grilling of chicken, and the more intense the heat, the more polycyclic aromatic hydrocarbons are presents which play a significant role in human cancer (Norat et al., 2001).

4.5.4.1. Distribution of breast cancer by eating, buying, and washing vegetables:

Table (4.8b): Breast cancer and types of diet

Variable		Case (n= 144)		Control (n=144)		P. value	CI	Odds ratio
		No.	%	No.	%			
Eating raw vegetables weekly	Large amount	4	2.8	36	25.0	0.001	-	-
	Moderate amount	110	76.4	108	75.0			
	Small amount	30	20.8	0	0.0			
Eating cooked vegetables weekly	Large amount	3	2.1	25	17.4	0.001	-	-
	Moderate amount	111	77.1	119	82.6			
	Small amount	30	20.8	0	0.0			
Buying fruits and vegetables at the beginning of the season	Yes	119	82.6	12	8.3	0.001	23.91-117.24	52.36
	No	25	17.4	132	91.7			
Washing vegetables and fruits	Yes	142	98.6	143	99.3	0.562	0.02-7.06	0.50
	No	2	1.4	1	0.7			

Table (4.8b) indicates that there were three categories for eating raw vegetables; large amount, moderate amount and small amount. There were 2.8% of cases ate large amount compared to 25% of controls, 76.4% of cases ate moderate amount of raw vegetables compared to 75% of controls and 20.8% of cases ate small amount of raw vegetables compared to none of controls. There was a statistical significant relationship between breast cancer and eating raw vegetables between cases and controls (P= 0.001) and this relationship did not congruent with many studies in which eating vegetables were associated with a decreased level of breast cancer risk. The rational thing which justify our results is the excess use of pesticides in Gaza Strip, which lead to increase the residues of pesticides in these vegetables and also there were no protocols to monitor pesticides residues in agricultural crops that might endanger the health of the whole population in Gaza (Safi et al., 2001 and 2002).

Regarding cooked vegetables, there were 2.1% of cases ate large amount of cooked vegetables compared to 17.4% of controls, 77.1% of cases ate moderate amount of cooked vegetables compared to 82.6% of controls and 20.8% of cases ate small amount. The difference between two groups reach a statistical significant level (P= 0.001), means that this factor affect the chance of getting breast cancer among women and considered to be as a risk factor of breast cancer. Unfortunately, when we asked women during interview about the amount of raw and cooked vegetables they had been eaten in the past they did not answer this question. Therefore, the researcher think these two parts need more precise information to judge accurately about the effect of eating vegetables on breast cancer. In this regard we can say that vegetables used in Gaza Strip may have been exposed to many pesticides that do not have control during use in addition to the exposure of these chemicals to high temperature which may lead them to produce more dangerous chemicals on human health especially during cooking.

The table also showed that 82.6% of cases bought vegetables and fruits at the beginning of the their season compared to 8.3% of controls while 17.4% of cases did not buy them at the beginning of the season compared to 91.7% of controls. The difference between the two groups reach a statistical significant level (P= 0.001, OR= 52.36). This factor seriously affect the chance of getting breast cancer where women who bought vegetables and fruits at the beginning of their season had a chance of getting breast cancer fifty two times more than women who did not buy them at the beginning of the season. Therefore, it is

considered as a risk factor of breast cancer among women. As we know, vegetables and fruits in Gaza Strip exposed to high amounts of pesticides that accumulate in them especially at the beginning of their season, also some farmers exploit the beginning of vegetables and fruits season to sell them in markets in order to get the highest price, irrespective of the extent of danger on human health while most of them do not use these vegetables and fruits for their household uses.

The last part in the same table showed that 98.6% of cases washed vegetables and fruits before eating compared to 99.3% of controls, while 1.4% of cases did not wash vegetables and fruits before eating compared to 0.7% of controls. The difference between two groups did not reach a statistical significant level (P= 0.562). This factor does not affect the chance of getting breast cancer so it dose not considered as a risk factor of breast cancer. The first look on the table suggested that there is a conflict between the effects of the variable of weekly eating raw vegetables and the variable of washing vegetables before eating but indeed there is systemic pesticides which their residues found not only on the surface but also inside the vegetables and the question here is the process of washing vegetables was appropriate and reduced the effect of pesticides used on them?

4.5.4.2. Distribution of breast cancer by materials used in cooking and eating canned food and eggs:

Table (4.8c): Breast cancer and types of diet

Variable		Case (n= 144)		Control (n= 144)		P. Value	CI	Odds ratio
		No.	%	No.	%			
Materials used in cooking	Olive oil	9	6.3	3	2.1	0.001	-	-
	Butter	2	1.4	2	1.4			
	Margarine	16	11.1	1	0.7			
	Others	117	81.3	138	95.8			
Eating Canned food	Yes	107	74.3	92	63.9	0.05	0.96-2.80	1.63
	No	37	25.7	52	36.1			
Eating whole egg	Yes	139	96.5	142	98.6	0.251	0.05-2.32	0.39
	No	5	3.5	2	1.4			

Table (4.8c) showed that 6.3% of cases were used olive oil in cooking compared to 2.1% of controls, 1.4% of cases as well as controls were used butter in cooking, 11.1% of cases were used margarine in cooking compared to 0.7% of controls, and 81.3% of cases were

used other materials in cooking such as sun flower oil and corn oil compared to 95.8% of controls. The difference between cases and controls reach a statistical significant level (P= 0.001), means that this factor affect the chance of getting breast cancer and considered as a risk factor of breast cancer.

As well known, butter is loaded with saturated fats and is ultimate high fat dairy product which may also contain residues of pesticides mainly chlorinated hydrocarbons and other environmental toxins that tend to concentrate in fats, making high-fat dairy products more dangerous than low fats or, especially, nonfat ones. All margarines have some saturated fats ad also should be free of drugs, but depending on where its oil come from, it may contain pesticide residues and other toxins and the heat and chemicals used to transform vegetables oils into margarine change fatty acids into unnatural forms that may be most unhealthy to eat.

All of the above support our study in which using these types of fats increase the risk of breast cancer in addition to some studies reported by Thiebaut et al. (2007) who showed that there were association between saturated and monounsaturated fat intake with the risk of postmenopausal invasive breast cancer. Sierris et al. (2008) showed that there were an association between high saturated fat intake and breast cancer risk and there were no significant association of breast cancer with total monounsaturated or polyunsaturated fats.

Regarding canned food, there were 74.3% of cases ate canned food compared to 63.9% of controls while 25.7% of cases did not eat canned food compared to 36.1% of controls. The statistical analysis showed that P value equal 0.05, so that the difference between two groups reach a statistical significant level and this factor affect the chance of getting breast cancer and considered as a risk factor of breast cancer. As mentioned in literature review metal cans contain Bisphenol A as a liner (CBC NEWS, 2009) which act as a synthetic estrogen and could affect the chance of getting breast cancer (BCF, 2008). Also canned food imported to us from unknown source so they might contain some toxic chemicals such as pesticides that might affect on women health. BPA is an unstable polymer and is also lipophilic, it can leach into food products especially when heated (Brotons, 1995). The researcher think that we need precise information about the dose of BPA taken by women during their depending on canned food if we need to be accurate in judgment on BPA effects on breast cancer risk.

Table (4.8c) also showed that there were 96.5% ate whole egg compared to 98.6% of controls while 3.5% of cases did not eat whole egg compared to 1.4% of controls. The difference between the two groups did not reach a statistical significant level (P= 0.251, OR= 0.39), means that this factor did not affect the chance of getting breast cancer and it did not consider to be as a risk factor of breast cancer among women.

4.5.5. Distribution of breast cancer by chemical exposure:

Table (4.9): Breast cancer and chemical exposure

Variable		Case (n= 144)		Control (n= 144)		P. value	CI	Odds ratio
		No.	%	No.	%			
Live near field/factory	Yes	27	18.8	16	11.1	0.069	0.90-3.80	1.85
	No	117	81.2	128	88.9			
Live near any waste incinerators	Yes	12	8.3	9	6.2	0.497	0.51-3.65	1.36
	No	132	91.7	135	93.8			
Solid waste disposal site	Yes	10	6.9	2	1.4	0.018	1.06-35.69	5.30
	No	134	93.1	142	98.6			
Expose to any of the following	Toxic gases	38	26.4	32	22.2	0.164	-	-
	Fumes, tires fire	49	34.0	39	27.1			
	No	57	39.6	73	50.7			

Table (4.9) showed the relationship between breast cancer and chemical exposure of the subjects. It is clear that 18.8% of cases were lived near factories compared with 11.1% of controls while 81.2% of cases did not live near any factory in the past compared with 88.9% of controls. The difference between the two groups did not reach a statistical significant (P= 0.069, OR= 1.58), means that this factor did not affect the chance of getting breast cancer and it does not consider to be a risk factor of breast cancer among women.

Regarding to waste incinerators, there were 8.3% of cases were lived near waste incinerator compared to 6.2% of controls while 91.7% of cases did not live near waste incinerators compared to 93.8% of controls. The difference between the two groups did not reach a statistical significant level (P= 0.497, CI 0.51- 3.65, OR= 1.36), so it has not the ability to affect on the chance of getting breast cancer and it does not consider to be a risk factor of breast cancer among women.

Living near solid waste disposal site was differ from the last factors, in which 6.9% of cases were lived near solid waste disposal sites in the past compared to 1.4% of controls. On the other hand, 93.1% of cases did not live near solid waste disposal sites compared to 98.6% of controls. Clearly, the difference between two groups reach a statistical significant level (P= 0.018, OR= 5.29), means that this factor affect the chance of getting breast cancer and consider to be a risk factor of breast cancer. Another thing clear from the data that women living near solid waste disposal sites have the chance to get breast cancer 5 times more than women who did not live near solid waste disposal sites in the past.

As we know if waste does not discarded properly on land, when it rains the waste is soaked and is then carried through the landfill, eventually making its way into the water holding with it many dangerous chemical that we may drink with our water. Volatile organic compounds which usually come from household cleaners and industrial solvent that emitted from the solid waste disposal sites have been linked to everything from cancers to birth defects. Moreover, when wastes burned, many toxic chemicals released in the surrounding environment such as dioxin which cause a serious public health risks like cancers. This is the justification for why living near solid waste disposal site lead to get breast cancer among women.

Regarding exposure to toxic gases and fumes of tires fire, 26.4% of cases exposed to toxic gases compared to 22.2% of controls, 34% of cases exposed to fumes of tires fire in the past compared to 27.1% of controls, but 39.6% of cases and 50.7% of controls did not expose to toxic gases as well as fumes of tires fire. The difference between the two groups did not reach a statistical significant level (P= 0.164), means the this factor has not the ability to affect the chance of getting breast cancer and it does not classify as a risk factor of breast cancer.

The researcher finds these results as a rational one because Gaza Strip mainly considered as one unit in the same geographical area, means that hazards in the environment might affect the total population of Gaza Strip which is a small area compared with other countries.

4.5.6. Distribution of breast cancer by occupation:

Table (4.10): Breast cancer and occupation

Variable		Case		Control		P. value	CI	Odds ratio
		No.	%	No.	%			
Employed for more than 6 month	Yes	56	38.9	61	42.4	0.549	0.53-1.42	0.87
	No	88	61.1	83	57.6			
Total		**144**	**100**	**144**	**100**			
Regularly exposed to source of pollution	Yes	17	30.4	3	4.9	0.001	2.12-38.97	8.43
	No	39	69.6	58	95.1			
Total		**56**	**100**	**61**	**100**			

The relationship between breast cancer and occupation is indicated in Table (4.10). There were 38.9% of cases employed for more than six months in the past compared to 42.4% of controls, while 61.1% of cases did not employ for more than six months compared to 57.6% of controls. The difference between two groups did not reach a statistical significant level (P= 0.549) and this factor dose not classify as a risk factor of breast cancer.

From the total cases who employed for more than six months in the past (n= 56) there were 30.4% of them regularly exposed to the source of pollution while from the total controls (n= 61) there were 4.9% of them exposed regularly to source of pollution. The difference between the two groups reach a statistical significant level (P= 0.001, OR= 8.43), so this factor affects the chance of getting breast cancer among women and classified as a risk factor of breast cancer. Also women who exposed regularly to a source of pollution in the past have the chance of getting breast cancer eighth time more than women who did not regularly exposed to the source of pollution.

4.5.7. Distribution of breast cancer by pesticides:

Table (4.11a): Breast cancer and pesticides

Variable		Case		Control		P. Value	CI	Odds ratio
		No.	%	No.	%			
Living in a farm	Yes	71	49.3	55	38.2	0.05	0.96-2.59	1.57
	No	73	50.7	89	61.8			
Total		**144**	**100**	**144**	**100**			
Period of living in a farm	≤20Y	59	83.1	40	72.7	0.05	-	-
	21-40	12	16.9	11	20.0			
	≥41 Y	0	0	4	7.3			
Total		71	100	55	100			
Pesticides used in the farm	Yes	65	91.5	36	65.5	0.001	1.92-17.75	5.72
	No	6	8.5	19	34.5			
Total		**71**	**100**	**55**	**100**			
Working with crops by naked hands	Yes	29	20.1	5	3.5	0.001	2.48-21.36	7.01
	No	115	79.9	139	96.5			
Total		**144**	**100**	**144**	**100**			
Working in the field while pesticides applied at the same time or within 24 hours	Yes	30	20.8	1	0.7	0.001	5.37-753.1	37.63
	No	114	79.2	143	99.3			
Total		**144**	**100**	**144**	**100**			

The relationship between breast cancer and pesticides is presented in table (4.11a). It is clear from the table that there were 49.3% of the total cases lived in a farm in the past compared to 38.2% of controls. On the other hand 50.7% of the total cases did not live in a farm compared to 61.8% of controls. The difference between the two groups reach a statistical significant level (P= 0.05, OR= 1.57), means that this factor affect the chance of getting breast cancer and there were a weak positive association between living in a farm and breast cancer.

The second part in the table showed that there were 83.1% of the total cases (n=71) lived in a farm for 20 years or less compared to 72.7% of the total controls (n= 55), while 16.9% of cases were lived in a farm for 21-40 years compared to 20.0% of controls, and 7.3% of controls were lived in a farm for 40 years and more compared to none from the cases. The difference between the two groups reach a statistical significant level (P=0.05), and this factor affect the chance of getting breast cancer weakly, so it considered as a risk factor of breast cancer.

Regarding to pesticides used, 91.5% from the 71 cases indicated that pesticides were used in the farm compared to 65.5% from the 55 controls, while 8.5% of cases showed that pesticides were not use in the farm compared to 34.5% of controls. The difference between the two groups reach a statistical significant level (P= 0.001, OR= 5.72), which means that this factor has the ability to affect the chance of getting breast cancer and classified as a risk factor of breast cancer. Additionally, there were a positive association between using pesticides in farms where women lived and the risk of breast cancer. Those women have the chance of getting breast cancer five times more than women who lived in a farm where pesticides did not use their.

The fourth part in the same Table showed that 20.1% of cases worked with crops with naked hands compared to 3.5% of controls, but 79.9% of cases did not work with crops with naked hands compared to 96.5% of controls. There were a difference between the two groups and this difference reach a statistical significant level (P= 0.001, OR= 7.01), and there were a positive association between working with crops with naked hands and breast cancer. These women who worked with crops with naked hand have the chance of getting breast cancer seven times more than women who did not work with crops with naked hands.

The last part in Table (4.11a) indicates that 20.8% of cases worked in the field during the same time of pesticides application or during 24 hours of this application compared to 0.7% of controls while 79.2% of cases did not work in the field during the same time of pesticides application or during 24 hours of this application compared to 99.3% of controls. The difference between two groups reach a statistical significant level (P= 0.001, OR= 37.63) with strong positive association between this factor and breast cancer. Therefore, this factor classifies as a risk factor of breast cancer among women. It is important to mention here that women who worked in the field while pesticides application take place or during 24 hours of this application have the chance of getting breast cancer 37 times more than women who did not work in the field during the same situations.

Table (4.11b): Breast cancer and pesticides

Variable		Case		Control		P. Value	CI	Odds ratio
		No.	%	No.	%			
Buying and transporting of pesticides	Yes	2	1.4	0	0.0	0.156	-	-
	No	142	98.6	144	100			
Total		**144**	**100**	**144**	**100**			
Cleaning of pesticides mixing and application equipments	Yes	22	15.3	2	1.4	0.001	2.83-80.46	12.80
	No	122	84.7	142	98.6			
Total		**71**	**100**	**55**	**100**			
Personal application of pesticides	Yes	7	4.9	0	0.0	0.007	-	-
	No	137	95.1	144	100			
Total		**144**	**100**	**144**	**100**			

Table (4.11b) revealed that 1.4% of cases were participated in buying and transporting of pesticides while none of controls were participated, 98.6% of cases did not participate in buying and transporting of pesticides compared to 100% of controls. The difference between the two groups did not reach a statistical significant level (P= 0.156), means that this factor did not affect the chance of getting the breast cancer and did not consider to be a risk factor of breast cancer among women.

Twenty two (15.3%) of cases were cleaned the equipments used for mixing and application of pesticides compared to 1.4% of controls, while 84.7% of cases did not clean these equipments in the past compared to 98.6% of controls. The difference between the two groups reach a statistical significant level (P= 0.001, OR= 12.80) and this factor considered to be a risk factor of breast cancer because there were a positive association between this risk factor and breast cancer. Also women who were clean these equipments have the chance of getting breast cancer 12 times more than women who did not clean these equipments in the past.

Regarding pesticides application, 4.9% of cases were personally applied pesticides in a farm while none of controls did, but there were 95.1% of cases did not apply pesticides to any of crops on the farm compared to100% of controls. The difference between the two groups reach a statistical significant level (P= 0.007) and this factor affects the chance of getting breast cancer and classified as a risk factor of breast cancer.

Table (4.11c): Breast cancer and pesticides

Variable		Case		Control		P. Value	CI	Odds ratio
		No.	%	No.	%			
Living with anyone worked in a farm	Yes	30	20.8	17	11.8	0.038	0.99-3.95	1.97
	No	114	79.2	127	88.2			
Total		**144**	**100**	**144**	**100**			
Contact with working cloths,tools,equuipment	Yes	27	90.0	5	29.4	0.001	3.65-152.60	21.6
	No	3	10.0	12	70.6			
Total		**30**	**100**	**17**	**100**			
Father,mother brother, sister working in a farm	Yes	34	23.6	19	13.2	0.023	1.05-3.95	2.03
	No	110	76.4	125	86.8			
Total		**144**	**100**	**144**	**100**			
Period of living with them	≤10Y	14	41.2	7	36.8	0.024	-	-
	11-21	15	44.1	4	21.1			
	22-32	1	2.9	6	31.6			
	≥33	4	11.8	2	10.5			
Total		**34**	**100**	**19**	**100**			
Living beside a farm or rural area	Yes	67	46.5	46	31.9	0.011	1.12-3.08	1.85
	No	77	53.5	98	68.1			
Total		**144**	**100**	**144**	**100**			
Smelling strange odors like pesticides.	Yes	66	98.5	21	45.7	0.001	10.19-1651.7	78.57
	No	1	1.5	25	54.3			
Total		**67**	**100**	**46**	**100**			

Table (4.11c) showed that there were 20.8% of cases lived with others who worked in a farm in the past compared to 11.8% of controls, while 79.2% of cases did not live with others worked in a farm compared to 88.2% of controls. That the difference between the two groups reach a statistical significant level (P= 0.038, CI 0.99-3.95, OR= 1.97), so this factor classified as a risk factor of breast cancer among women which affect the chance of getting breast cancer. Also 90.0% of women who lived with persons worked in a farm (n=30) had a contact with their working cloths, tools, and pesticide equipments that used in agricultural work compared to 29.4% of the total controls (n=17), while 10.0% of cases had no contact with such things compared to 70.6% of controls. Actually, these results prove the previous results of the first part in the same table, in which direct contact with cloths, tools, and pesticide equipments of persons worked in a agricultural field elevates the risk of breast cancer among women (P= 0.001, OR= 21.6), so this factor considered as a risk factor of breast cancer and women who have contact with these things have a high risk of breast cancer more than women who have no contact with these things 21 times.

Regarding to the third part in the same table there were 23.6% of cases lived with one of their first relatives compared to 13.2% of controls, while 76.4% of cases did not live with any one of their first relatives compared to 86.8% of controls. There was a statistical significant relationship between this factor and breast cancer (P= 0.023, CI 1.05-3.95, OR= 2.03), and this factor considered as a risk factor of breast cancer which has the ability to affect the chance of getting breast cancer among women. Also women who lived with their first relatives worked in agricultural field have the chance of getting breast cancer two times more than women who did not.

The period of time in which women lived with first relatives was divided into four groups, the first one indicates that 41.2% of the total cases (n=34) were lived with their first relatives for 10 years or less compared to 36.8% of the total controls (n= 19), the second one shows that 44.1% of cases were lived for 11-21 years compared to 21.1% of controls, the third group reveals that 2.9% of cases were lived with their first relatives who worked in agricultural field compared to 31.6% of controls, the last group shows that there were 11.8% of cases lived ≥33 years compared to 10.5% of controls. The difference between the two groups reach a statistical significant level (P= 0.024) so the period of living with persons who worked in a agricultural field affect the chance of getting breast cancer.

The fifth part in the table showed that 46.5% of cases were lived beside a farm or a rural area compared to 31.9% of controls, while 53.5% of cases did not live beside a farm or a rural area compared to 68.1% of controls. There was a statistical significant relationship between this factor and breast cancer (P= 0.011, CI 1.12-3.08, OR= 1.85) and this factor considered as a risk factor of breast cancer among women.

There were 98.5% of the total cases (n= 67) smelled odors like pesticides compared to 45.7% of controls (n= 46), while 1.5% of cases did not smell any odors like pesticides compared to 54.3% of controls. The difference between the two groups reach a statistical significant level (P= 0.001, CI 10.19-1651.79, OR= 78.57), means that this factor had a positive association with breast cancer and affect the chance of getting breast cancer among women and women who smelled odors like pesticides had the chance of getting breast cancer 78 times more women who did not smell any odor like pesticides.

As well known, living in a farm or beside a farm and a rural area makes women more vulnerable to environmental hazards of which they are exposed through the food they eat,

the air they breath, and the water they drink. Actually, all factors included in pesticides domain showed a direct contact with these pesticides through the three routs of exposure absorption, digestion and inhalation. During pesticides domain, mainly all the variables related to it are associated with the risk of breast cancer. Pesticides still one the most serious public health problems in Gaza Strip by which there were uncontrolled and heavy use of pesticides and some of these pesticides are internationally suspended, banned, and cancelled are still used in the agricultural environment of Gaza Strip (Safi, 1998; Safi et al., 1993; Shomar et al., 2006).

It is very important to mention here that there were more than 900 metric tones of formulated pesticides used annually in Gaza Strip, with more than 10,000 tons of organic fertilizers also were used annually in 2001 in the presence of formal Ministry of Agriculture (Safi, 2002). Nowadays could we imagine the amount of pesticides currently used in Gaza Strip where tunnels open for every one to import anything without monitoring and clear rules and regulations regarding to the kinds of pesticides that are safety for users and general population.

There were no protocols to monitor pesticides residues in agricultural crops that might endanger the health of whole population in Gaza (Safi et al., 2001 and 2002), also there were no restriction on the sale and use of pesticides in Gaza, farmers have easy access to all pesticides including banned, highly toxic and restricted species. Therefore all of the above makes users of pesticides and general population in particular women vulnerable to public health problems such as breast cancer as mentioned before in literature review.

Our results showed that women who worked in the field at the time of applying pesticides or during 24 hours of their application had elevation in breast cancer risk which supported by Duell et al. (2002) who reported that there were an increased risk of breast cancer in women who likely exposed to pesticides in particular women present in field during or shortly after pesticides application. Also Brophy et al. (2002) support our results through his data that find a 3-9 fold increase in incidence of breast cancer amongst women with history of agriculture. Data also showed that living beside a rural area or in a farm lead to increase the risk of breast cancer which is also supported by Engle et al. (2005) who found an elevated risk of breast cancer among women whose their homes were closest to area of pesticides application. Band et al. (2002) found a significant association in both

menopausal and postmenopausal women between breast cancer and involvement in crop farming and fruits and vegetables production which was likely exposed to pesticides which support our study findings.

Chapter 5: Conclusion and Recommendations

5.1 Conclusion

This chapter provides the main conclusions of this study as well as some recommendations for decision makers for adopting new strategies to reduce prevalence of breast cancer disease among women.

Breast cancer is a major public health concern. Since there is no previous research about the environmental risk factors that associated with breast cancer in Gaza Strip, this study was carried out to find out if there is a relationship between some environmental risk factors and breast cancer.

Data were collected by face to face questionnaire from 288 women (144 cases and 144 controls). During the questionnaire the researcher constructs many domains included some physical and environmental risk factors such as contraceptives and hormone replacement therapy, lifestyle, smoking, diet, chemical exposure, and pesticides in away to reflect the impacts of some chemicals presented in these domains indirectly and to investigate their impacts on breast cancer among women in Gaza Strip. Therefore, we can conclude from our findings that there is statistically significant risk factors associated with breast cancer as the following:

High incidence of breast cancer was among young women in proportion to western countries where high prevalence among old age breast cancer women.

Educational level and marital status as a socio-demographic factors showed a statistical significant relationship with breast cancer among women.

Physical trauma on breast as a physical environmental factor showed a statistical significant relationship with breast cancer with a positive association.

Medication for infertility treatment as a chemical environmental factor which reflects the impacts of some endocrine disruptors presented in their chemical structure showed a positive association with breast cancer and women who had these medication have great risk of breast cancer than women who did not treated with these medication.

Diet influence the women risk for breast cancer, so women who depend on animal meat in their diet showed an elevated risk of breast cancer, also women who eat red meat 500gm or more weekly at high risk of breast cancer than women used to eat less than 500gm weekly.

Regarding to chicken skin it was very clear that women who ate the skin of chicken were at higher risk of breast cancer than women who did not eat the skin of chicken.

Eating raw vegetables and cooked vegetables showed statistically significant relationship with breast cancer, also women who buy vegetables and fruits at the beginning of the season were at higher risk of breast cancer than women who did not buy vegetables and fruit at the beginning of the season.

Types of oil used in cooking also showed statistically significant relationship with breast cancer , especially using margarine as a source of saturated fats.

Living beside solid waste disposal sites where many chemical and toxins presented and emitted showed statistically significant relationship with breast cancer and women who lived their had greater chance for getting breast cancer than women who did not live their in the past.

Women who exposed during their works to some sources of pollution such as pesticides, fertilizers, dusts are at higher risk of breast cancer than women who did not expose to the same sources of pollution.

Women who lived in a farm or beside a farm where pesticides were applied their and smelled odors like pesticides are also at higher risk of breast cancer than women who did not live in such areas where pesticides did not apply.

Dealing with crops with naked hands by women also showed great statistically significant relationship with breast cancer risk among women, also women who worked in a farm where pesticides are applied in the same time or during 24 hours are at higher risk of breast cancer than women who did not present in a farm at the same time or during 24 hours of pesticide applications.

Women who cleaned pesticides equipments and personally applied pesticides on crops in a farm at higher risk of breast cancer than women who did not participated in the cleaning of such equipment and not experience pesticides application on crops.

Finally, women who lived in the past with others like father, mother, husband, sister, brother, son, and daughter who worked in a farm or in agricultural field and had a direct contact with their working cloths, tool, and equipments had higher chance for getting breast cancer than women who did not live in the past with such people.

5.2 Recommendations

- Public awareness and health education about environmental risk factors associated with breast cancer.
- Policy makers should design governmental control programs for breast cancer to minimize prevalence in Gaza Strip.
- Developing a breast cancer screening program and ensure effective protection for women at risk of having the disease.
- Awareness programs to the farmers and their families about hazards of pesticides and their impacts on human health.
- Avoiding working in a farm during pesticide applications and avoiding exposure to pesticides during 24 hours of their application.
- Regular monitoring of pesticide residues on fruits and vegetables as well as minimize overuse and heavy use of pesticides.
- Avoiding as possible eating of red meat more than 500gm/week and eating of chicken skin as well as saturated fats.
- Avoiding as possible buying and eating vegetables and fruits from unknown sources.
- Further research activities related to breast cancer disease and its causes.
- Further research on synthetic chemicals and their impacts on human health.

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Annexes

Annex (1) Arabic questionnaire

بسم الله الرحمن الرحيم

عنوان البحث

" عوامل الخطر البيئية المرتبطة بسرطان الثدي - محافظات غزة".

هذه الدراسة يقوم بها الباحث كمتطلب للحصول على درجة الماجستير في الصحة العامة تخصص صحة البيئة بجامعة القدس أبو ديس كلية الصحة العامة

يشكر الباحث لكم حسن المشاركة في هذه الدراسة من خلال الإجابة على أسئلة الاستبيان والتي لا تستغرق أكثر من 30 دقيقة من وقتكم الثمين وان مشاركتكم تسهم في إنجاح الدراسة التي تهدف للتعرف على العوامل البيئية المرتبطة بسرطان الثدي بين النساء في محافظات غزة.

و يود الباحث التأكيد على أن المعلومات ستبقى سرية و لهدف البحث العلمي لذلك لا داعي لذكر الأسماء علما بأنه من حق المشارك الامتناع عن إجابة أي سؤال أو رفض المشاركة.

شكرا لكم على المشاركة

الباحث/ أسعد سعيد عاشور

الاستبانة

عنوان البحث: عوامل الخطر البيئية المرتبطة بسرطان الثدي- محافظات غزة

- الرقم المتسلسل: .....

- الحالة: ☐ Control ☐ Case

- التاريخ: .....

أولا: المعلومات الشخصية

- الاسم " اختياري": .....

1. العنوان

1.1 المحافظة

الشمالية ☐ غزة ☐ الوسطى ☐ خان يونس☐ رفح ☐

1.2 نوع مكان السكن

مدينة ☐ مخيم ☐ قرية ☐

2. العمر بالسنوات: .....

3. المستوى التعليمي: .....

4. الحالة الاجتماعية

متزوجة ☐ غير متزوجة ☐ منفصلة ☐ أرملة ☐

جميع الأسئلة التالية من سؤال 5 لغاية سؤال 8 للحالات المصابة فقط

5. تاريخ تشخيص الإصابة بسرطان الثدي .....

6. العمر بالسنوات عند تشخيص الإصابة بسرطان الثدي .....

7. الوزن قبل سنة من تشخيص الإصابة بسرطان الثدي .....كجم

7.1 الوزن الحالي .....

8. طريقة تشخيص الإصابة بسرطان الثدي

الصدفة ☐ فحص روتيني شخصي ☐ فحص بواسطة اختصاصي طبي ☐

ثانيا: عوامل الخطر البيئية الفيزيائية

9. هل سبق لك التعرض لأشعة اكس لأي سبب كان؟

نعم ☐ لا ☐

9.1 إذا كانت الإجابة السابقة نعم، كم كانت عدد مرات تعرضك لتلك الأشعة؟ .....

9.2 ما هو السبب وراء تعرضك لتلك الأشعة؟ .....

9.3 ما نوع أشعة اكس التي سبق لك التعرض لها؟ .....

10. هل سبق لك التعرض لأي علاج إشعاعي؟

نعم ☐ لا ☐

10.1 إذا كانت إجابة السؤال السابق نعم، كم كانت عدد مرات تعرضك للعلاج الإشعاعي؟.....

10.2 ما هو السبب وراء تعرضك للعلاج الإشعاعي؟.....

11. هل تعرضت لأي كدمات أو ضربات على الثدي؟ نعم ☐ لا ☐

ثالثا: عوامل الخطر البيئية الكيميائية

موانع الحمل و العلاج الهرموني

12. هل سبق لك تناول أو تعاطي حبوب أو حقن لمنع الحمل أو لأي سبب أخر كحب الشباب و الدورة الشهرية غير المنتظمة أو لأعراض سن اليأس

نعم ☐ لا ☐

12.1 إذا كانت إجابة السؤال السابق نعم، كم كانت الفترة الزمنية لاستخدامها؟ .....

13. هل سبق لك تناول أ و تعاطي أي أدوية أو علاجات لغرض الإنجاب؟

نعم ☐ لا ☐

14. هل سبق لك أن تلقيت أي علاج هرموني لتفادي أعراض سن اليأس؟

نعم ☐ لا ☐

14.1. إذا كانت إجابة السؤال السابق نعم، كم كانت عدد سنوات تعرضك لذلك العلاج الهرموني؟

أقل من 5 سنوات ☐ من 6 إلى 10 سنوات ☐ أكثر من 10 سنوات ☐

نمط الحياة

15. هل سبق لك استخدام صبغات الشعر؟

نعم ☐ لا ☐

15.1. إذا كانت إجابة السؤال السابق نعم، كيف تصفين استخدامك لتلك الصبغات؟

اغلب الأحيان ☐ عادة ☐ أحيانا ☐ نادرا ☐

15.2. كم كان عمرك عند أول استخدام لتلك الأصباغ؟.....

16. هل سبق لك استخدام مزيل العرق "أسفل الإبط"؟

نعم ☐ لا ☐

16.1. إذا كانت إجابة السؤال السابق نعم، كيف تصفين استخدامك لمزيل العرق أسفل الإبط؟

اغلب الأحيان ☐ عادة ☐ أحيانا ☐ نادرا ☐

16.2. كم كان عمرك عند أول استخدام لك لمزيل العرق أسفل الإبط؟.....

17. هل سبق لك استخدام مواد التجميل على الوجه؟

نعم ☐ لا ☐

17.1. إذا كانت إجابة السؤال السابق نعم، كيف تصفين استخدامك لتلك المواد؟

اغلب الأحيان ☐ عادة ☐ أحيانا ☐ نادرا ☐

17.2. أي نوع من مواد التجميل كانت الأكثر استخداما لديك؟

ماكياج العيون ☐ احمر الشفاه ☐ بودرة الوجه ☐ جميع ما ذكر ☐

18. هل سبق لك استخدام مراهم إزالة الشعر؟

نعم ☐ لا ☐

18.1. إذا كانت إجابة السؤال السابق نعم، كم كان عمرك عند أول استخدام لتلك المراهم؟.....

18.2. كيف تصفين استخدامك لتلك المراهم؟

اغلب الأحيان ☐ عادة ☐ أحيانا ☐ نادرا ☐

التدخين

19. هل سبق و أن مارس والدك عادة التدخين أثناء وجودك؟

نعم ☐ لا ☐

19.1. إذا كانت إجابة السؤال السابق نعم، كم كان عمرك عند بداية تعرضك لدخان سجائر والدك؟.....

19.2. كم عدد المرات يوميا التي كان يمارس فيها والدك عادة التدخين أثناء وجودك؟.....

20. هل أقمت أو سكنت مع أي شخص آخر كان يمارس عادة التدخين أثناء وجودك؟

نعم ☐ لا ☐

20.1 إذا كانت إجابة السؤال السابق نعم، ما هي صلة القرابة التي تجمعك بذلك الشخص؟.....

20.2. كم كانت الفترة الزمنية التي أقمت فيها مع ذلك الشخص؟.....

21. هل سبق وان مارست عادة التدخين؟

نعم ☐ لا ☐

21.1. إذا كانت إجابة السؤال السابق نعم، هل سبق أن دخنت سيجارة واحدة يوميا لمدة ستة شهور أو أكثر؟

نعم ☐ لا ☐

النظام الغذائي

22. كيف تصفين نظامك الغذائي؟

نباتي ☐ حيواني ☐ طبيعي ☐

23. هل سبق لك أن تناولت في غذائك ما يعادك 1/2 كجم من اللحم الأحمر أسبوعيا

نعم ☐ أكثر من 1/2 كجم أسبوعيا ☐ اقل من 1/2 كجم أسبوعيا ☐

24. هل عادة تأكلين جلد الدجاجة؟

نعم ☐ لا ☐

25. هل تأكلين الأسماك؟

نعم ☐ لا ☐

25.1. هل الأسماك التي تتناوليها مع طعامك تكون عادة

مشوية ☐ مقلية بالزيت ☐ مغلية "مسلوقة" ☐

25.2. ما هو نوع السمك؟ طازج ☐ مجمد ☐

26. كم من الخضار الطازجة تتناولين يوميا؟

كمية كبيرة ☐ كمية متوسطة ☐ كمية قليلة ☐

26.1 وضحي الكمية بالجرامات.....

27. كم من الخضار المطبوخة تتناولين يوميا؟

كمية كبيرة ☐ كمية متوسطة ☐ كمية قليلة ☐

27.1 وضحي الكمية بالجرامات.....

28. هل سبق و أنت قمت بشراء خضار أو فاكهة في بداية موسمها؟

نعم ☐ لا ☐

29. هل تقومين بغسل الخضار أو الفاكهة قبل أكلها؟

نعم ☐ لا ☐

30. من من المواد التالية تستخدمين لغرض الطبخ؟

زيت الزيتون ☐ الزبدة ☐ السمنة ☐ مواد أخرى، وضحي.....

31. هل تستخدمين الأطعمة المعلبة "لحوم، اسماك، خضار"؟

نعم ☐ لا ☐

31.1. إذا كانت إجابة السؤال السابق نعم، كيف تصفين استخدامك لها؟

اغلب الأحيان ☐ عادة ☐ أحيانا ☐ نادرا ☐

32. هل تتناولين البيضة بأكملها على طعامك؟

نعم ☐ لا ☐

التعرض للمواد الكيميائية

33. هل سبق لك استخدام مواد كيميائية لغرض التنظيف داخل المنزل؟

نعم ☐ لا ☐

34. ما هي المواد الكيميائية التي كنت تستخدمينها لغرض التنظيف داخل المنزل؟ .....

35. هل سبق لك أن سكنت قريبا من إحدى المصانع؟

نعم ☐ لا ☐

35.1. إذا كانت إجابة السؤال السابق نعم، ما نوع هذا المصنع؟ .....

35.2. كم كانت الفترة الزمنية التي سكنت فيها بالقرب من هذا المصنع بالسنوات؟.....

36. هل سبق لك السكن قريبا من أماكن محارق النفايات؟

نعم ☐ لا ☐

36.1. إذا كانت إجابة السؤال السابق نعم، كم كانت الفترة الزمنية لسكنك بالقرب من تلك المحارق؟.....

37. هل سبق لك السكن قريبا من مواقع التخلص من النفايات الصلبة؟

نعم ☐ لا ☐

37.1. إذا كانت إجابة السؤال السابق نعم، كم كانت الفترة الزمنية لسكنك بالقرب من تلك المكبات بالسنوات؟.....

38. هل سبق لك التعرض لأي من المواد التالية؟

غازات سامة ☐ دخان الإطارات المشتعلة ☐ لا ☐

المهنة "الحرفة"

39. هل سبق لك أن عملت في أي مهنة لمدة تزيد عن 6 شهور؟

نعم ☐ لا ☐

39.1. إذا كانت إجابة السؤال السابق نعم، ماذا كانت تلك المهنة؟.....

39.2. كم كانت الفترة الزمنية التي قضيتيها في تلك المهنة؟.....

40. هل سبق لك التعرض بشكل منتظم لأي من مصادر التلوث خلال عملك؟

نعم ☐ لا ☐

40.1 إذا كانت إجابة السؤال السابق نعم، ما هو مصدر التلوث الذي تعرضت له خلال عملك؟

محرقة ☐ مدخنة ☐ مبيدات ☐ أسمدة ☐

غبار ☐ لا ☐ مصادر أخرى، وضحي.....

41. ما هي مهنة زوجك الحالي؟.....

42. ما هو المسمى الوظيفي لزوجك الذي قضى فيه أطول فترة زمنية؟.....

42.1. كم كانت الفترة الزمنية التي قضاها زوجك في مسماه الوظيفي السابق بالسنوات؟.....

المبيدات

43. هل سبق لك أن سكنت في مزرعة أو منطقة زراعية؟

نعم ☐ لا ☐

43.1. إذا كانت إجابة السؤال السابق نعم، هل كانت تستخدم المبيدات على المحاصيل في تلك المزرعة؟

نعم ☐ لا ☐

44. هل سبق لك أن تعاملت مع المحاصيل الزراعية بأيد مكشوفة؟

نعم ☐ لا ☐

45. هل سبق لك أن عملت أو ساعدت بالعمل في المزرعة أثناء رش المبيدات أو خلا 24 ساعة من رشها؟

نعم ☐ لا ☐

46. هل سبق لك أن شاركت في شراء أو توصيل المبيدات؟

نعم ☐ لا ☐

47. هل سبق لك أن ساهمت أو ساعدت في تنظيف معدات خلط و استخدام المبيدات؟

نعم ☐ لا ☐

48. هل سبق لك أن قمت شخصيا برش المبيدات على المحاصيل في المزرعة؟

نعم ☐ لا ☐

48.1. إذا كانت إجابة السؤال السابق نعم، ما نوع المبيد التي كنت تستخدمينه؟.....

48.2. كم كانت الفترة الزمنية التي كنت ترشين فيها المبيدات؟.....

49. هل عمل أو يعمل أي ممن تقطنين المنزل معهم في مزرعة أو منطقة زراعية؟

نعم ☐ لا ☐

49.1. إذا كانت إجابة السؤال السابق نعم، هل كان لك أي اتصال كاللمس بالأيدي لملابسه أو معداته التي يستخدمها؟

نعم ☐ لا ☐

50. هل يعمل أو كان/ت يعمل والدك/أمك/ابنك/أخيك في مزرعة أو في مجال الزراعة؟

نعم ☐ لا ☐

50.1. كم كانت الفترة الزمنية التي سكنت فيها معه/ها؟.....

51. هل سبق لك أن سكنت قريبا من مزرعة أو منطقة زراعية؟ نعم ☐ لا ☐

51.1. إذا كانت إجابة السؤال السابق نعم، هل كنت تشتمين روائح غريبة تشبه رائحة المبيدات؟

نعم ☐ لا ☐

51.2. كم كانت الفترة الزمنية التي سكنتيها قريبا من المزرعة أو من المنطقة الزراعية؟.....

Annex (2) English questionnaire

Explanatory letter

"Environmental Risk Factors Associated with Breast Cancer - Gaza Governorates"

Dear Participant,

This study carried out by the researcher as a requirement to obtain a master's degree in public health specialty of environmental health at the Al-Quds University – Palestine.

Thank you for your participation in this study by answering the questions of the questionnaire, which takes no more than 30 minutes of your valuable time and your participation contribute to the success of the study, which aims to identify the possible risk factors for breast cancer among women in Gaza Strip.

And the researcher would like to emphasize that the information will remain confidential and for the purpose of scientific research that does not need to mention names, note that the right to refrain from participating answer any questions or refused to participate.

Thank you for your participation

Researcher,
Asad Said M. Ashour

Questionnaire

"Environmental Risk Factors Associated with Breast Cancer - Gaza Governorates"

Serial No…….
Subject 1) Case 2) Control
Date: ……

I. Personal Profile

Name……**(Optional)**

1. Address:-

1.1 Governorate

1) North 2) Gaza 3) Mid-Zone 4) Khanyounis 5) Rafah

1.2 Living area:

1) City 2) Camp 3) Village

2. Age in years …….

3. Educational level in years …….

4. Marital status:

1) Married 2) Single 3) Divorced 4) Widowed

4.1 What is the number of children? …….

The following questions from No. 5 to 8 for case only

5. What is the date of diagnosis? ...../ ……/ ……..

6. What is your age at diagnosis? ……..

7. One year prior to diagnosis how much did you weight? ……. Kg

7.1 What is your current weight? …….Kg

8. How the problem was discovered?

1) Accidentally 2) Routine self examination 3) Routine physical examination by health professional

II. Physical Environmental Risk factors

9. Did you ever have x-ray in the past?

1) Yes 2) No

9.1. If yes, how many times? ……..

9.2. What is the reason? ……..

9.3. What is the type of x-ray did you ever have? ……

10. Have you ever have radiation therapy in the past?
1) Yes 2) No

10.1. If yes, please indicate the duration? ……

10.2. What was the reason? …….
11. Have you exposed to physical trauma on the breast?
1) Yes 2) No

III. Chemical Environmental Risk Factors
Contraceptive and Hormonal Therapy
12. Have you ever take birth control pills, shots or implants for a another reasons such as irregular menstrual periods, acne, cramps, menopausal symptoms?
1) Yes 2) No

12.1. What is the total number of years you have taken birth control pills, shots, or implants? ……

13. Have you ever take any medication to get pregnant for the treatment of infertility?
1) Yes 2) No

14. Have you ever take any hormone replacement therapy for menopausal symptoms?
1) Yes 2) No

14.1. If yes, what is the total number of years you have taken hormone replacement therapy?
1) Never 2) 5 years or less 3) 6-10 years 4) more than 10 years

Lifestyle
15. Did you use hair dye ingredients?
1) Yes 2) No

15.1. If yes, how it was?
1) Often 2) Usually 3) Sometimes 4) Rarely

15.2. How old were you when you start to use hair dye? …….

16. Did you use underarms deodorants?
1) Yes 2) No

16.1. If yes, how it was?
1) Often 2) Usually 3) Sometimes 4) Rarely
16.2. How old were you when you start to use antideoderant underarms?
…….
17. Did you use facial cosmetics?
1) Yes 2) No
17.1. If yes, how it was?
1) Often 2) Usually 3) Sometimes 4) Rarely

17.2. Which type of facial cosmetics you used?
1) Eye shadow 2) Lipsticks 3) Face powder
4) All of them

18. Did you use hair removal ointments?
1) Yes 2) No
18.1. How old were you when you start to use antideoderant underarms?
……
18.2. If yes, how it was?
1) Often 2) Usually 3) Sometimes 4) Rarely

Smoking

19. Did your father smoke in your presence?
1) Yes 2) No

19.1. How old were you when you exposed to your father smoke? ……..

19.2. How many times a day did your father smoke in your presence? …….

20. Did you live with any other persons who smoked in your presence?
1) Yes 2) No

20.1. What was the relationship of that person to you? ……

20.2. How long of this period? …….
21. Did you smoke any type of tobacco?
1) Yes 2) No

21.1. Did you ever smoke at least one cigarette/day for six months or more?
1) Yes 2) No

Diet
22. How do you describe your diet?
1) Vegetarian 2) Animal 3) Normal

23. Did you eat about 500gm/week of red meat?
1) Yes 2) More than 500gm/week 3) Less than 500gm/week

24. Did you usually eat the skin of chicken?
1) Yes 2) No

25. Did you eat fish?
1) Yes 2) No

25.1. Was the fish usually
1) Grilled 2) Fried 3) Boiled

25.2. What was the type of fish?
1) Fresh 2) Frozen

26. How much raw vegetables do you eat weekly?
1) Large amount 2) Moderate amount 3) Small amount
26.1. Specify the quantity in grams? ……

27. How much cooked vegetables do you eat weekly?
1) Large amount 2) Moderate amount 3) Small amount
27.1. Specify the quantity in grams? ……

28. Do you used to buy vegetables and fruits at the beginning of the season?
1) Yes 2) No

29. Do you wash vegetables and fruits before eating?
1) Yes 2) No

30. Which of the following do you use in cooking?
1) Olive oil 2) Butter 3) Margarine 4) Others,…….

31. Do you used to eat canned food (meat, fish, and vegetables)?
1) Yes 2) No

31.1. How it was?
1) Often 2) Usually 3) Sometimes 4) Rarely

32. Do you used to eat whole eggs?
1) Yes 2) No

Chemicals exposure

33. Have you ever used chemicals for cleaning at your home?
1) Yes 2) No
34. If yes, what type of chemicals? ……

35. Did/Do you live near field/factory?
1) Yes 2) No

35.1. If yes, what type of factory? …….

35.2. For how long? …….. years

36. Did/Do you live near any waste incinerators?
1) Yes 2) No

36.1. For how long? ……
37. Did/Do you live near any solid waste disposal site?
1) Yes 2) No
37.1 If yes, for how long? ……

38. Did/Do you expose to any of the following?
1) Toxic gases 2) Fumes of tires fire 3) No
38.1. For how long? …….

Occupation

39. Have you ever employed for more than 6 month?
1) Yes 2) No

39.1. What was the job? ……..

39.2. For how many years did you work in this job? ……. years

40. Have you been regularly exposed to source of pollution in your work?
1) Yes 2) No
40.1. If yes, what was the source of pollution?
1) Incinerator 2) Smokestack 3) pesticides
4) Fertilizer 5) Dust 6) No
7) Others, specify …….

41. What was your current husband's job? …….

42. In what job title did he work for the longest period? ……

42.1. How long did he work? …….

Pesticides

43. Since you born, have you ever lived in a farm?
1) Yes 2) No
43.1. If yes, for how long? ……..years

43.2. Were pesticides ever used on crops grown in this farm?
1) Yes 2) No

44. Did you ever work with any crops by naked hands?
1) Yes 2) No

45. Did you work or help in the field at the same time or within 24 hours of the time that Pesticides were being applied?
1) Yes 2) No

46. Did you participate in the buying or transporting of pesticides?
1) Yes 2) No

47. Did you participate in the cleaning of the pesticide mixing or application equipment?
1) Yes 2) No

48. Did you personally apply pesticides to any of the crops on the farm?
1) Yes 2) No

48.1. If yes, which type of pesticides did you apply? ……

48.2. How did you apply the pesticides? ……

49. Did/do anyone you lived with in the same home work in a farm or agricultural area?
1) Yes 2) No

49.1. If yes, did you have any contact with their working clothes, tools, and equipment?

1) Yes 2) No

50. Did/Do your father/mother/brother/sister work in a farm?

1) Yes 2) No

50.1. If yes, for how long? ……..

51. Did you live beside a farm or any rural area?

1) Yes 2) No

51.1. Did you smell any strange odors like the pesticides?

1) Yes 2) No

51.2 How long of this period? ……

Annex (3) Approval of Helsinki

33

Palestinian National Authority
Ministry of Health
Helsinki Committee

السلطة الوطنية الفلسطينية
وزارة الصحة
لجنة هلسنكي

التاريخ 7/6/2010

Name:

الاسم: أسعد سعيد محمد عاشور

I would like to inform you that the committee has discussed your application about:
Environmental risk factors associated with breast cancer- Gaza Governorates.

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:-

In its meeting on June 2010
and decided the Following:-
To approve the above mention research study.

و ذلك في جلستها المنعقدة لشهر 6 2010
و قد قررت ما يلي:-
الموافقة على البحث المذكور عاليه.

Signature
توقيع

Member
عضو

Member
عضو

Chairperson

Conditions:-
- Valid for 2 years from the date of approval to start.
- It is necessary to notify the committee in any change in the admitted study protocol.
- The committee appreciate receiving one copy of your final research when it is completed.

Annex (4) Approval of Human Resources Development (MOH)

Al-Quds University
Jerusalem
School of Public Health

جامعة القدس
القدس
كلية الصحة العامة

2010/7/13

الأخ/د. ناصر أبو شعبان المحترم
مدير عام تنمية القوى البشرية–وزارة الصحة
تحية طيبة وبعد،،،

الموضوع: مساعدة الطالب أسعد سعيد عاشور

يقوم الطالب المذكور أعلاه بإجراء بحث بعنوان:

"Environmental Risk Factors Associated with Breast Cancer- Gaza Governorates"

كمتطلب للحصول على درجة الماجستير في الصحة العامة–مسار صحة البيئة و عليه نرجو التكرم للإيعاز لمن ترونه مناسب لتسهيل مهمة الطالب في جمع البيانات اللازمة من مستشفى الشفاء الطبي و مستشفى غزة الأوروبي التابعين لوزارة الصحة.
علماً بأن المعلومات ستكون متوفرة لدى الباحث و الجامعة فقط.

و اقبلوا فائق التحية و الاحترام،،،

د. بسام أبو حمد
منسق عام برامج الصحة العامة

نسخة:
– الملف

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ص.ب/51000–القدس

Annex (5) Approval of El-Shifa Hospital

Palestinian National Authority
Ministry Of Health
Hospitals General Administration

السلطة الوطنية الفلسطينية
وزارة الصحة
الإدارة العامة للمستشفيات

الرقم:عام

التاريخ:٢٠١٠/٠٨/٠٢م

الأخ / د. حسين عاشور حفظهم الله

مدير عام مجمع الشفاء الطبي

السلام عليكم ورحمة الله وبركاته

الموضوع/ إجراء بحث

بالإشارة لكتاب السيد مدير عام تنمية القوى البشرية بخصوص الموضوع أعلاه يرجى تسهيل مهمة الطالب/أسعد سعيد عاشور وملتحق ببرنامج ماجستير الصحة العامة- إدارة صحية- جامعة القدس لإجراء بحث بعنوان.

"Environmental Risk Factor Associated with Breast Cancer-Gaza Governorates"

حيث سيقوم الباحث بتعبئة استبانه من المرضى بمجمع الشفاء الطبي وعينة ضابطة أخرى من المرضى الغير مصابين بهذا المرض بعد أن يقوم الباحث بأخذ الموافقة الخطية من المرضى ، وذلك بما لا يتعارض مع مصلحة العمل وضمن ضوابط وأخلاقيات البحث العلمي، دون تحمل الوزارة أي أعباء.

ولا مانع لدينا من إجراء الاستبيان.

آملين حسن تعاونكم،،،

٢٠١٠/٨/٥

د.محمد الكاشف

مدير عام المستشفيات

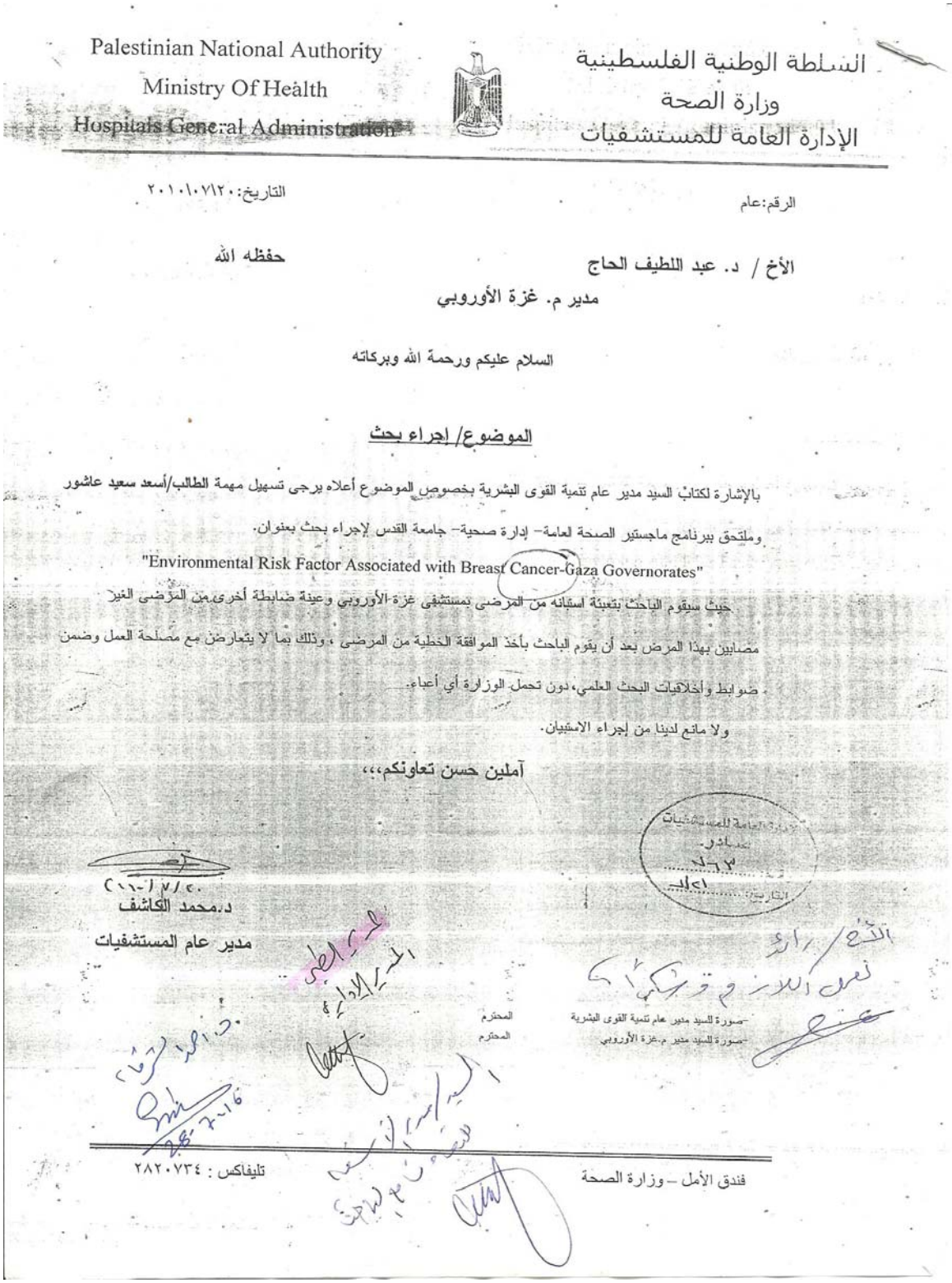
الإدارة العامة للمستشفيات
الصادر
الرقم: .....
التاريخ: .....
المحتويات
المختوم

-صورة للسيد مدير عام تنمية القوى البشرية
-صورة للسيد مدير تفتيش الطبي

فندق الأمل – وزارة الصحة

تليفاكس : ٢٨٢٠٧٣٤

Annex (6) Approval of EG Hospital



Palestinian National Authority
Ministry Of Health
Hospitals General Administration

السلطة الوطنية الفلسطينية
وزارة الصحة
الإدارة العامة للمستشفيات

الرقم:عام

التاريخ: ٢٠١٠/٧/٢٠

الأخ / د. عبد اللطيف الحاج
مدير م. غزة الأوروبي

حفظه الله

السلام عليكم ورحمة الله وبركاته

الموضوع/ إجراء بحث

بالإشارة لكتابْ السيد مدير عام تنمية القوى البشرية بخصوص الموضوع أعلاه يرجى تسهيل مهمة الطالب/أسعد سعيد عاشور

وملتحق ببرنامج ماجستير الصحة العامة- إدارة صحية- جامعة القدس لإجراء بحث بعنوان.

"Environmental Risk Factor Associated with Breast Cancer-Gaza Governorates"

حيث سيقوم الباحث بتعبئة استبانه من المرضى بمستشفى غزة الأوروبي وعينة ضابطة أخرى من المرضى الغير

مصابين بهذا المرض بعد أن يقوم الباحث بأخذ الموافقة الخطية من المرضى ، وذلك بما لا يتعارض مع مصلحة العمل وضمن

ضوابط وأخلاقيات البحث العلمي، دون تحمل الوزارة أي أعباء.

ولا مانع لدينا من إجراء الاستبيان.

آملين حسن تعاونكم،،،

د.محمد الكاشف
مدير عام المستشفيات

المحترم

المحترم

-صورة للسيد مدير عام تنمية القوى البشرية
-صورة للسيد مدير م.غزة الأوروبي

تليفاكس : ٢٨٢٠٧٣٤

فندق الأمل – وزارة الصحة

Annex (7) Approval of Primary Health Care (MOH)

The Palestinian National Authority
Ministry of Health
Directorate General of Human Resources Development

السلطة الوطنية الفلسطينية
وزارة الصحة
الإدارة العامة لتنمية القوى البشرية

الرقم :.../1396/10
التاريخ: 2010/09/28

الأخ الدكتور/ فؤاد العيسوي المحترم،،،
مدير عام الرعاية الأولية

تحية طيبة وبعد،،،

الموضوع/ إجراء بحث

بخصوص الموضوع أعلاه، يرجى تسهيل مهمة الطالب/ أسعد سعيد عاشور والملتحق ببرنامج ماجستير الصحة العامة- مسار إدارة صحية- جامعة القدس لإجراء بحث بعنوان:

"Environmental Risk Factors Associated with Breast Cancer – Gaza Governorates"

حيث سيقوم الباحث بتعبئة استبانه من الحالات التي تقوم بعمل(mammography) ونتائجها سلبية، كعينة ضابطة للبحث ضمن ضوابط وأخلاقيات البحث العلمي وأخذ الموافقة الخطية من المشاركين في البحث، دون تحمل الوزارة أي أعباء.

وتفضلوا بقبول التحية والتقدير،،،

د. ناصر رأفت أبو شعبان
مدير عام تنمية القوى البشرية

صورة لـ:
- الملف

وزارة الصحة
الإدارة العامة للرعاية الأولية
الرقم: ...1396/10...
التاريخ: 29/9/10

Gaza Tel / 08-2827298 Fax / 08-2868109 Email / gdhrd@moh.gov.ps

Annex (8) Approval of Ministry of Education

Al-Quds University
Jerusalem
School of Public Health

جامعة القدس
القدس
كلية الصحة العامة

2010/10/30

معالي الدكتور/محمد عسقول المحترم
وزير التربية و التعليم
تحية طيبة وبعد،،،

الموضوع: مساعدة الطالب/ أسعد سعيد عاشور

ضمن برنامج ماجستير الصحة العامة/بكلية الصحة العامة –جامعة القدس يقوم الطالب المذكور أعلاه بإجراء بحث بعنوان:

"Environmental Risk Factors Associated with Breast Cancer- Gaza Governorates"

و ذلك كمتطلب للحصول على درجة الماجستير في الصحة العامة-مسار صحة البيئة و عليه نرجو التكرم من معاليكم بالموافقة و الإيعاز لمن ترونه مناسب لتسهيل مهمة الطالب في جمع البيانات اللازمة من المدرسات العاملات في المدارس الحكومية و شاركن بالفحص المبكر للسرطان الثدي. علماً بأن الطالب حاصل على موافقة أخلاقية (لجنة هلسنكي، و وزارة الصحة) لإجراء البحث.

علماً بأن المعلومات ستكون متوفرة لدى الباحث و الجامعة فقط.

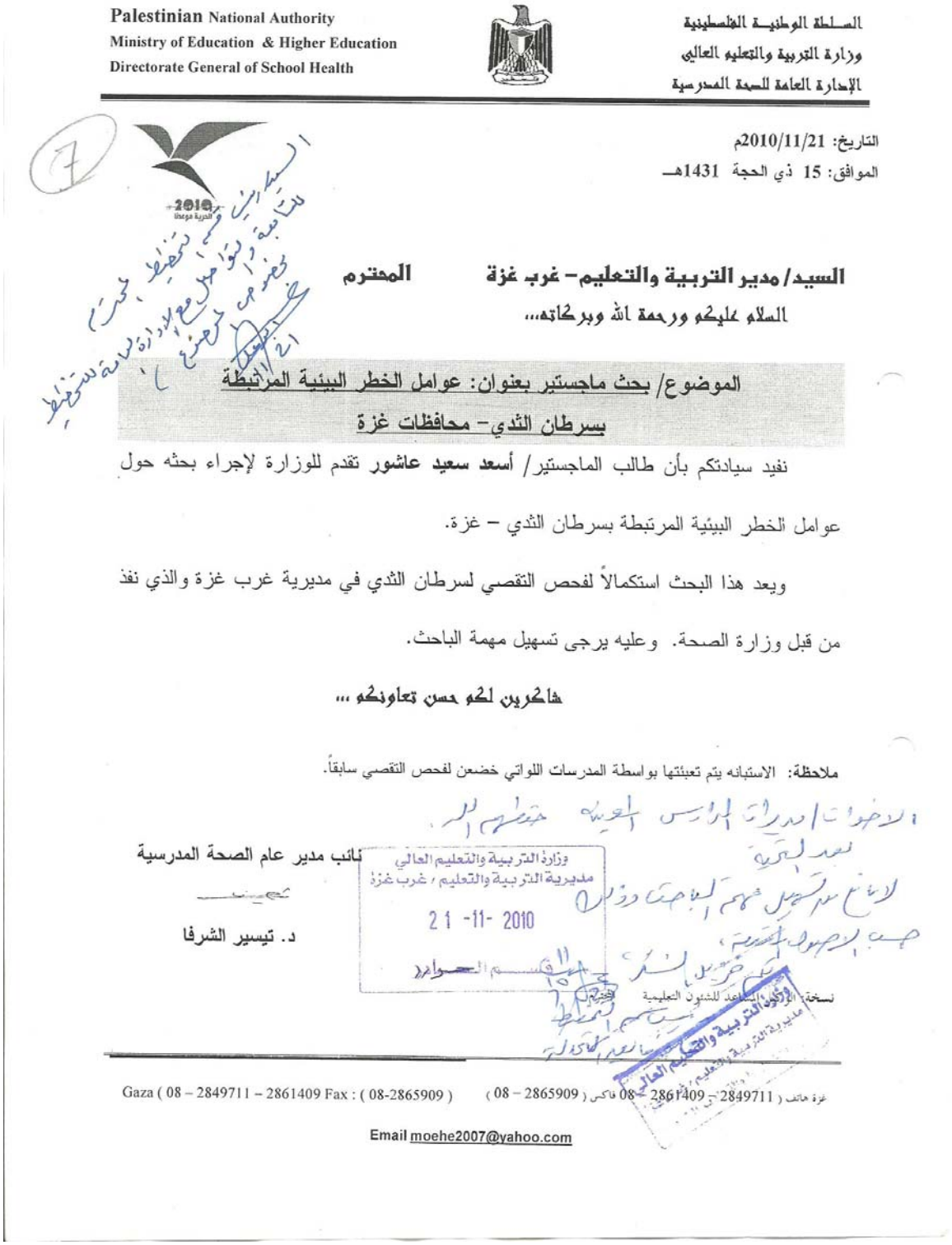
و اقبلوا فائق التحية و الاحترام،،،

د. بسام أبو حمد
منسق عام برامج الصحة العامة

نسخة:
- الملف

Jerusalem Branch/Telefax 02-24799234
Gaza Branch/telefax 08-2884422-2884411
Sphealth@admin.alquds.edu
فرع القدس/تلفاكس 02-2799234
فرع غزة/تلفاكس 08-2884422-2884411
ص.ب/51000-القدس

Annex (9) Approval of Area Education Officer-West Gaza.



Palestinian National Authority
Ministry of Education & Higher Education
Directorate General of School Health

السلطة الوطنية الفلسطينية
وزارة التربية والتعليم العالي
الإدارة العامة للصحة المدرسية

التاريخ: 2010/11/21م
الموافق: 15 ذي الحجة 1431هـ

السيد/ مدير التربية والتعليم- غرب غزة المحترم

السلام عليكم ورحمة الله وبركاته...

الموضوع/ بحث ماجستير بعنوان: عوامل الخطر البيئية المرتبطة بسرطان الثدي- محافظات غزة

نفيد سيادتكم بأن طالب الماجستير/ **أسعد سعيد عاشور** تقدم للوزارة لإجراء بحثه حول عوامل الخطر البيئية المرتبطة بسرطان الثدي – غزة.

ويعد هذا البحث استكمالاً لفحص التقصي لسرطان الثدي في مديرية غرب غزة والذي نفذ من قبل وزارة الصحة. وعليه يرجى تسهيل مهمة الباحث.

شاكرين لكم حسن تعاونكم ...

ملاحظة: الاستبانه يتم تعبئتها بواسطة المدرسات اللواتي خضعن لفحص التقصي سابقاً.

نائب مدير عام الصحة المدرسية

د. تيسير الشرفا

وزارة التربية والتعليم العالي
مديرية التربية والتعليم / غرب غزة
21 -11- 2010

نسخة: الأرشيف المساعد للشؤون التعليمية

Gaza (08 – 2849711 – 2861409 Fax : (08-2865909) غزة هاتف (08 – 2849711 – 2861409) فاكس (08 – 2865909)

Email moehe2007@yahoo.com

Annex (10) Arabic abstract

ملخص الرسالة

"عوامل الخطر البيئية المرتبطة بسرطان الثدي- محافظات غزة"

تهدف هذه الدراسة إلى تحديد عوامل الخطر البيئية المرتبطة بسرطان الثدي والتي تم تطبيقها في مستشفيين رئيسيين في قطاع غزة هما مستشفى الشفاء بغزة ومستشفى غزة-الأوروبي جنوب قطاع غزة في عام 2010 ميلادية. كان حجم العينة 288 امرأة، 144 امرأة مصابة بسرطان الثدي و144 امرأة أخرى سليمة غير مصابة بسرطان الثدي ولهذا تم تصميم دراسة الحالة والضابطة لتفي بغرض تحقيق أهداف الدراسة، واستخدمت الاستبانة لتحقيق تلك الأهداف أيضا والتي تم تطبيقها على الحالات و العينة الضابطة وجها لوجه من خلال المقابلة الشخصية، وكانت نسبة الاستجابة 100% لكلا من الحالات والعينة الضابطة، ولتحليل البيانات تم استخدام المجموعة الإحصائية للعلوم الاجتماعية. تم اختيار الحالات خلال الفترة الزمنية الممتدة من شهر أغسطس من العام 2010 ميلادية إلى شهر ديسمبر من نفس العام حيث شملت الحالات جميع السيدات اللواتي يتابعن في عيادات الأورام في كلا المستشفيين خلال الفترة الزمنية سابقة الذكر، أما العينة الضابطة فقد تم اختيارها بعناية فائقة للتأكد من خلو السيدات المشاركات في الدراسة من إصابتهن بسرطان الثدي وذلك باختيار السيدات اللواتي شاركن في برنامج الفحص المبكر لسرطان الثدي في عيادة الرمال الصحية ومن السيدات اللواتي عملن فحص مبكر لسرطان الثدي بشكل شخصي ومن بعض النساء اللواتي عملن فحص جسدي شخصي بأنفسهن مع مراعاة سؤالهن عن طريقة الفحص الشخصية للتأكد من معرفتهن بالطريقة الصحيحة. شملت الدراسة على العديد من المتغيرات، منها المتغيرات الديموغرافية و المتغيرات غير المباشرة والمتعلقة بالعوامل الكيميائية البيئية والعوامل الفيزيائية البيئية والتي من المتوقع أن تساهم في الإصابة بسرطان الثدي عند السيدات. وجدت هذه الدراسة مجموعة من عوامل الخطر ذات الدلالة الإحصائية المعنوية مثل: الوضع الاجتماعي للسيدة، الوضع التعليمي للسيدة، الضربات الجسدية على الثدي التي تتعرض لها السيدة، علاجات الإنجاب، تناول اللحوم الحمراء لأكثر من 500 جرام أسبوعيا، تناول الخضروات المطبوخة وغير المطبوخة، تناول جلد الدجاج، استخدام المواد المشبعة بالدهون، السكن قريبا من مكبات النفايات الصلبة، التعرض لبعض مصادر التلوث خلال العمل مثل المخصبات الزراعية والمبيدات والغبار، السكن داخل مزرعة أو قريبا من مزرعة، التعامل مع المبيدات بأيدي مكشوفة، العمل داخل مزرعة أثناء رش المبيدات أو خلال 24 ساعة من رشها، تنظيف الأدوات والمعدات المستخدمة في رش المبيدات ، السكن مع أشخاص يعملون في الزراعة وأخيرا رش المبيدات. بينت الدراسة أن عوامل الخطر الأخرى التي تم دراستها ليست ذات دلالة إحصائية مثل منطقة السكن، التعرض لأشعة اكس، التعرض لعلاج إشعاعي، تناول حبوب منع الحمل،استخدام صبغات الشعر، استخدام مزيل العرق أسفل الإبط، استخدام مستحضرات التجميل، استخدام مراهم إزالة الشعر، السكن قريبا من محارق النفايات، شراء وتوصيل المبيدات. وأخيرا أوصت الدراسة بتنفيذ برامج الفحص المبكر لسرطان الثدي ليشمل جميع شرائح المجتمع والبعد قدر الإمكان عن تناول أكثر من 500 جرام أسبوعيا من اللحوم الحمراء وإتباع إجراءات الوقاية السلامة أثناء التعامل مع المبيدات ومعداتها.