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Colorectal Cancer Risk Factors in Gaza Governorates

Submitted by

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Colorectal Cancer Risk Factors in Gaza Governorates

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Dedication

To my beloved family, to my sincere friends, to all the Palestinian people and future generations I dedicate this work.

Declaration

I certify that this entire thesis submitted for the degree of master is my own work and has not written to me in whole or in part, by any other person(s), and that this thesis (or any part of the same) has not been submitted for a higher degree or qualification to any other university or institution.

Signed
Haya Nabeel Shaban Al Rayes
Date: / /

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List of Abbreviations

BMI	Body Mass Index
CBD	Chronic Bowel Disturbances
CDC	Centers for Disease Control and Prevention
CRC	Colorectal Cancer
EGH	European Gaza Hospital
FAP	Familial Adenomatous Polyposis
FHRT	Females Hormonal Replacement Therapy
HNPCC	Hereditary Non Polyposis Colon Cancer
IBD	Inflammatory Bowel Disease
NIS	New Israeli Sheqalim
NSAIDs	Non Steroidal Anti Inflammatory Drugs
OR	Odds Ratio
PCBS	Palestinian Central Bureau of Statistics
PENGO	Palestinian Non Governmental Organizations Network
PMOH	Palestinian Ministry of Health
RR	Relative Risk
SPSS	Statistical Package for Social Sciences
UNRWA	United Nation Relief and Work Agency for Palestinian Refugees
US	United States
US$	United States Dollar
WHO	World Health Organization

Abstract

Background: *Colorectal cancer is one of the top five cancers in the Palestinian society. Risk or protection factors of the disease vary between genetics and environmental factors which involve nutritional and lifestyle behaviors.*

Aim*: The study was conducted to identify the most common risk factors that may be associated with colorectal cancer among the population Gaza Governorates.*

Design and methods*: A case control study involved 66 registered colorectal cancer patients from Al Shifa and Gaza European hospitals matched (for age, sex and locality) with two controls for each case. Controls were chosen from the primary health care centers. An interviewed questionnaire was used to compare between cases and controls in relation to the socioeconomic factors, family history, chronic diseases, dietary habits, lifestyles, supplementations, medications, health education and screening. To examine statistical significance OR with 95% confidence interval besides, Chi square test were calculated; P value <0.05 was considered as significant.*

Results: *Risk of colorectal has been increased with: lower income level OR=6.5(2.39-18.29), lower level of education OR=2.53(0.91- 7.1), some types of professions OR=3.42(1.49-7.93), family history OR=4.2 (1.35-13.54), chronic bowel disturbances OR=42.8(15.5- 124.7), eating fried fish OR=6.6(1.77-29.08), preferring to eat red meat OR=2.1(1.1-4.0) and poor health knowledge OR=2.38(1.17- 4.86). Protection from colorectal cancer was obtained with regular intake of fruits OR=0.3(0.09-.98), cereals OR=0.5(0.26- 0.96), bran bread OR=0.44(0.21- 0.94), besides preferring to eat vegetables OR=0.51(0.24-1.0), calcium supplementation intake OR=0.36(0.13-0.91), and attending of health educational lectures about healthy nutrition and life styles OR=0.51(0.25- 1.0). Colorectal cancer screening tests were only performed for the diagnosis of the disease rather than being used for the screening purpose. No evidence of relation was associated with other chronic diseases, other types of food, life styles and supplementations.*

Conclusion: *Risk was found with: family history, chronic bowel disturbances, socioeconomic factors, some food, and poor health knowledge, while protection was associated with of some other food, calcium. Recommendations to improve the community health education provide suitable related screening programs; improve cancer patients' registry and the encouragement of further related studies.*

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Chapter (1)

Introduction

1.1 Overview about cancer (international, regional and local)

Cancer is one of the most dramatic diseases currently frightening the world; it has many hard images of pain over populations; these images vary between physical, psychological, emotional, social and economical ones. It usually ends with death which is the most inevitable tragic part. Cancer disease starts to compete with heart diseases for being the leading cause of death worldwide (Chang and Candice, 2009). The estimate of total cancer deaths worldwide in 2007 was 7.6 million deaths (about 20,000 cancer deaths every day); it forms about 12.5 % of all the deaths in the world (Chang and Candice, 2009). By the year 2050, the global burden is expected to grow to 27 million new cancer cases and 17.5 million cancer deaths; simply these figures may be raised due to the growth and aging of population (Garcia, 2007). Moreover, it's expected that more than 70% of the projected cancer deaths will occur in both the low and middle income countries (WHO, 2006[a]).

Cancer ranks in its incidence after cardiovascular, infectious parasitic diseases and injuries; it lies on the fourth order of the leading causes of deaths in the East Mediterranean region. It kills about 272,000 people each year in the region. Although cancer incidence is still well below in the developing countries than that of the developed areas, it is expected in the two coming decades for the East Mediterranean region to have the highest increase in cancer cases among all of the WHO regions (WHO, 2009[a]), with a projection modeling of an increase ranging from 100% to 180%. This trend can be attributed to both population ageing and to the increase of the exposure to cancer risk factors, such as smoking, unhealthy diet, physical inactivity and environmental pollution (WHO, 2009[a]).

Cancer can affect any part of the body including both colon and rectum, when it appears in these parts it’s commonly named as colorectal cancer (CRC) or colon cancer. Total global CRC deaths around the world were estimated by nearly half a million deaths every year, moreover, the incidence of the new cases was estimated by nearly one million new cases every year (WHO, 2008[a]).

CRC resembles the fourth most common cancer incidence in both males and females worldwide (WHO, 2008[a]). The frequency of CRC varies around the world; it was most common in the western and developed countries while being of less occurring in the developing ones, but recently, it's incidence has been noticed to increase in that areas (World Gastroenterology Organization, 2007). This may be due to the changes in the economical conditions and life styles in these areas, in addition to, the transformation towards the western life styles and dietary habits (Levin & Smith, 2005). The increase in CRC incidence in both Arab and East Mediterranean regions may be due to that reason, in which CRC is considered the fifth leading cause of cancer incidence in both male and female in the East Mediterranean region (WHO, 2009[a]). While locally in the Palestinian West Bank; CRC incidence in the year 2005 was estimated by 9.6 and 9.2 per 100,000 populations in male and female respectively (Husseini et al., 2009).

1.2 Risk factors of colorectal cancer

Colorectal cancer risk factors vary between genetic and environmental factors; the genetic risk factors result from certain gene damages and some types of mutations; these genetic alterations may be transmitted through generations (Goodbrand & Steele, 2008). These inherited risk factors resemble a small proportion of CRC cases (American Cancer Society, 2010), other than, CRC is mostly considered as an environmental disease with the broad definition of the environment to involve cultural, social, and lifestyle practices (Boyle & Langman, 2001). One of the major environmental risk factors that may enhance CRC occurrence is the type of diet taken, which may be rich in saturated fats and poor of fibers; additionally, food processing procedures may increase the risk (Boyle & Leon, 2002). Obesity and lack of physical activity which seem to be dependent on each other may be other environmental risk factors related to CRC as well (Boyle & Leon, 2002; Franco & et al., 2005).

Determining CRC risk factors in a specific country may introduce some appropriate suggestions for that place specifically, thus may help to control the disease and decrease it's incidence in that area, and this may be achieved by focusing on preventive and control programs against these risk factors (Colditz, 2009), and as well may prevent of more than 40% of cancers when their enhancing modifiable risk factors are avoided and controlled (WHO, 2009[a]). It has been suggested that about

(9% to 37%) with average 23% of the CRC cases could be prevented when fully applying some recommendations about healthy life styles based on: physical activity, weight, smoking, alcohol intake, and diet (Kirkegaard et al., 2010). But modifications of these risk factors need long time to have their effect over the incidence of this disease; it was found that the minimal time span of about ten to fifteen years was required of changes in exposure to the related risk factors to be able to modify the incidence of this tumor (Bejar et al**.,** 2010).

The screening tests of CRC can be beneficial in the modification of the incidence of this disease as well; that's if these tests to be performed to persons at the age of 50, they can prevent about one- third of the deaths from CRC, this percent can be achieved by the early detection and early removal of polyps that may overtime initiate the cancer of colon or rectum. As stated by the Centers of Disease Control and Prevention (CDC) that screening tests can also discover CRC earlier which improves the chance of its curing (CDC, 2002). This reaches up to 90 percent curable when it is found in its early stages (U.S. Department of Health and Human Services, 2008).

1.3 Problem statement

Half of the cancer cases in the East Mediterranean region are occurring in people younger than the age of 55 years, this age is 10-20 years younger than those of the industrialized countries (WHO, 2009[a]). Moreover, the mortality to incidence ratio is 70% which is also higher than other countries of the world (40% in America, 55% in Europe); this indicates lower survival rates of the diagnosed cases in the developing countries. The top five cancers in the region when males and females are combined are breast, bladder, lung, oral and colon cancer (WHO, 2009[a]).

Studies that focus on cancer are to some extent scarce in Palestine, particularly in the Gaza Strip; although all the incidences of cancer are in an increasing manner as the same of all other areas of the world. CRC studies are scarce as well; in spite of being the third most common cancer in Gaza Strip with 11.4 of age standardized rate (12.1 for male and 10.9 for females) (PMOH, 2009). While for West Bank it was also the third most common type of cancer in men with age standardized incidence of 9.6%, and represented the fourth mortality rate in males, while being the second most common type in the women, with 9.2% of the age standardized incidence and leading

to the second highest mortality rate from cancer in female. The study was performed in the West Bank in 2005, (Husseini et. al., 2009). These figures may be underestimated due to cancer cases registration problems.

CRC is considered a disease of much affluence and results from the domination of sedentary life styles including; diet, over comfort and decrease of physical activity. Urbanization and transforming of developing countries to the western life styles and western dietary habits may trigger the development of this type of cancer in those areas previously used to have the original Mediterranean diet which is known to lower the risk of this disease in that areas (Randi et al, 2010). And recently the incidence of this type of cancer is increasing in young patients, despite of being a disease of elder people (El-Tawil et al, 2010).

This study tried to focus on risk factors that may enhance CRC in Gaza Governorates; although this area is considered as a moderate to low economical levels (The World Bank website, 2010). The study also tried to find out whether the most dominant risk factors in the Gaza Governorates are the same of those commonly found around the globe.

1.4 Justification of the study

By the completion of this study, it's expected to explore the major risk factors which may develop CRC among the population of Gaza Governorates; it may interpret the increase of CRC incidence in that area, which may be due to sedentary life style domination, changes in dietary habits, and the decrease of educational level; that may affect people's knowledge about the healthy dietary habits and healthy life styles. The global modifiable risk factors of CRC are mostly preventable, if these risk factors are the same among Gaza Strip population 70-80% of cases can be prevented (Boyle & Langman, 2001). This is simply achieved by avoiding these modifiable risk factors, which can be gained by introducing of health educational and promotional programs that clarify the influence of these risk factors on CRC, and thus helping to prevent their occurrence.

About two-thirds of the new cancers could be prevented by successful interventions against tobacco use and obesity (Chang & Collie, 2009 & Colditz, 2009). When

prevention programs are focused against diet and physical inactivity, 35% of the new cases can be prevented as well (Colditz, 2009).

World Health Organization, (2009[a]) suggested that 40% of cancers can be prevented by risk factor modification and cancer control can be improved by the greatest public health potential the prevention which might be the most effective and efficient strategy.

This study may help in the control and prevention of CRC, and as a result, there might be a decrease in its incidences and rates. Accordingly, this may prevent cancer, save lives, diminish suffering and reduce a part of referral treatment cost which has constituted the third highest health expenditure since the year 2005 (WHO, 2009[b]). At 2004 oncology cases were just 9% but with the highest referral cost of about 15.9% of total cost (Kharouf, 2006).

1.5 Aim of the study

The purpose of this study is to identify common risk factors that may be associated with colorectal cancer cases in Gaza Governorates population. Determination of these factors may help to develop preventive health educational and promotional programs against this disease**.**

1.6 Objectives

General Objective

To identify the major and common risk factors associated with the occurrence of CRC in Gaza Governorates' population.

Specific Objectives

- To identify the relation between colorectal cancer and some socioeconomic factors.
- To determine the relationships between family history and the occurrence of CRC.
- To assess the relationships between dietary habits and the emergence of cancer of colon and rectum.
- To examine the association between certain behavioral and personal life styles such as lack of physical activity, smoking and obesity with the CRC development.

- To clarify the relation between the health education, in addition, to the screening programs and the risk of CRC.
- To provide suggestions and recommendations to decrease rates of CRC.

1.7 Research questions of the study

1. Do different marital status with an influence to develop colorectal cancer?
2. Is there a relationship between CRC occurring and socioeconomic level of patients?
3. Does poor educational level affects more to develop colorectal cancer?
4. What is the effect of employment in colorectal cancer development?
5. Does occupation have correlation with colorectal cancer occurrence?
6. Is family history with a great influence on the occurring of CRC?
7. Do other chronic health and abdominal problems relate to CRC and trigger its occurring?
8. Is there an association between smoking habits and cancer of colon and rectum occurring?
9. Is obesity with a close association of CRC patients?
10. What is the relation between physical exercise and CRC development?
11. Are dietary habits with relationships to CRC?
12. Do participants exhibit screening programs through their lives before confirming the disease?
13. Do participants receive health educational programs health centers?
14. What are the main risk factors of colorectal cancer among the population of Gaza Strip?

1.8 Background of the study area

1.8.1 Gaza Governorates

Gaza governorates (together are known as Gaza Strip) form one of two compartments where the Palestinian live in the Palestinian land, while the West Bank including East Jerusalem forms the other compartment (WHO, 2006[b]). The Strip is divided into five smaller governorates; North Gaza, Gaza City, Mid Zone, KhanYounis and Rafah. These governorates' total population was estimated in the year 2010 by 1,535,120 resident forming about 37.7% of the total Palestinian population (PCBS, 2010[a]), this

large number of people is living in a small piece of land of about 365 km^2 on the south of Palestine (PCBS, 2009), this leads the Strip to be one of the highly dense areas in the world. Furthermore two thirds of the populations in that area are refugees (WHO, 2006[b]), with an average family size of 6.5 (PCBS, 2008), and an estimated dependency ratio at the year 2006 by 103.7. Added to this is the unemployment level at the year 2008 that reached 41.9% (PCBS, 2009).

Although about very high percent among people those above 15 years old in the Palestinian areas are literates, and the area is considered to have higher levels of literacy and education from the neighboring countries (WHO, 2006[b]), about 38% of the total population of the Gaza governorates were living under the line of poverty throughout the year 2010, with 33% of this class of people living in the deep poverty category (PCBS, 2010[b]).

1.8.2 Conditions that may influence health status in Gaza Governorates

Living and working conditions in any country can help to create or even destroy peoples' health; these conditions may include low levels of income, inappropriate housing, unsafe workplaces, and lack of access to the health services (WHO, 2006[c]). This fact can be applied on the Gaza Strip population. Furthermore, the problem of health in Palestine is influenced by many other factors exceeding those of any other country by which the situation is complicated. Occupation besides unstable political situations may be the core of these factors; they are both having too many consequences over health, their consequences vary and may directly lead to injury, disability and death, or indirectly may lead to physical displacement, peoples' marginalization, and violations of human rights through the prevention of people access to the health services by the fragmentation of land and the destruction of health infrastructures. Furthermore other consequences of the Israeli occupation to the area are food shortage, job insecurity and the out of hands borders which restrict people and goods movements. This situation is moreover complicated due to other internal factors that make the health condition worse, such of these factors are the governance financial troubles, management problems, dependence on international aids and tax revenues for resources (together these two resources form about 75% of the Palestinian National Authority budget) which are threatened to be boycotted after the year 2006 (Giacaman et al., 2009), with five percent of the international fund to be

directed for the health sector in the year 2004 (WHO, 2006[b]). Other threats of health in the area are the insufficiency of health personnel and specialists in some medical fields (surgery, pathology, anesthesiology and nursing) plus the shortages of both medication and equipments (Giacaman et al., 2009).

Another major health problem in the Palestinian occupied territory is the epidemiological transition among population in which non-communicable diseases, such as cardiovascular diseases, hypertension, diabetes, and cancer are replacing the communicable diseases which were previously dominant among the Palestinian population (Giacaman et al., 2009). And those non communicable diseases represented by cardiac, cerebrovascular diseases and cancer started to be the leading causes of death in Gaza Governorates (PENGO, 2009). CRC is a type of cancer that with an increasing manner in the West Bank population (Husseini et al., 2009) and may be in Gaza Strip too.

1.8.3 Health sectors and responsibilities

The Palestinian Ministry of Health (PMOH) was established in 1994, since then it started its responsibility toward the health of the Palestinian population which had been neglected when it was the responsibility of the Israeli military government before (WHO, 2006[b]). A round 70% of the health services are provided by the government in Gaza Strip, it provides primary, secondary and some tertiary health services while purchasing the unavailable tertiary health services from domestic and abroad providers. At the year 2004 fifteen percent of PMOH expenditure was spent for purchasing non-public medical services in Palestine (WHO, 2006[b]). The PMOH operates 13 hospitals in Gaza Strip (PMOH General Management of Hospitals website, 2010). It also manages a number of primary health care facilities in Gaza Strip (Abed, 2007).

Another provider of the health services in the area is the UNRWA; it provides primary care services only for the refugees and purchases secondary care services for the hardship cases. Nongovernmental medical sector (NGOs) is another health provider in Gaza Governorates, they provide primary, secondary and some of the tertiary services, the last provider of health is the private for profit health sector, it provides the three level of care through a variety of specialized hospitals and

investigation centers (WHO, 2006[b]). All UNRWA, NGOs and private health providers are supervised by and coordinate with the PMOH.

1.8.4 Quality of the health services provided to the population of Gaza Governorates

Unfortunately current health services haven't been adequately able to provide people's health needs and demands (Giacaman et al.**,** 2009*)*; this incapability and low quality of care may be due to the large number of patients using these services, few numbers of hospitals and few available human resources (Abed, 2007).

Other reasons for this failure may be due to the obstacles faced by health services to meet standards and the overall quality, which may result from restricted mobility and movement through both local and outside areas leading to less effective function of the health system (Giacaman et al., 2009). Management problems and weak capacity for monitoring and assessment may be other reasons contributing in the provision of low quality of health care. Multiplicity of donors and being with different agendas in addition to the over dependence of the Palestinian National Authority on donor financial assistance have also complicated the health situation, that all constrain the PMOH to establish it's priority of needs and results in fragmented health programs (Giacaman et al.**,** 2009).

The biggest failure to meet patient demands is in the provision of the tertiary care. Therefore, the PMOH is obliged to refer patients those who require tertiary care outside (Israel, Egypt, and Jordan) leading to a significant drain of health resources (Giacaman et al.**,** 2009). Referral for tertiary care requires a special committee agreement where specialists from secondary care level agree to refer the patient outside, and patients are with no choice to select between hospitals or physicians being referred to, the process is covered by governmental health insurance which costs millions of US$ for many years before (Abed, 2007), the total Palestinian referral treatment cost constituted the third highest health expenditure since the year 2005 (WHO, 2009[d]). Oncology cases were just 9%, but they were with the highest cost of about 15.9% of total referral cost (Kharouf, 2006). PMOH also purchases the unavailable chemotherapy drugs from the main foreign producers through bilateral agreements (WHO, 2006[b]).

The load over the health system became more complex on Gaza Strip lately, thus the health services has dramatically deteriorated of both local provision and outside treatment, this result from the Israeli tight siege over Gaza Strip, this siege is with a great bad influence over the Gaza's health system, thus rendering it dysfunctional properly through the last years (PENGO, 2009).

1.9 Operational Definitions

Risk factor: A factor that raises the probability of adverse health outcomes (WHO, 2009[d]).

Colorectal Cancer: It is the adenocarcinoma in the lining mucosa of either the colon or rectum; it may start in the cells that form mucus secretion glands, found in the mucosa of these parts (American Cancer Society, 2010).

Low education: Subjects having education of 6 years and less.

Medium education: Having educational years of more than 6 years and till 12 years.

High education: Having more than 12 years of education.

Low income: Having an income with less than 1000 NIS monthly.

Medium income: Having an income of more than 1000 and less than 3000 NIS

High income: Having an income of more than 3000 NIS monthly.

Living out Gaza Strip: Being a resident in any other Arab or foreign country for more than one year.

Class I profession: Subjects with occupations that do not require high levels of education including; constructing workers, painters, guards, grocers and electricians, cleaners, dress makers.

Class II profession: Subjects with occupations that require high levels of education.

Class III profession: Subjects whom were housewives, unemployed or being retired.

Regular intake of food: Having this type of food either daily, 2-3 times a week or weekly.

Less regular intake of food: Having this type of food twice a month, monthly, rare or never.

Meat low fat processing: Using boiling, steam methods in processing.

Meat & chicken high fat processing: Using frying, barbecuing or grilling methods in processing.

Fish low fat processing: Using the grilling method in processing.

Fish high fat processing: Using the frying method in processing.

Physical activity: It is defined as any bodily movement produced by the skeletal muscles and requires energy expenditure (WHO, 2009[c]). It could be any exercise, recreation or any other activity other than regular job duties.

Regular physical activity: Practicing the activity daily, twice a week or weekly.

Less regular physical activity: Practicing the activity twice a month, monthly, rare or never.

A daily smoker: Is the person who daily smokes any of the tobacco products (WHO, 2009[e]).

Obesity: It's defined as the body mass index (BMI = weight by kg /height in m^2) when it equals to or greater than 30 kg /m^2 (WHO, 2006[d]).

CRC Health knowledge: Knowing about CRC and its general risk factors.

Health knowledge about healthy food: Mentioning three types of fiber rich food.

Chapter 2

Conceptual Frame work & Literature Review

2.1 Conceptual frame work of the study

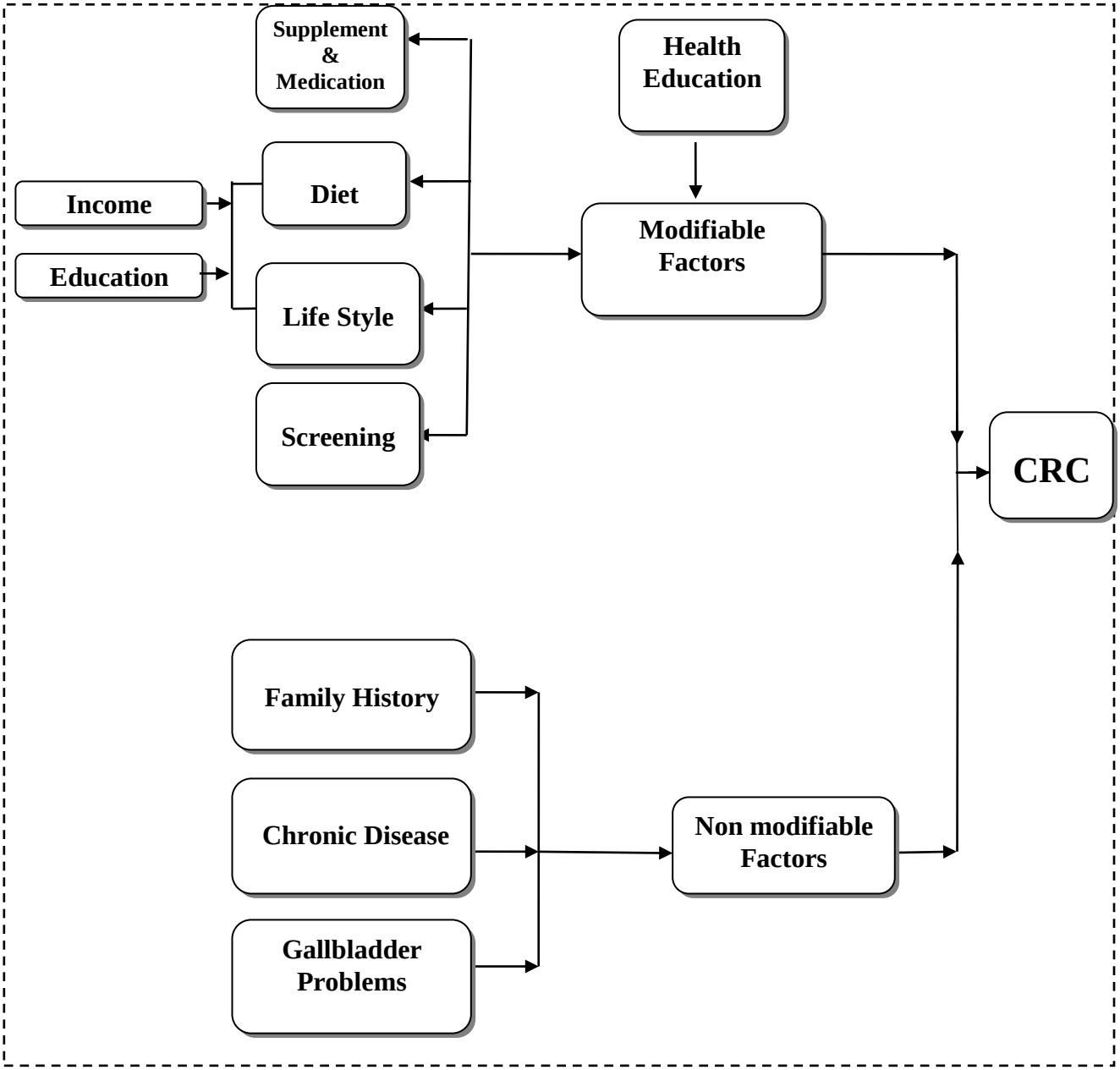

Figure 2.1: Conceptual frame work of the study

The conceptual frame work have been constructed after reviewing the concerning literature of CRC risk factors. Figure (2.1) illustrates this frame work; it consists of three major dimensions which are mainly affecting the development of CRC among populations. modifiable factors, non- modifiable factors in addition to the socioeconomic factors.

The study of non modifiable factors that may share in the development of CRC will focus on some items that are considered biologically found in the person and can't be changed or controlled to lower the risk of the disease development. These factors are mainly concerned of items such as: family history of CRC disease in addition to some chronic diseases (diabetes mellitus, chronic bowel disturbances, chronic inflammatory disease), and some other health problems such as bilary tract inflammation and cholecystectomy.

The other dimension of the study that will be discussed is the modifiable factors; those factors that can be changed, and by the control of their exposure, a noticeable change in the disease incidence may be obtained. These factors will involve socioeconomic variables such as marital status, occupation, and employment of participants, in addition to their income and educational levels. The study will also focus on subjects life styles including physical activities; smoking habits and obesity also it will review their dietary habits and their regular taking of some supplementations and medications. The provision of related health promotional and educational programs and health knowledge about healthy life style and diet for these subjects will also be checked in addition to the CRC screening programs that have effect on the risk of CRC.

Socioeconomic level may have a strong influence over all; the life styles, dietary habits and the health educational level; it (the health educational level) may affect both life styles and dietary habits. It's thought that with the increasing of economical levels people tend to exhibit sedentary life styles which is distinguished by less exerted activity and over comfort accompanied with the transformation of their dietary habits to fast food which is full of meat, fats and moreover being with little fiber content.

But fortunately, it's thought that with the increasing of literacy and educational levels people tend to improve their life styles, and as well they tend to improve their dietary habits. Health services also have their own role in such a problem, as it can improve the health educational level of people through introducing of health educational and promotional programs, besides sharing in the early diagnosis and control of CRC through the provision of CRC screening programs.

2.2 Literature review

2.2.1 Overview about Cancer

Cancer problem differs among countries around the world; every country and place has its own characteristics of its cancer profile and dominated types. As the same of the population of the East Mediterranean Region; Palestinians suffer from many types of cancer but it may be in a hidden or not in an evident way. This lower incidence of cancer types as other countries is due to less quality of cancer data in such developing countries (WHO, 1997) and thus may underestimate the problem of cancer incidences among the Palestinian population. The most dominated cancer types in the Palestinian West Bank were in order; lung, breast, prostate and colorectal (Husseini et al., 2009).

2.2.2 Colorectal Cancer

The adenocarcinomas of either colon or rectum are the most common type of colon or rectum cancer (more than 95% of colorectal cancers are of this type), these cancers start in cells that forming the glands responsible for the mucus secretion that lubricate the inside of the colon and rectum (American cancer society, 2010).

CRC other names are; Colon Cancer or Large Bowel Cancer. Lately CRC may be with an increased incidence in Palestine, it seems to be the most common malignancy of the gastrointestinal tract. Its age standardized incidences were 9.6 and 9.2 per 100,000 in males and females respectively in the Palestinian West Bank (Husseini et al., 2009).

Cancer problem in the Palestinian areas may be complicated, with its discovery and diagnosis at late stages, the problem is the same of the East Mediterranean region too, it may be due to the availability of less adequate services, lack of effective treatments, and the presence of insufficient number of well qualified oncology staff. Discovery at

late stages may decrease the survival rate of patients with CRC to 3-8 % despite being when early diagnosed and localized of about 90% of survival (WHO, 1997).

2.2.3 Risk factors of colorectal cancer

CRC has been linked to diverse etiologies; it may be influenced by both genetic and environmental factors, but mostly environmental ones; that about 70 – 80% of CRC cases are attributed to factors such as environment besides diet and life style (Franco et al., 2005). Studies showed that when populations migrate from countries distinguished with low risk of the disease to areas of higher risk, the incidence of CRC increases within the first generation of migrants (WHO, 1997).

However; there are few specific risk factors of non-dietary origin that may enhance the development of CRC, they are diseases found on susceptible persons; but they represent a small proportion of the overall incidence of CRC (American cancer society, 2010). CRC may be initiated through a process of multi steps, which consists of genetic mutations in the mucosal cells of the colon or rectum, activation of the tumor promoting genes, and loss of the genes responsible for tumor suppression (Goodbrand & Steele, 2008).

2.2.3.1 Non Modifiable Factors of colorectal cancer

There are some factors that may be referred to as biological ones, and they are with related aspects to enhance the risk of CRC.

2.2.3.1.1 Age

Age is one of these biological factors, people who are older than 50 years have more chance to develop CRC than younger adults. It has been noticed that the risk is dramatically increased after this age, and it has been found out that more than 90% of people diagnosed with CRC are older than that age (American Cancer Society, 2010), but the study type can't check the risk of the age variable as it requires matching of age in this type of studies.

2.2.3.1.2 Gender

In the past, differences among gender in the developing of CRC were found in rectum cancer only; men were more frequent with about 20-50% than women to develop that type of cancer, while the same frequency was for colon cancer in both genders (WHO,

1997). Recently it's found that the overall colorectal cancer incidence and mortality rates in men are higher by 23-35% than in women (American Cancer Society, 2010; Hoffmeister et al., 2010), with reasons are not completely understood, but may be due to men higher frequency of abdominal obesity, smoking, and drinking as well as the hormonal differences present in women (American Cancer Society, 2010). Studying gender as a risk factor can't be applied in this study due to the required matching process in this study type.

2.2.3.1.3 Race

Racial and ethnic background is also considered as a risk factor, it has been noticed that Jews of Eastern European descent (Ashkenazi Jews) have one of the highest CRC risks than any ethnic group in the world. It was explained by the several gene mutations have occurred in those people leading to the increased risk of CRC. These DNA changes are present in about 6% of the American Jews (American Cancer Society, 2010). The Palestinian society doesn't have this risk factor among its populations.

2.2.3.1.4 Hereditary

2.2.3.1.4.1 Family history

Familial risk may be another biological risk factor of CRC. This type of cancer is considered the most familial among the types of human cancer (World Gastroenterology Organization, 2007). Hereditary may vary to form 5% to 30% of the CRC cases, but only about 1 to 5% of these cases may be attributed to known genetic defects in these inherited syndromes (World Gastroenterology Organization, 2007). Family history increases the risk of developing CRC with about 4-7% or may be more to reach about 20% in some studies. Patients who develop CRC may have at least one affected first degree relative (Goodbrand & Steele, 2008), this risk may be increased by two to threefold when comparing this person with the incidence in normal population (World Gastroenterology Organization, 2007). The risk is even higher if the first degree relative is diagnosed at younger age (American cancer society, 2010). Moreover the risk is also increased with the increase in the number of relatives with CRC (World Gastroenterology Organization, 2007). Furthermore, the increase of person's risk of CRC may reach about 4.5-fold, for those of positive family history of CRC among relatives (Safaee et al, 2010).

2.2.3.1.4.2 Familial adenomatous polyposis (FAP)

Cases of Familial adenomatous polyposis (FAP) if untreated are with nearly of 100 % risk for developing CRC by the age of 40 (Nicum et al., 2003). But only about 1% of all the CRC patients are attacked due to FAP (American Cancer society, 2010). Also up to 20% of people with FAP who develop CRC have other family members who have been affected by this disease. Cancers can run in the family because of inherited genes by about 5-10 % or they may share in the same environmental factors, or with the combination of both (American Cancer Society, 2010).

FAP is caused by changes or mutations in the APC gene which the person inherits from his parents. People with this disease usually in their teens or early adulthood; develop hundreds to thousands of polyps in their colon and rectum. Cancer usually develops in one or more of these polyps as early with nearly at the age of 20. If a preventive surgery (removing the colon) was not performed by the age of 40, almost all people with this disorder will develop cancer, usually the risk of CRC increases significantly after 10 to 15 years for the polyps to develop into CRC (American Cancer society, 2010; de Campos et al., 2010).

2.2.3.1.4.3 Hereditary Non Polyposis Colon Cancer (HNPCC)

HNPCC is also known as Lynch syndrome, it accounts for about 3% to 5% of all CRC cases. It can be caused by inherited changes in a number of different genes which normally help the repair of DNA damage. This type of cancer appears when people are relatively young and they are recognized by fewer polyps than FAB patients. The lifetime risk of CRC in theses people could reach as high as 80% (American Cancer society, 2010).

2.2.3.1.5 Inflammatory Bowel Disease

Inflammatory bowel disease (IBD) includes both ulcerative colitis and Chrons disease, patients who have a history of these two diseases are with increased risk to develop CRC, this is due to the inflammation of colon for significant periods of time (American Cancer society, 2010). The risk of CRC development depends on three factors; the age of the person at onset of colitis, the extent of colonic involvement and the duration of the active disease (Lukas, 2010).

The average interval before the onset of cancer as found by some studies is about 8 to 10 years and the risk of CRC varied between 15-18% by 30 years old (World Gastroenterology Organization, 2007; Lukas, 2010). About 40% of the IBD cases who develop dysplasia (the appearance of abnormal cells but not like true cancer cells) may have the potential to progress to CRC or invasive cancer over the time (Goodbrand & Steele, 2008; American cancer society, 2010**)**. It may be due to chronic mucosal inflammation that favors the carcinogenesis of CRC (Viennot et al., 2009).

Most CRC arise from benign adenomatous that may appear in lining wall of the colon; these polyps may grow to larger sizes and have a villous appearance or may contain dysplastic cells to most likely progress to cancer (Boyle and Leon, 2002). Males with IBD had a 60% higher risk of CRC than females, the effect of sex was limited to the period after 10 years of follow-up evaluation (Soderlund et al., 2010).

Two contrary factors; constipation and diarrhea have been suspected as being causes of CRC. Some case control studies consistently supported the association between constipation and CRC (Jacobs & White, 1998), and either both diarrhea and constipation may be accompanied with the disease. Diarrhea was found to increase the risk of rectal cancer in men in a study held in Netherlands, while constipation findings were to the reduce this type of cancer, but both were of no significant association with colon cancer type (Simons et al., 2010), otherwise, other study conducted in Japan found out that there were no clear association between such of these disturbances of bowel and CRC risk (Otani et al., 2006).

2.2.3..1.6 Diabetes Mellitus

Many studies have discovered that diabetes mellitus as an enhancer of CRC that people with type II diabetes have an increased risk of developing CRC (He et al., 2010). This risk was suggested to be explained by the theory showing that both type II diabetes and CRC share common risk factors such as excess of weight, sedentary lifestyle, and Western diet, but even after taking this into consideration, people with type II diabetes do still have an increased risk of CRC (Franco et al., 2005).

Patients with type II diabetes are usually non insulin dependent and they tend to have a less favorable prognosis after the diagnosis (American cancer society, 2010). But, if

chronic insulin treatment is followed, it has been linked with the increased CRC risk among those patients, it might be due the role of insulin like growth factor in hyperinsulinemia and its participation of oncogenic intracellular signaling pathways (Giouleme et al., 2011).

Diabetes may increase the chance of developing CRC as much as 40% (American Cancer Society, 2010). When the exposure is defined as the duration of having diabetes it was found that in the first 4 years after the diagnosis diabetes the risk of CRC was the same as in those never having diabetes, but it has been increased for those who had been diagnosed between 4 and 8 years previously, the observed RR in diabetic women for 4 and 8 years of the disease was of 2.36 (Flood et al., 2010).

2.2.3.1.7 Cholecystectomy and bilary tract inflammation

An increased risk of CRC has been noticed after cholecystectomy, some evidence presented in both experimental and epidemiologic studies found that bile acids may be etiologically important in the development of colorectal carcinoma (Siddiqui & et al., 2009). An increased risk of the large intestine adenomas was found only in those patients aged between 60-80 years, whereas the younger patients had no increased risk of CRC even if the cholecystectomy previously performed for more than 10 years (Mannes et al., 1984). Patients with bilary tract inflammation were 6.54 times of higher risk of CRC during the first year of following up. However, in another conducted study no increased hazard of CRC was observed for patients with gallbladder inflammation (Lin, L. et al., 2010).

2.2.3.2 Modifiable Factors of colorectal cancer

2.2.3.2.1 Socioeconomic factors

2.2.3.2.1.1 Education and income

Strong evidence has been found for the proposition showing that education has important social impacts on health and its determinants (health behaviors and risky contexts) as well. But education actually does not affect health in isolation; thus, many factors may interrelate with its effect. Income is another important factor that may interact with education to make an influence over health (Feinstein et al., 2006). It has been found that those with more years of schooling tend to have better health,

well being and healthier behaviors. Education also helps to promote and sustain healthy lifestyles and choices that may promote human health. Moreover, education can increase the utilization of the preventative care and screening programs; with the role of education to increase the potential to change health beliefs and behaviors (Feinstein et al., 2006).

An example of education to have a substantial effect on persons healthy behaviors was shown in a study concentrating on education and the decision of whether start or stop smoking, it showed that the more educated the people are less likely to smoke (Wald et al., 1988). A study in the United States has observed that one year of college education decreases smoking prevalence by 3.8 percentages from a mean value of 52%, and increases smoking cessation by 5 percentages from a mean value of 46% (De Walque, 2004).

Obesity may be another lifestyle factor that may be substantially influenced by education and it may be decreased by the increasing of the years of education. A Sweden study for the cohort of men born between 1945 and 1955 found that an additional year of schooling improves the likelihood of being in a healthy range of weight (Spasojevic, 2003). In addition to another study in Denmark, it observed that education has a significant protective impact on the BMI of males (Arendt, 2005).

Regarding dietary habits as well, there was a strong correlation between education and food related behaviors, but these educational effects have been found to be gender specific and depended on the nutrient intake (Feinstein et al., 2006). One study in the United States found that education has an effect on reducing of saturated fat intake for men only, whereas for intake of fiber, the educational effects were of more uniform between men and women (Variyam et al., 2002).

The effect of education on physical activity was observed too. It has been observed in the United States that an additional year of schooling increases the amount of exercise per 2 weeks by 34 minutes, while for weekly strenuous exercise from 2.9 to 3.0 days per week, and walking from 3.2 to 3.4 days per week (Ross and Willirgen 2000). Other study proposed that more educated persons were of more likely to meet public health recommendations about physical activity (Cerin et al., 2005).

2.2.3.2.1.2 Occupation

The potential of occupational hazards is varied and broad among some professions, which may vary between chemicals exposures or adverse ergonomic conditions. These exposures may increase the risk of a number of health problems, including cancer disease (WHO, 2002).

A small higher risk of colon cancer but statistically significant was observed among white collar occupations (administrators, professionals, clerical and sales workers) (Ross et al., 1989), while a reduced risk was among workers in agricultural and some similar jobs, like, fishermen, but a small statistically significant increased risk was observed among shoe and leather workers, metal smiths, and foundry workers in the metal manufacturing industry. These findings may indicate that occupation in general may possibly play a role in colon cancer etiology, with perhaps its major contribution as an indirect effect through the physical activity **(**Chow et al., 1994) with the inverse linear trend in risk according to level of the exerted physical activity in occupation (Ross et al., 1989).

2.2.3.2.1.3 Marital status

Being married may reduce the risk of CRC, this is a suggestion resulted from the study (Nkondjock et al., 2006), while other study contradict with this issue announcing that there is no link between marriage and CRC (Robb et al., 2004), but the link may be between parenthood as a protection from the disease (Jacobson et al., 1994).

2.2.3.2.2 Dietary habits

Diet is one of the most environmental factors influencing the development of cancer generally; likewise dietary habits may be possibly considered one of the major causes leading to the occurrence of CRC. Many studies have focused on the relation between patterns of diet; its contents and the incidence of CRC. Recently researchers have been able to point to many factors which may relate to diet (proteins, and metabolites) and which may be involved to clarify the role of diet in the carcinogenesis process; in addition, they suggested possible interactions between metabolic processes, environmental factors and the development of the disease (Sung & Bae, 2010).

A study performed by the European Prospective Investigation into Cancer and Nutrition postulated that a genetic alterations in p53 (a gene of tumor suppression) is associated with lifestyle risk factors including some types of diet that stimulating the formation of CRC (Park, J. et al., 2011).

2.2.3.2.2.1 Fat rich food

Many studies of several designs including; ecological, case control, cohort and animal experiments concentrated on the consumption of diets rich of fats, particularly animal type rather than those of vegetable to increase the risk of CRC (Boyle & Langman, 2001). A mechanism explaining its action was the escaping of some small parts (about 1-2%) of bile acids which is produced by the liver to the colon (bile acids are primary conjugated salts participate in the absorption of fat in the small intestine, these salts must be reabsorbed and redirected back to the liver). In the colon these escaped bile acids can be metabolized by the action of the micro flora into secondary bile acids, those products are mutagenic themselves (Franco et al., 2005).

Substitution of animal meat which is rich in fats with fish and poultry meat, which are distinguished by lower contents of fats, were with inverse relationship of CRC incidence (Chao et al., 2005).

Other type of food rich of fats that may relate to CRC is the dairy products; it has been observed that dairy products rich with fats were associated with an increased risk of rectal tumors, while low fat dairy products reduced risk of the same type (Slattery et al., 2010).

Olive oil is another type of food and most representing of the traditional Mediterranean diet and considered as the main source of fat in that area; this type of fat seemed to share in the lowering rates of cancer incidence there than rates in the western countries (Lopez-Miranda et al., 2010). While it was found the increase of using butter was to increase the occurrence of the diseases by 1.9 times (Fernandez et al., 1997).

2.2.3.2.2.2 Types of Meat

High consumption of red meat is thought to be another risk factor related to the dietary habits and may be with increased of association with CRC disease (Boyle & Langman, 2000; Flood et al., 2008; Gonzalez & Riboli**,** 2010**)**. The intake of red meat was found to increase the risk of CRC by two and a half fold (Ramadas & Kandiah , 2009). A

study conducted on nurse women has resulted in an increase of relative risk (RR) of CRC in those women who ate beef as the main dish every day when compared to women who ate such meals once a month, the RR was 2.49 (95% CI, 1.24 - 5.03).

A published Meta analysis of many prospective studies about the relation of meat consumption and the risk of CRC, showed that the increasing of the daily consumed amount of meat with 100 g (all or red type) increasing the risk of CRC by (12-17%). The risk, moreover, was higher to reach 49% with a daily increase of 25% of the processed meat (Boyle & Leon, 2002). A recent study revealed that the increment of 50 g/day in total meat intake was associated with having mutations of p53 (tumor suppression gene) and similarly, the same amount of the increment in red meat intake was also significantly associated with having consistent p53 mutations and accelerates the progression of CRC (Park, J et al., 2011).

Fish has been considered as a protective factor from developing CRC (Gonzalez & Riboli, 2010). Other study in Japan focused on the dietary patterns found that sea food may be linked with decreased risk of CRC, specifically with distal colon cancer type (Kurotani et al., 2010).

The consumption of poultry meat in long term was found out to be with an inverse association with the risk of both proximal and distal colon cancer (Chao et al., 2005).

Also it has been found that the increase in taking canned meat raises the risk of getting CRC by nearly two times (Fernandez et al., 1997)**.**

2.2.3.2.2.3 Processing Methods

A suggestion explained about the increased risk of CRC by the increase of red meat intake may be due to the processing methods of meat at high temperatures (frying, broiling, or grilling); particularly frying with oil may be the cause of the increased risk (Guesmi et al., 2010). Processing methods through cooking may generate carcinogenic components such as (heterocyclic amines and poly aromatic hydrocarbons); these carcinogens may accumulate at the surface of meat through long time of processing, or these components may reach meat by direct contact with fire then transported to human when ingested (Boyle and Leon, 2002). Human metabolic enzymes may transform such of these carcinogenic compounds to other more active

types that may increase risk of polyps' development and large bowel cancer (Boyle and Leon, 2002).

Other suggesting explanation was the iron taken from the heme molecule found on red meat, itself may increase the risk of CRC; the suggested mechanism was the cytotoxic effect of the heme molecule on colon cells and increase N-nitrous compounds concentration in feces. These compounds are themselves mutagenic (Franco et al., 2005; Chao et al., 2005). Smoking processing method was related to elevate CRC risk in some studies (Ruth et al., 1989; Navarro et al., 2004) and particularly with positive association with colon cancer, RR was 1.4, and 95% CI was (1.1-1.9). While in other studies there was no relation (Lee et al., 2009).

2.2.3.2.2.4 Fiber rich food

Fiber rich food shows many epidemiological arguments about its protective action against CRC. Some epidemiological studies confirm this protective action such as a cohort study was performed in Japan; it suggested that highest fiber intake may decrease the risk of CRC by 25% (Wakai et al., 2007). Similarly, another study supported this action by (EPIC) European Prospective Investigation into Cancer and Nutrition (Gonzalez and Riboli, 2010); furthermore, a cohort study was conducted in America among middle aged adults; matched with the protective action of fibers found in fruits and vegetable (Flood et al., 2008), while other studies showed no relation with food fiber except for fibers in grains (Schatzkin et al., 2007). However, some studies haven't confirmed that protective effect of cereal fibers but have found a marginal protective effect of vegetable fiber and perhaps fruits fibers. Some researchers mentioned that it might be due to an association with other components found in fruits and vegetables (Boyle and Langman, 2000), while other studies observed that high levels of vegetable and whole grains reduced the likelihood risk of rectal cancer only (Slattery et al., 2010). Though other study found out different results that total, soluble and insoluble dietary fibers were not obviously associated with overall risk of CRC, and there was no association between vegetable consumption and CRC, while lowest intake of fruits tended to have an increased risk of the disease (Uchida et al., 2010).

Fruits and vegetables fibers in some studies have been shown to decrease the risk of CRC and higher servings of both types were found to significantly decrease this risk

(Ramadas & Kandiah, 2009), but this effect was with no consistency in all of the observational studies. Fruits and vegetables fibers effect was justified by the high consumption among the African population; thus may be the reason of the decreased incidence among those populations than those in the western people (Boyle & Leon, 2002). Food fibers were thought to increase the fecal bulk and reduce its transit time, so preventing long contact and reducing chance of CRC (Boyle & Langman, 2001).

Differences between epidemiological studies about the effect of fibers in vegetables and fruits could be due to many reasons such as; short duration of the studies, selection process, presence of confounding factors and the presence of other substances in fruits and vegetables rather than fibers such as carotenoids, folic acid, vitamin C which themselves may protect against CRC by their antioxidant action, in inhibiting free radical reactions and thereby prevent oxidative damage to DNA, or it could be involved in cellular proliferation (Boyle & Langman, 2001). Some studies stated that antioxidants may also inhibit tumor genesis by the stimulation of the immune system (Boyle & Langman, 2001). Recommendation of total fiber intake of at least 30-35 g per day is still advised, with the reason of its positive effect on the gastrointestinal system in preventing constipation, hemorrhoids and diverticulitis, giving the indirect positive protective action for the colon (Franco et al., 2005).

2.2.3.2.2.5 Coffee Drinking

Coffee consumption is a major and frequent dietary habit around the globe; coffee drinking has been shown by many case control studies of high quality to lower the risk of CRC (Boyle & Leon, 2002). A Meta analysis study conducted in Italy of some case control studies about coffee consumption and the risk of CRC; it succeeded to find out a moderate favorable effect to reduce incidence of CRC and coffee consumption when compared to none or low drinkers. The study has found that drinkers of one cup per day were with a significant result to lessen the risk, and for the highest coffee drinkers results were better, but the study states that either the obtained result was due to a real protection or it may be due to the decreased coffee consumption among cases suffering from the onset of bowel symptoms (Galeone et al., 2010), while other study conducted in Finland observed that no association was found between coffee drinking and CRC lower risk (Bidel et al., 2010), or in another study association was of a borderline protection (Arab, 2010).

2.2.3.2.3 Supplementation and medications

2.2.3.2.3.1 Calcium & vitamin D

Calcium and vitamin D were linked to the CRC disease, indicated by the results of many epidemiological studies; it has been suggested that the increase of serum levels of these two micronutrients may decrease the CRC risk. A cohort study performed at the National Institutes of Health in America introduced a hypothesis that higher calcium intake would decrease the risk of CRC occurrence (Park et al., 2007; American cancer society, 2010); this role of calcium is going with another European study (Gonzalez & Riboli, 2010). Dairy food is well known to be rich in both calcium and vitamin D, and are both considered as anti carcinogenic factors and a suggestion about the mechanism of dairy products role in decreasing the risk of CRC is the Lactobacilli which are found in these products and may play a preferable role on the intestine (Boyle & Leon, 2002).

Calcium is shown to suppress the growth of the abnormal cells and potentiates normal turnover of the cells of the gastrointestinal tract. It also may bind with bile and fatty acids reducing its damage to the mucus membrane of the large intestine (Shike et al., 1990). Moreover, some studies suggested that the role of calcium in the protection against CRC may decrease about 20 to 30% of the risk (Shike et al, 1990). Calcium protection may be found with a moderate inverse association when giving a supplementation of 1200-2000 mg per day, but it becomes with a higher inverse association when combined with adequate levels of vitamin D to empower the action of calcium. The action of Vitamin D is found out, by many ways, to inhibit the proliferation of colonic epithelial cell, induce differentiation, promote apoptosis, and moreover, positively affects the absorption of calcium and its transportation (American cancer society, 2010). Furthermore, studies showed that 29% of CRC risk may be reduced by the role Vitamin D when it's absorbed from diet at highest levels (Shike et al., 1990). Maintaining the serum vitamin D concentrations may be essential to lower and prevent CRC particularly in the elderly population who are commonly being insufficient of this vitamin type (Rheem et al., 2010). Furthermore, studies has showed a strong inverse dose response association with risk of CRC, lower levels of this vitamin were associated with higher CRC risk (Jenab et al., 2010). However, some studies oppose giving calcium supplementation to protect

against CRC in particularly for men, since calcium high levels has been noticed to increase risk of certain cancer types, especially prostate cancer (Franco et al., 2005).

2.2.3.2.3.2 Folate

Some studies suggested that daily intake of folic acid may lower CRC risk (American cancer society, 2010). This inverse association has been linked to the concentrations of folate found in the red blood cells and CRC development; moreover, low folate concentration was found to be with strong relation to higher the risk of inflammatory bowel disease (Franco et al., 2005). However, not all studies have found out the protective action of folic acid from the CRC disease; some other studies have noted that folic acid might help the existing tumors to grow (American cancer society, 2010).

2.2.3.2.3.3 Non-steroidal anti-inflammatory drugs

It has been found by many cohort studies that people with both gender who regularly use low doses of aspirin and other non steroidal anti inflammatory drugs (NSAIDs) could have lower risk of CRC, and the risk is lower from dying out of this disease, yet such doses lower the appearance of adenomatous polyps (Baron et al., 2003; American cancer society, 2010; Thun et al., 1991). Aspirin had provided strong evidences in many studies to prevent the growth of polyps in people who were previously treated in the early stages of CRC or who previously removed polyps (American cancer society, 2010).

Observations suggested that regular use of (NSAIDs) or aspirin may reduce the chances of CRC deaths by 30-50% **(**Douglas et al., 2002); the protective effect of these drugs against CRC has been associated with low doses of aspirin of about 75 mg per day after 5 years of use (Din et al., 2010). Other studies failed to prove this protective effect (Cook et al., 2005) or suggested different patterns of use through the duration and dose. A study concluded that both long term (10 years) and high doses (greater than 14 tablets per week) of use to have the maximum level of prevention (Chan et al., 2005).

2.2.3.2.3.4 Females hormonal replacement therapy and contraceptives

Females hormonal replacement therapy (HRT) are consisting of both estrogen and progesterone, they are used during the postmenopausal stage; these hormones were

found out to reduce the risk of CRC development in women at that stage (American cancer society, 2010; Long et al., 2010). It has been observed in a prospective mortality study performed in United States of America that estrogen therapy, particularly recent one and that of long term use were able to decrease the risk of CRC (Calle et al., 1995). Other study also in United States confirmed that association between HRT and the decrease risk appeared only in colon cancer but not the same with rectal cancer (Newcomb & Storer, 1995). In a conducted Meta analysis study results were of 20% reduction in the risk of colon cancer and 19% in the rectal cancer risk for women who had ever received HRT compared with those who never used such hormones, but this reduction in CRC was limited to current hormones users (Grodstein & Newcomb, 1999).

Contraceptives or birth control pills in some other studies may play the same role of HRT. When women use contraceptives, the risk of CRC may be lower (American cancer society, 2010; Tsilidis et al., 2010).

2.2.3.2.4 Life Styles

2.2.3.2.4.1 Tobacco Smoking

Tobacco smoking is considered another factor that may raise the risk of CRC (American cancer society, 2010, Bener et al., 2010). The relation between smoking and CRC has been observed by too many studies, and may be of more link to CRC than that of the family history (Hoffmeister, 2010). It has been found that both long duration and heavy cigarette smoking may have an elevated risk of CRC by 2–3-fold (American cancer society, 2010).

Duration of smoking habit was linked to develop CRC; that smoking history of more than 15 years increased the likelihood of CRC in men (Onega et al., 2010), but some studies revealed that smoking was marginally associated with an increased risk of colon cancer (Nordenvall et al., Jan 2011), while in other study it has been noticed that smoking was with slightly stronger association for rectum than colon cancer (Zhao et al., 2010; Nordenvall et al, 2011), smokers may die from CRC with 40% more likely than non smoker (Chao et al., 2005), carcinogens from tobacco may reach the colorectal mucosa through either the alimentary tract (American cancer society, 2010) or the circulatory system and then damage or alter the expression of cancer

related genes (Boyle and Leon, 2002). Lately, the prevalence of smoking shows an increasing trend in Palestine; this may be due to the transformation to the westernized life style among population there. The prevalence of the Palestinian tobacco smoking reached 40.7 in males of those more than 15 years and 3.2 in females of more than 15 years (WHO, 2008[b]).

2.2.3.2.4.2 Obesity

Being overweight or obese is an established risk factor for CRC, both obesity and overweight are other forms of sedentary life styles that may increase the risk in developing cancer particularly CRC (American cancer society, 2010; Bener et al., 2010).

Obesity is measured by body mass index (BMI = weight by kg / height in m^2), when this BMI equals to or greater than 30 kg/m^2 the person is said to be obese (WHO, 2006[d]). Obesity accounts for about 20% to 30% of the total cancer burden in the world, obesity in the Eastern Mediterranean region is a rapidly growing problem; it appears to be found in more than 50% of the population of 12 countries of the region (WHO, 2009[c]).

Obesity raises the risk of colon cancer in both men and women but may be of more link in men (American cancer society, 2010). Among men, the elevation of weight and being obese was associated with about 50% of the increased risk of CRC in comparison to men with a normal BMI (Campbell et al., 2004). A study on female nurses observed that women had a body mass index greater than 29 kg/m2 would be of more risk of CRC than those who had a body mass index less than21 kg/m by about one and a half times (Boyle and Leon, 2002).

In another study, overweight was associated with increased risk of the rectal cancer type in women only (Campbell et al., 2004). Obese men and women over the age of 55 years may be of more association with CRC than younger women (Franco et al., 2005). The increase risk in older women may be due to menopausal status and the lower estrogen levels that differ between pre and post menopause periods, with the role of estrogen as a protective factor against CRC (Campbell et al., 2004), whereas for men, the adipose tissue tend to accumulate on the visceral areas.

The mechanisms by which obesity increases the CRC risk may be due to many hypotheses; one is the insulin resistance and the compensatory hyper insulinemia as components of the metabolic syndrome related to obesity. Another potential mechanism is the insulin which has growth promoting effects by itself, and it promotes insulin like growth factor I (IGF-I) with its tumorogenic actions; this is produced from the intake of diets with high content of glucose level (Donohoe et al., 2010). Other hypothesis stated that leptin; a hormone produced by fat cells is associated with colon cancer (Franco et al., 2005). Other mechanism may be the metabolic disturbances occurring due to the positive energy balance which may trigger and accelerate CRC development, (Sung & Bae, 2010).

2.2.3.2.4.3 Physical Activity

Physical activity which is a consequence of the changes to display lifestyles of the western areas have a great influence on cancer development; particularly CRC. Epidemiological studies were with a strong evidence of physical activity to decrease CRC risk; this was proved by some cohort and case control studies, with the control of confounding factors such as diet and body mass index. It seemed that individuals who efficiently make use of energy when increasing their physical activity they may be at lower risk of CRC (Boyle and Langman, 2001*)*. It was estimated that increased physical activity would reduce CRC incidence up to 50% (Franco et al., 2005). A study was performed on women suggested that walking for about 4 hours per week would decrease CRC risk when compared with a sedentary group. The results were the same when increasing the levels of physical activity; CRC was reduced among women and in men aged over 45 years (Boyle and Leon, 2002*)*.

To lower the risk of CRC it has been recommended by the American Cancer Society for adults to get at least 30 minutes of moderate or vigorous physical activity on 5 or more days of the week, and better benefits with the moderate or vigorous activity for at least 45 minutes on 5 or more days of the week. Other study stated that tense activity was of greater protection effect than less intense ones (American cancer society, 2010).

Other assumption stated that quick walking for 7 hours per week lowers the risk of colon carcinoma by 40% (Halle & Schoenberg, 2009). In a case control study results were showing that leisure or recreational physical activity was to protect women, but

work physical activity was with no evidence to protect either men or women; otherwise, men who didn't participate in any type of sport were of increased risk (Boyle and Leon, 2002), but no consistency has been found about the occupational physical activity exerted, a study suggested that the risk for colon cancer increased with the decrease of occupational physical activity, for men the risks for proximal and distal colon cancer increased by 20 and 40% but not for rectal cancer in both sexes (Moradi et al., 2008).

Mechanisms of the protection of physical activity against CRC may include the release of cytokines from the adipose tissue, which play a role in the inflammation associated with CRC. Others proposed mechanisms include a reduction in the intestinal transit time, which may decrease contact time between the mucosa of the colon and cancer promoting compounds found in the intestinal contents, or it may be reduce the rate of the proliferation of the colonic mucosa. It may also decrease the body mass index as well through a balance obtained between energy intake and energy consumed through the exerted physical activity to protect against CRC (Franco et al., 2005). Other suggestion explaining the effects of exercise introducing the role of the immune system or serum cholesterol and bile acid metabolism (Boyle & Leon, 2002*)*. Other study assumed that high levels of physical activity reduced the risk of having rectal tumor mutations (Slattery et al., 2010).

2.2.3.2.4.4 Alcohol

Alcohol consumption particularly more than 2 drinks per day or for heavy drinking people, they has seen to be associated with increased risk of CRC (Cho et al., 2004). Drinking may cause depletion of some of the body vitamins including folic acid, and this may play a role in the development of CRC, besides the direct effect of alcohol on the colon that may also be responsible for the increased risk of CRC *(*Siteman Cancer Center website, 2010).

2.2.3.2.5 Health literacy and colorectal cancer

Health literacy and knowledge about healthy practices and the information about colon cancer may play a great role in the prevention of this type of cancer, as both genetic and nutritional interactions have been observed to be the basis for the development of this cancer and may promote or attenuate the carcinogenic process in the colon (Shike et al., 1990). Taking into consideration the role of some specific

nutritional factors of certain dietary patterns which may be either of increasing risk or protecting effect with respect to disease and making modifications together in diet and lifestyle may appear to be useful for giving recommendations and strategies for the primary prevention of CRC to substantially reduce its incidence (Chan & Giovannucci, 2010). Moreover, integration between primary and secondary prevention have the potential to optimize the efforts to improve cancer prevention and survival (Van der Aalst et al., 2010).

Although biology plays a role in health determination, it is often the behaviors and choices of individuals that may put health at risk, so health educational interventions provide the community with the information and skills needed to help people in making their choices or changes that will promote their societal health and well being. The main aims of these programs are: to reduce morbidity and mortality through changing the behaviors and beliefs of individuals, to foster the appropriate use of health services and to create general awareness about health issues. So that health promotion has shifted toward the social and behavioral determinants of health (Tones and Green, 2004).

2.2.3.2.6 Screening tests of colorectal cancer

Cancer screening is the process of cancer detection in people seemed to be a symptomatic of this disease. CRC screening tests examine the structure of the colon and rectum to find out any abnormal areas (cancer) or polyps to be removed before they become dangerous, so these tests may be the most powerful weapons for the prevention of CRC or for discovering it at early stages and when it is still highly curable (American cancer society, 2010), it is up to 90 percent curable when detected CRC earlier (U.S. Department of Health and Human Services, 2008).

Screening should begin at age of 50 years for people who have no identified risk factors other than age. For those who have a family history or other risk factors for colorectal polyps or cancer (such as inflammatory bowel disease) it should start earlier and at younger age and with more frequently (American cancer society, 2010)

2.2.3.2.6.1 Fecal Occult Blood Test

Fecal occult blood test is a type of the CRC screening tests; it's performed to examine the stool searching for the signs of cancer. The test is used to find occult hidden

blood in feces through a chemical reaction; this blood is shed from the fragile vessels (present at the surface of large colorectal polyps or cancers in the colon or rectum) and which are damaged through the passage of feces. The fresh blood is rarely enough to be visible in the stool but routinely has been shown to be hidden (American cancer society, 2010).

Several randomized studies showed that the mortality of CRC was reduced by 15 to 33% in the cohorts of the study and by 45% in the compliers, depending on the type of the slide used in addition to the frequency of testing (World Gastroenterology Organization, 2007). Data from some controlled studies rely on biennial testing of fecal occult blood for people between age of 50 and 74 and then followed by colonoscopy for cases of positive results showing that CRC mortality varies to decrease between 15 to 28% in the general population, 33 to 39% among participants to the screening test (Lepage & Faivre, 2010).

However, this test cannot confirm that the blood found is either from the colon and rectum or from other parts of the digestive tract, as a result confirmation by a colonoscopy is required when it's with a positive result to examine the presence of cancer, polyp or other cause of bleeding.

In conclusion the advantage of fecal occult blood test that it is less invasive to the patient and easily to have been performed, but its disadvantage is the disability to detect polyps. Moreover, it must be repeated every year in order to be beneficial (American cancer society, 2010). That sensitivity of this test is only 50–60% for one-time use, but may be higher up to 90% when it is used every 1–2 years over a long period of time (World Gastroenterology Organization, 2007).

2.2.3.2.6.2 Flexible sigmoidoscopy

Flexible sigmiodscopy is another screening test for CRC, it screens the lower part of the colon and rectum with a sigmoidoscope (a flexible, lighted tube with a small video camera on the end); it is inserted through the rectum and can reach into the lower part of the colon and viewing images from the scope on a display monitor (American cancer society, 2010). By the use of sigmiodscopy any polyps or abnormality can be detected (and possibly removed) in the reached part of the colon. The main disadvantage of this procedure is that it can only view about less than half of the colon

due to the length of sigmoidoscope which is only 60 centimeters (American cancer society, 2010). With the fact that the left colon is only examined by this method while misses the lesions on the right side; further, it's with lower sensitivity for the entire colon that ranges from 35% to 70%. This is due to the significant missing number of right sided adenomas which hasn't been reached (World Gastroenterology Organization, 2007). While the advantage of this test is that it's specificity of its findings is very high about 98–100% and with few false positives results. Some case control studies have shown that the screening by using sigmoidoscopy decreases the CRC mortality by 60–70% in the area examined (World Gastroenterology Organization, 2007).

2.2.3.2.6.3 Colonoscopy

Colonoscopy is a third type of CRC screening tests; it uses a colonoscope, (similar to the sigmoid scope but longer). The colonoscope is inserted through the rectum to reach to the colon. This test examines the inside of the colon to detect abnormalities and polyps as well and if needed removing them and taking biopsies for histo-pathological testing (American cancer society, 2010).

The advantage of this test is that both its specificity and sensitivity for detecting polyps and cancer are high to reach about 95% for large polyps. Percent of the small adenomas polyps missed which with about 5 mm in diameter is 15–25%, it is less for larger adenomas those with about 10 mm or more to reach about 0–6%. A study using the mathematical modeling showed that by using the colonoscopy test it can reduce the incidence and mortality of CRC by 90% in the tested area (World Gastroenterology Organization, 2007). Other study supported this idea of the decreased mortality with the periodic surveillance by the use of colonoscopy to detect dysplasia (Viennot et al., 2009).

Colonoscopy screening test is recommended for susceptible persons such as those with the first degree relatives of patients with CRC, and specially who are diagnosed before the age 60, for people with two affected first degree relatives, in subjects with an extended ulcerative colitis or Crohn disease or with a personal history of large bowel cancer or large adenoma (Lepage & Faivre, 2010).

Chapter (3)

Methodology

This chapter will be concerned of the methodology that was used in the study conduction; the chapter will include the cornerstones of the study such as the design, populations, eligibility criteria, setting, period, data collection, in addition to both of the validity and reliability, besides data analysis methods, study limitations and the ethical consideration followed through its performance.

3.1 Context of the study

The conducted study was based on the patients from the oncology departments in the Palestinian Ministry of Health hospitals in Gaza Strip, while controls were chosen from the primary health care centers. Both cases and controls were from the same governorates. The study was held in the duration between "September to December 2010".

3.2 Study design

The study type was a hospital based case-control one; it was an observational analytical retrospective investigation. The study compared past events and exposures between cases (subjects who had the disease of interest) and controls (subjects who were free from the disease of interest) (Fathalla, 2004). Examining of cases who were patients of either colon or rectum cancer will be the start of the investigation, then matching each case with 2 controls who were free of either colon or rectum cancer and who will be selected with specific criteria to represent the source from which the population of cases have emerged (Rutjes et al., 2005). Matching between cases and controls was for three variables age; gender and locality.

Using this design has many advantages; it made the study relatively simple, quick; short and didn't take long time. Also, this type was inexpensive and did not need a high fund. Moreover, few subjects may be required in such a type, and may be efficient to give reasonable results for some unusual diseases with small loss of precision (Rutjes et al., 2005).

In this type of the study, a chance was provided to check the past exposure to some CRC related risk factors; thus producing a comparative role between odds and frequency of exposure in the patient group the (cases who had CRC) and with the odds and frequency of exposure in the control group, they had the same characteristics of cases except they were free from CRC. If exposures among cases of CRC differ from that of controls in relation to the development of the disease, and this difference reaches statistically significant level, then, they may indicate a relation which may to be improved to an association or even causation relationship between the exposure of the investigated factor and CRC development (Van et al., 2010).

However, this type of studies have some disadvantages, mainly the recall bias which is a form of information bias and is accompanied with such studies that investigating past exposures and events. It may be not easy to remind some tested variables, especially dietary habits which were subjected to be forgotten (Rutjes et al., 2005). Other disadvantage of using this type was the inability to calculate neither incidence nor prevalence of CRC among population to estimate the load of this disease in an important area of the Palestinian country. Also confounding is an important issue in such studies. (Rutjes et al., 2005).

3.3 Study population

The study population consisted of two types; cases group which included accessible CRC (colon or rectum cancer) patients from both gender. These patients were utilizing the oncology services from September to December 2010. The total number of available cases was 66 persons. These patients were registered in the oncology clinics of the Gaza Strip and were diagnosed either in the year 2010 or years before. Double controls were chosen as another type of the tested study population, they were selected from people utilizing the primary health care centers. Total number of controls was 132 subjects; this group of subjects is considered free from CRC. Matching between cases and controls was applied; this matching was for three variables: age, gender and the locality**.**

3.4 Selection criteria

The study population has the following criteria:

Cases

1- Cases were diagnosed as a colorectal (colon or rectum) cancer patient. They must be registered in the oncology services archive and their medical files are available.

2- Diagnosis of the disease was confirmed by histological testing and documented by histological report which should be provided in their files.

Controls

1- Controls are clinically free from cancer colon or rectum as they were chosen from primary health care centers, thus they may have minor health problems.

2- Had no history of chronic abdominal problems that medically followed up.

3- Must not suffer from idiopathic weight loss.

Exclusion was for cases that were diagnosed before the year 2000, and for controls who were medically followed up for chronic bowel disturbances.

3.5 Place of the study

The first part of the study was to collect cases; it was performed at the oncology clinics of both Al Shifa and Gaza European Hospitals, which are considered the main governmental hospitals providing the oncology services to the cancer patients in Gaza Strip. Whereas the second part was to collect controls, it was established through the primary health care centers of the same governorates of cases to apply the matching process in the place of residency.

3.6 Data collection procedures

Data were collected by two persons, the majority was collected by the researcher herself for the North, Gaza and the Middle governorates and the remaining part concerned with the south governorates was collected by other data collector who had been asked to help the researcher.

Data were collected through an interviewed questionnaire (Annex1) which had been developed by the researcher; it was consisted of five major parts:

- The first part was concerned with the socio- demographic variables including age, sex, marital status, living governorates, income, education, occupation or previous work and its duration. It also asks if participants ever lived outside the strip, and if yes, the living country and duration were investigated too.

- The second part concentrated on the non modifiable factors and medical history such as hereditary, family history of having the CRC disease, some other disease that may trigger the development of CRC, and also asking about some supplementation and drugs that may be in relation with the disease which either may be modifiable or not.

- The third part was designed to examine the role of some of the health services that were provided for participants and which may affect the risk of CRC including both health educational and screening programs.

- The next part was concerned of various life styles and activities of the subjects who shared in the study. It included smoking habits, its type and durations. It also included asking about some types of the exerted physical activity and obesity.

- The final part of the questionnaire was designed for testing dietary habits subjects may follow; this part was used to investigate the frequency of certain type of food and drinks intake which may be related to increase the risk of CRC or enhance a protection effect.

3.7 Validity & Reliability

A special attention was given to improve the validity of the study; which means that the tool used in the study conduction is actually measuring what is intended to measure (Fathalla, 2004). To get the study validity improved and to have a more adequate tool required for the study conduction; several steps were applied such as:

- Concerning the content validity which means to examine the extent of the measurement method to include all the major elements relevant to the construct being measured; adequate reviewing of related topics in literature about CRC was performed before designing the study and its tool, besides reviewing some of the already prepared questionnaires related to the diseases (Lafaille & Wildeboer, 1995).

In addition to population representatives besides content experts (Burns & Grove, 1997) that have been followed, 12 experts reviewed the developed questionnaire to

improve its content and criterion validity, consideration to their comments and recommendation had been met.

- Furthermore, pilot study was conducted before the official beginning of the data collection; this study had been conducted to test the ability of the developed questionnaire to measure the questioned risk factors of CRC, and few modifications had been made in response to the experience obtained from the pilot study that was performed.

Whereas regarding the study reliability which means the stability and reproducibility of the obtained results arising from the used measurement (Lafaille & Wildeboer, 1995); the following steps were performed to have it improved:

-The data collector of the South area of the Gaza Strip had been well trained to standardize the data collection method with that of the data collected from other areas of the strip, in addition to a regular check for obtained data which had been made over the time of his work.

- The filled questionnaires were checked immediately at the field after being collected; also, subjects were asked to give their telephone number if they agree to be able to complete any missed items. Besides, data reviewing if being missed or inconsistent before analysis took place and re entry of some questionnaires had been performed to test the accuracy of its entry.

3.8 Data analysis

The study analysis begun first with development of a model through the Statistical Package for Social Sciences (SPSS) program for the data entry, then followed by several steps:, then checking and verifying the collected data from having errors such missing and inconsistent data; thus was followed by the entry of data through the prepared model, data cleaning and then the processing of these refined data has been established. SPSS program version 16 and Epi Info Stat Calc version 3.4.3 were used as statistical programs to analyze the obtained quantitative data.

The odds of exposure for each item or variable (family history, life styles, dietary habits and educational levels) can be assessed for both cases and controls groups. Odds ratio with the 95% confidence interval were calculated to check the difference of the relative frequency of exposure between cases and control groups, if this odds

ratios with their confidence intervals reach statistically significant levels, the variable can be interpreted as a relative risk or as a protective factor. Chi square test also has been calculated for variables to examine the relation between such variables and the disease risk. P value of 0.05 was considered as a statistically significant in the Chi square test measurement.

3.9 Piloting

Piloting was performed prior to the formal starting of the data collection. It was conducted to check the construct validity of the designed questionnaire and the validity of study to assess cross tabulation between factor exposures and CRC development. The sample of the pilot study included 7 cases (4 from Al Shifa hospital and 3 from Gaza European hospitals) and 14 controls (a couple for each case according to age, sex, and locality). Collected data from the piloting sample was reviewed and examined to check the ability of the questionnaire to achieve its purpose, and then obtained data was analyzed using the SPSS program version 16 and Epi Info Stat Calc to predict the desired results. Few minor modifications of the used questionnaire were performed.

The sample collected from the pilot study was included in the total study sample for two reasons; few minor modification had been performed to the tested questionnaire and which may not affect the standardization of the used tool besides the results gained from the study and the other reason was the small number of cases that had been available in the oncology clinics.

3.10 Ethical Consideration & Administrative Approvals

Ethical and administrative approvals that have been required for the study conduction had been all obtained and fully respected.

Many administrative approvals for the study conduction have been obtained. An approval has been taken from the Palestinian ministry of health through the department of the Human resource development in the ministry (Annexes 2, 3). Other approvals have been taken from the directorate of the hospitals for the oncology clinics of both Al Shifa and European Gaza Hospital (Annex4), in addition to the approvals obtained from the directorate of the primary health care centers of several areas in Gaza Strip (North, Gaza, Middle and South) (Annex5). Helsinki committee approval (Annex6) was also obtained before starting in the study conduction to ensure

the participants safety during the performance of the study. In addition to the obtaining of the participants' consents that were assured (Annex7), Moreover a concern was given to the provision of enough information for subjects about the desired studied topic, its importance and benefits that can be achieved from its emerging results. Furthermore, a high consideration was given to the participant's privacy, confidentiality in addition to the high respect for their option of either participate or reject of being a member of this study. Honesty in reporting and analysis of data with respect to confidentiality to the appeared results was fully met and finally sharing of these findings with others who are interested, associations that provided help or people who may get benefits from them.

3.11 Response rate

The study response rate was of high levels. From the 75 available cases that were going with the inclusion criteria and being asked to participate in the study 66 patients agreed to be a member of the conducted study giving a response rate of 88%.

Controls response rate was even higher to reach 94% that from 140 persons who match with the controls criteria 132 members agree to share in the study.

3.12 Limitations and constraints of the study

Some difficulties have been faced by the researcher during the conduction of the study. The first problem was the selection of CRC cases; it was complex to some extent, due to less adequate and less organized services of oncology in Gaza Strip, cancer registry was not able to provide the researcher with the annual incident of CRC patients in the Strip, files were with some missed or less accurate data including contact addresses of patients; moreover, no appointments were given to the patients that it may facilitate the work of the researcher to meet these patients. Also sometimes the patients were not utilizing the services personally.

Limited local cancer information and sacristy of oncology studies in the Gaza strip were additional problems, and the researcher was obliged to refer to some studies held in the other areas rather than using local ones.

Recall bias may be found as a limitation of the provided study, that when asking participants about their past events, they may forgot or being ere less précised in giving data (Van et al., 2009). Besides that, some lifestyle factors are more difficult to remember than other major past events. Dietary exposures for cases may be of such a

limitation (Colditz, 2009). Also, obesity may be difficult to relate as a risk factor to CRC in case control studies as weight loss may be a sign of the disease and may not express the risk (Boyle & Langman, 2000).

Chapter 4

Results and discussion

4.1 Characteristics of the study population

4.1.1 Total sample size

The total sample size of the study population was 198 participants; they were residents from all of the five governorates of the Gaza Strip. This number of participants comprised two groups; the group of cases which involved 66 members and they were matched in some variables with the control group which includes132 participants. Every case was matched by a pair of controls to strengthen the power of the study for being with small number of cases (less than 100).

4.1.2 Age of participants

Table 4.1 illustrates that 51 members (25.8%) of the study population were of the first age group of 45 years old and less. One hundred fourteen members (57.6%) were in the second age group (46-60 years), while the third age group was for participants of more than 60 old years and included 33 members with 16.6% of the total sample. It has been noticed from the study that most of the available cases were at age of more than 45 years (74.2%), but age cannot be considered as a risk factor for this disease in this study as all the cohort of CRC has not been included in this study, in addition to the followed matching process.

Table 4. 1: Age and gender of the study population

Type	Case		Control		Total	
	No	%	No	%	No	%
Age groups						
≤45	17	25.8	34	25.8	51	25.8
46-60	38	57.6	76	57.6	114	57.6
> 60	11	16.6	22	16.7	33	16.7
Gender						
Male	26	39.4	52	39.4	78	39.4
Female	40	60.6	80	60.6	120	60.6

4.1.3 Gender of the participants

Participants of the study were from both genders as shown in Table 4.1, 78 members with (39.4 %) of the total sample were males (26 cases and 52 controls), and while female participants were 120 members with (60.6 %) of the total sample (40 for cases and 80 for controls). Percentage of female cases was higher than that of males by nearly one and a half times, but gender cannot be interpreted as a risk through this study just because only the available cases were asked to participate in the study instead of examining all of the complete cohort in addition to the matching process.

4.1.4 Governorates of residency of the study population

All of the five governorates of Gaza Strip were included in the sample of the study as shown in Figure 4.1. The distribution of subjects among areas was as follows: the North governorate had 30 members (15.2%) of the total sample, Gaza governorate had the highest number of participant with 84 person (42.4%), then the followed by the Middle governorate to be the second highest area of participants with 45 members (22.7%), Khanyonis and Rafah governorates to have 24 (12.1%) and 15 (7.6%) respectively, yet Rafah Governorate was found to have the least participants; consideration was given to the complete matching in the place of residency between cases and controls.

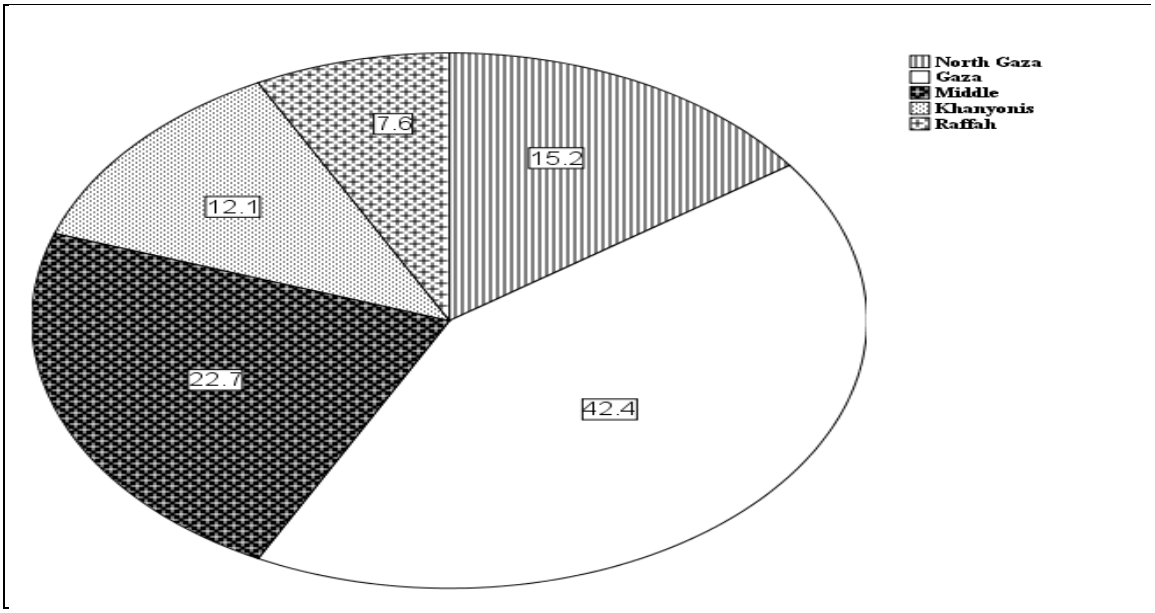

Figure 4.1: Living Governorates of the study population

Nearly half of the cases (42.2%) were from Gaza governorate, but it cannot be considered that being a resident of this governorate may increase the risk of CRC. Rather, it may raise more questions about this finding and it may be the life style, income, or other factor in this area which may enhance this issue.

4.1.5 Characteristics of Cases

The interviewed questionnaires for cases were filled through visiting the main providers of the oncology services in the Gaza Strip which are Al Shifa hospital in Gaza and the European Gaza hospital in the south of the Strip. Figure 4.2 shows percentages of each clinic participation.

Forty eight cases were collected from Al Shifa Hospital resembling 72.7 % of the total cases, while the remaining 27.3 % were from the European Gaza Hospital with a total number of 18 cases; this finding may be due to the fact that Al Shifa hospital may provide its medical services for the majority of the population of Gaza Strip.

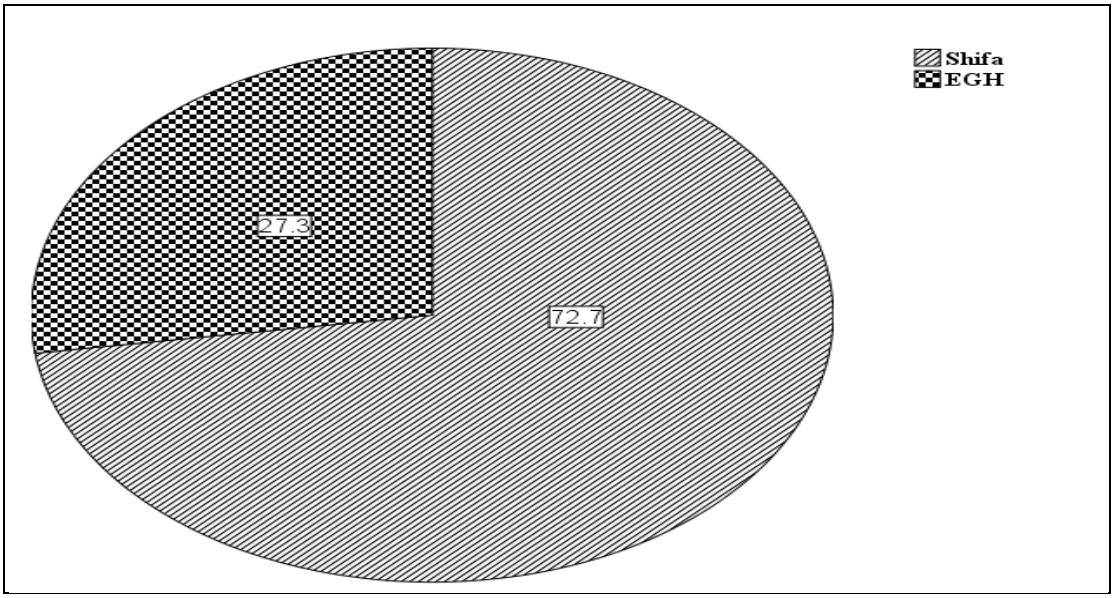

Figure 4.2: Oncology clinics of study cases

EGH: European Gaza Hospital

Cases years of discovery and diagnosis ranged from the year 2000 to the year 2010; few of the cases members were diagnosed from the years 2000 to 2005, while the greater part was diagnosed from the year 2007 to 2010, particularly the year 2010 which forms about 42.4% of cases as shown from Figure 4.3.

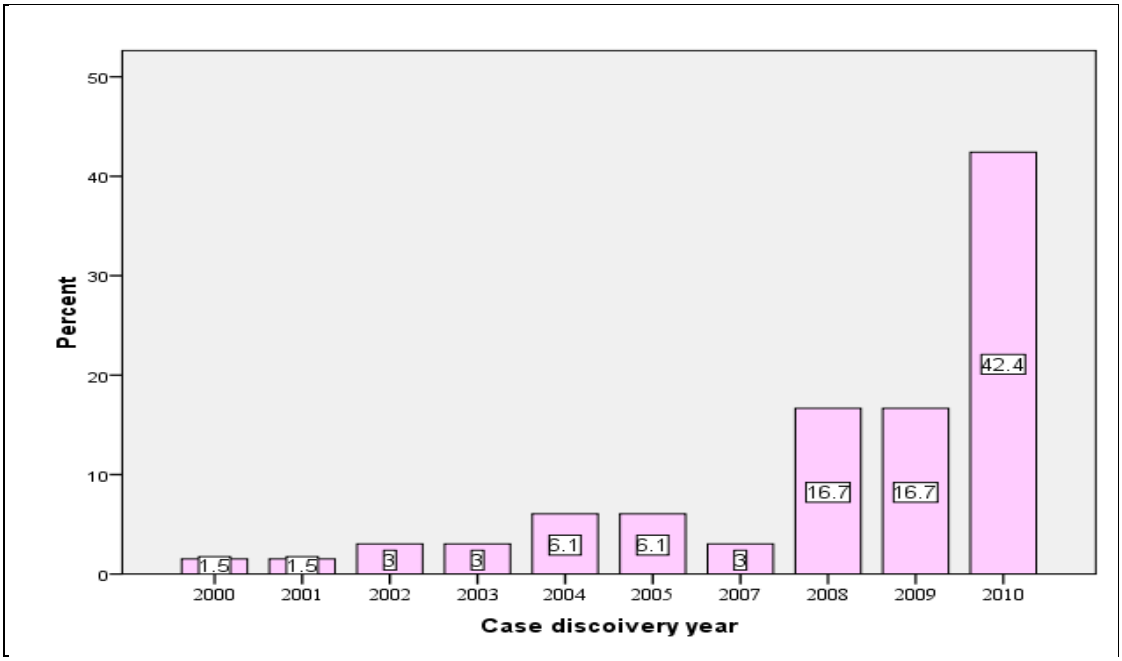

Figure 4.3: Cases Years of Discovery

4.2 Factors related to colorectal cancer

4.2.1 Socioeconomic factors

Socioeconomic factors are illustrated in Table 4.2; these factors include the results obtained from comparing between cases and controls for marital status, number of family members and the gained educational levels.

Table 4.2: Socioeconomic factors

Item	Cases		Controls		P Value	OR(95% Confidence Interval)
	No	%	No	%		
Marital status					0.46	1.4 (0.56- 3.56)
Married	59	89.4	113	85.6		-
Unmarried	7	10.6	19	14.4		-
No. family members					1.0	-
≤5 members	25	37.9	50	37.9	-	1.0
6-10 members	33	50.0	66	50.0	1.0	1.0 (0.5-1.98)
> 10 members	8	12.1	16	12.1	1.0	1.0 (0.34-2.97)
Educational level					0.14	-
≤ 6 years	13	19.7	14	10.6	0.047	2.53 (0.91- 7.1)
7-12 years	35	53.0	69	52.3	0.16	1.83 (0.71-4.69)
> 12 years	18	27.3	49	37.1	-	1.0

4.2.1.1 Marital status

Percentages of married and unmarried participants among cases and controls were of little differences; controls (14.4%) were of smaller increase of unmarried persons than cases (10.6%). This difference failed to reach a statistical significant level. OR with 95% confidence interval were of 1.4 (0.56- 3.56) and Chi square test results a P value of 0.46. Accordingly it suggests the absence of the relation between marital status and increased risk of CRC. This result agreed with study held in Japan (Jacobson et al., 1994) giving the same finding.

4.2.1.2 No. of family members

Results from this study showed that there was not any difference between cases and controls group, with the finding that half of the participants had from 6-10 members in their family, the study gave no relation between number of family members and the disease, Chi square test P value and OR were 1.0.

4.2.1.3 Educational level

Educational level was compared among cases and controls, lower levels of education among cases was (19.7%) against (10.6%) of controls, in addition to the higher educational levels of controls (37.1%) while cases were of (27.3%). When comparing medium levels of education (7-12 years of education) among participants with those of higher levels, both cases and controls were nearly the same in the medium level with 53.0 %, and 52.3 % for cases and controls respectively, the differences start to show the some risk but did not reach significance giving a P value of 0.16 of the Chi square test and OR with 95% confidence interval was 1.83 (0.71-4.69). But when comparing participants of lower education (6 years of education and less) with those of higher education (more than 12 years of education) this difference between these two classes has been able to marginally reach a statistical significant level P value of the Chi square test was 0.047, and OR with 95% confidence interval 2.53 (0.91- 7.1). The lower education may raise the risk by nearly two and a half times from those with higher levels.

These findings may suggest that the increase of personal educational level may give a role of protection and decrease the risk from getting the disease. This may be noticed

by the improving of the obtained OR's. This suggestion may be supported by the theory which asserts that education can affect health seriously such as many of the other socioeconomic factors (Feinstein et al., 2006).

4.2.1.4 Income

There were clear income differences among the two groups of cases and controls; as presented in Table 4.3. The percentage of persons with lowest income was higher by nearly about twice and a half times in the cases group (47%) than in controls (18.9%); moreover, higher levels of income has been found in controls (31.8%) while (12.1%) for cases. These differences reached a statistical significant level to give an inverse relationship to produce the evidence that lower income increased the risk of the disease. When comparing participants with medium income levels with those of higher income; OR ratio with 95% confidence interval was 2.18 (0.84-5.79), and P value of 0.07. The risk was further increased and giving a trend when the comparison performed between those with low level of income to those with high income levels to reach 6.5 time, as the OR with 95% confidence interval 6.5 (2.39-18.29) and P value of 0.00.

Table 4.3: Income and living out Gaza Strip

Item	Case		Control		P Value	OR (95% Confidence Interval)
	No	%	No	%		
Income						
Low	31	47.0	25	18.9	0.000	6.5 (2.39-18.29)
Medium	27	40.9	65	49.2	0.07	2.18 (0.84-5.79)
High	8	12.1	42	31.8		1.0
Living Out Gaza Strip					0.91	1.04 (0.51 -2.12)
Yes	18	27.3	35	26.5		-
No	48	72.7	97	73.5		-

This result may differ from the theory stating that the increasing income may enhance persons to transform their life styles to the westernized pattern which may increase the risk of CRC (Levin & Smith, 2005). The researcher may interpret this obtained result that higher income of people may facilitate the ability of these persons to modify their

diets and increase their consumption of some protective type of food such as fruits and vegetables (Wakai et al., 2007; Ramadas & Kandiah, 2009).

4.2.1.5 Living outside Gaza Strip

Comparing between cases and controls whether they had been living outside Gaza Strip or not had been established in the study, it was suggested from the idea that the risk is increased for populations who migrate from countries with lower risk of the disease to a higher places of risk (WHO, 1997). Results related to this question has found that the majority of the participants have not ever lived abroad Gaza Strip with 72.7 % for CRC patients and 73.5% for controls; there was no statistical difference to correlate between CRC and living outside, OR with95 % confidence interval 1.04 (0.51 -2.12) and 0.91 P value of the Chi square test as presented in Table 4.3.

4.2.1.6 Occupation

Table 4.4 shows the findings of the study that related to the occupation variable, results are concerned with the type of current occupation; its duration, if having a previous occupation, its type and it's duration as well.

Differences were checked about the current occupation of subjects for either being of class I (occupations that do not require certain studying), class II (those occupations that requires certain studying) or class III occupations (housewives, unemployed or retired persons), in addition to the examination of the duration of this current occupation. The obtained study results were of some difference between the two groups, class I professions were nearly the same between the two groups; it was 9.1% and 9.8% for case and controls respectively, but controls were of higher percent of class II professions 23.5% against 13.6% for patients, housewives and unemployed were higher in cases 77.3% than 66.7% in controls, however all these differences collectively could not reach a statistical significant level to make a correlation between CRC risk and either the current occupation or its duration with non significant level of ORs or P values that comparing between class I profession and class II profession gave an OR with 95% confidence interval of 0.63 (0.16-2.51), while comparing between class I profession and class III of either being a housewife, unemployed or retired gave an OR with 95% confidence interval of 1.26 (0.41- 3.98).

The duration of the current occupation of participants of working for less than 10 years compared to 11-20 years of working, introducing an OR with 95 % confidence interval of 0.89 (0.29-2.69) which didn't support significance, the result was the same when comparing between working with less than 10 years and working of more than 21 years with an OR of 95% confidence interval 1.37 (0.43-4.38) which giving no significance too.

Table 4.4: Occupation

Item	Cases		Controls		P- value	OR (95% confidence interval)
	No	%	No	%		
Current occupation						
Class I profession	6	9.1	13	9.8	-	1.0
Class II profession	9	13.6	31	23.5	0.45	0.63 (0.16-2.51)
Class III profession	51	77.3	88	66.7	0.66	1.26 (0.41- 3.98)
Occupational years						
≤ 10 years	14	43.8	32	45.7	-	1.0
11 -21 years	9	28.1	23	32.9	0.825	0.89 (0.29-2.69)
> 21 years	9	28.1	15	21.4	0.55	1.37 (0.43-4.38)
P. Occupation classes						
Class I Profession	21	31.8	15	11.4	0.001	3.4 (1.49-7.93)
Class II Profession	9	13.6	29	22.0	0.51	0.76 (0.3-1.88)
No Previous Occupation	36	54.5	88	66.7	-	1.0
Duration p. occupation						
≤ 10 years	11	36.7	13	29.5	-	1.0
11-20 years	8	26. 7	15	34.1	0.44	0.63(0.16-2.38)
> 20 years	11	36.7	16	36.4	0.71	0.81 (0.23-2.85)

*** P. occupation**: previous occupation

Otherwise percentage of cases with previous class I jobs was nearly triple (31.8%) of that of controls (11.4%), thus having a previous occupation of class I profession has been with a positive association (p value 0.001) with CRC risk and working of such of these professions, when comparing the group for having a previous class I professions and those with no previous occupation, the OR with 95 % confidence interval was 3.4 (1.49-7.93) that having such a previous occupation increases the risk of getting CRC by 3.4 times, these results may mismatch with the study stating that a

reduction on the risk have been found among workers with such professions **(**Chow et al, 1994; Ross et al, 1989), but it may agree with an older study observed that risk may be associated to jobs in which dusts or fumes were inhaled particularly with rectal cancer (Ruth et al, 1989). Moreover the researcher suggested the idea that workers with these professions may routinely depend in fast food diets, which does not give them the chance to improve their diet contents of some protective types. Or other suggestion may be linked with shift work of some professions, working in shifts may made persons to be exposed to heavier workloads, higher demands, poor psychosocial work environments, reduced physical activity, and in addition to the probability of being with less education (WHO, 2002). Other suggestion may be due to the elevated exposure to some carcinogens found among some of the industrial and agricultural work places (WHO, 2002).

Having class II previous occupation did not affect the risk of the disease development, OR with 95% confidence interval was 0.76 (0.3-1.88) it may goes towards protection but it did not reach significant level.

The duration of previous working when was compared between working for less than 10 years and working for between 11-20 years, results showed the risk was not affected by the increase in working years, OR with confidence interval which did not reach significant 0.63(0.16-2.38) and the same was when comparing to those working for more than 20 years 0.81 (0.23-2.85). These results haven't been able to provide an association between increase in the duration of the previous occupation and the risk of CRC, p value of the Chi square test was insignificant too.

4.2.2 Non modifiable factors

Table 4.5 shows the findings related to the family history of any type of cancer in addition to CRC type, moreover it shows the results of having diabetes mellitus.

4.2.2.1 Family history of CRC and other types of cancer.

As shown in Table 4.5 the study findings revealed that there were some differences in having one or more persons of the family with a history of any other type of cancer. CRC patients had more persons of family history of various type of cancer (31.8%) while the history was (22.7%) in controls, but these percentages difference did not reach a statistical significance level to link between having a family history of other types of cancer and the development of the CRC, OR was 1.59 with 95% confidence

interval between (0.78- 3.23), P value of Chi square test was 0.16 stating the no relation between the history of other type of cancer in the family and the disease occurrence.

Table 4.5: Family history of cancer and having diabetes mellitus

Item	Case		Control		P value	OR (95% Confidence Interval)
	No	%	No	%		
Cancer F. H.					0.16	1.59 (0.78- 3.23)
Yes	21	31.8	30	22.7		
No	45	68.2	102	77.3		
CRC F. H.					0.004	4.2 (1.35-13.54)
Yes	11	16.7	6	4.5		
No	55	83.3	126	95.5		
D. M					0.4	0.74 (0.33- 1.6)
Yes	13	19.7	33	25.0		
No	53	80.3	99	75.0		

***Cancer F.H**: Having cancer family history. **CRC F.H**: Having CRC family history. **D.M**: Having diabetes mellitus

Table 4.5 also shows that the percent of CRC patients who had a family history of the same disease was 16.7, while controls had 4.5%, the value of OR was 4.2 with 95% confidence interval (1.35-13.54), while P value of Chi square test was 0.004 producing a positive association with family history to give a higher risk of having the disease by nearly four times. Family history of CRC introduces a fair relation between this history and the increase of the chance to develop CRC. This relation has been compatible with a study conducted in Iran stating; persons with positive family history of CRC were of increased risk by 4.5-fold (Safaee et al., 2010).

4.2.2.2 Diabetes mellitus

Suffering from diabetes was slightly higher in the control group (25.0%), than (19.7%) in the cases group; statistics find out that no connection between being a diabetic patient and the greater risk to become a CRC patient, OR 0.74 with 95 % confidence (0.33- 1.6), Chi square test P value was 0.4 representing no significance.

This study results did not support the hypothesis linking between diabetes and CRC (He et al, 2010; Franco et al, 2005); this result may be justified that it may take 4 to 8 years of diabetes to increase CRC risk (Flood et al., 2010).

4.2.2.3 Chronic bowel disturbances

Patients with chronic bowel disturbances were (90.9%), while (18.9%) of controls were having such disturbances represented by Table 4.6.

OR obtained in the conducted study was 42.8 with 95% confidence interval of (15.5-124.7) and p value of the Chi square test of 0.00 which is considered a high statistical significant result giving the evidence of strong relationship between chronic bowel disturbances and increased risk of CRC occurrence. Persons with these disturbances were of 42.8 times of more risk than those who do not suffer from such disturbances to have CRC.

Table 4.6: Chronic bowel disturbances and gallbladder problems

Item	Case		Control		P value	OR (95% Confidence Interval)
	No	%	No	%		
CBD					0.00	42.8 (15.5- 124.7)
Yes	60	90.9	25	18.9		
No	6	9.1	107	81.1		
CBD Years					0.95	1.05 (0.16- 8.45)
≤ 10 years	55	91.7	23	92.0		
>10 years	5	8.3	2	8.0		
Cholecystitis					0.58	1.2 (0.6 - 2.7)
Yes	12	18.2	20	15.2		
No	54	81.8	112	84.8		
Cholecystectomy					0.88	1.1 (0.43 - 2.6)
Yes	10	15.2	19	14.4		
No	56	84.8	113	85.6		

***CBD**: Chronic Bowel Disturbances

These results are supported by the proposition that long periods for inflammation trigger the dysplasia of cells (the appearance of abnormal cells but not like true cancer cells); these cells can convert to cancers at any time (Goodbrand & Steele, 2008; American cancer society, 2010**).** This outcome may, to some extent agree with other study suggesting that rectum cancer may be increased with the increase of bowel movement, but not with colon and constipation (Simons et al., 2010).

The study has not been able to link between duration differences (10 years less or more) of chronic bowel disease as majority of participants were having bowel disturbances of less than 10 years, cases were of (91.7%) while controls were (92.0%). In risk OR was 1.05 with 95 % confidence interval (0.16- 8.45) and 0.95 of the P value that did not meet significance.

4.2.2.4 Cholecystitis and Cholecystectomy

Differences between cases and controls in suffering from cholecystitis were small as shown in Table 4.6, (18.2%) of cases and (15.2%) of controls; these differences were deficit to get a significant level, giving the indication that no association has been confirmed between the inflammation of gallbladder and the hazard of CRC by this study. OR was 1.2 with 95% confidence interval (0.6 - 2.7) and P value of the Chi square test was of 0.58. This observed result has sustained the assumption of no relation between cholecystitis and enhancing of CRC development (Mercer et al., 1995; Lin et al., 2010) and contradict with the study supporting the cholecystitis relation with CRC (Siddiqui et al., 2009).

Cholecystectomy findings shown in Table 4.6 gave that CRC cases (15.2%) were of very small higher difference in controls (14.4%), these figures introduce OR of 1.1 with 95% confidence interval (0.43 - 2.6) and P value of the Chi square test 0.88; these values show that removing gallbladder was with no matter to a further risk for becoming a CRC patient. A study may interpret this result that it needs at least 10 years to have the effect of cholecystectomy in raising the risk of CRC (Mannes et al, 1984). Or theses findings may be matched with a necropsy study conducted in London, resulting in this no relation (Mercer et al., 1995).

The researcher tried to examine the effect of inflammatory bowel diseases (ulcerative colitis and Chrons disease) and Familial Polyposis Adenomatous**,** but subjects were unfamiliar with the scientific names of the disease and usually they were relevant with the symptoms they were suffering from, but without having enough information about the disease, so the researcher decided to cancel their related questions from being analyzed.

4.2.3 Modifiable factors

4.2.3.1 Dietary habits

Findings for dietary habits will be presented according to food and drinks type, besides their preference.

4.2.3.1.1 Meat intake

All types of meat including beef, lamb, chicken, fish, canned and cold meat were examined for their relation with the carcinogenesis process of CRC as represented in Table 4.7.

Regularly having beef was nearly the same between cases and controls with very little increase in controls, results were 80.3% and 81.8% respectively, accordingly OR with 95% confidence interval was 0.91 (0.4- 2.05) while Chi square test P value was 0.79 nearly all showing no significance and no relation between regular intake of this type of meat and enhancing CRC.

Table 4.7: Meat intake (all types)

Item	Case		Control		P value	OR (95% Confidence Interval)
	No	%	No	%		
Beef					0.79	0.91 (0.4- 2.05)
Regularly	53	80.3	108	81.8		
Less Regular	13	19.7	24	18.2		
Lamb					0.2	1.8 (0.67 - 4.76)
Regularly	10	15.2	12	9.1		
Less Regular	56	84.8	120	90.9		
Chicken					0.68	0.79 (0.22 - 2.91)
Regular	61	92.4	124	93.9		
Less Regular	5	7.6	8	6.1		
Fish					0.75	1.1 (0.57 - 2.1)
Regular	24	36.4	45	34.1		
Less regular	42	63.6	87	65.9		
Canned Meat					0.7	0.86 (0.38 – 1.95)
Regular	12	18.2	27	20.5		
Less regular	54	81.8	105	79.5		

About regular lamb intake; findings raised that cases group (15.2%) used to eat lamb more regularly than controls (9.1%) but this difference was of no significance to

increase the risk of CRC resulting in an OR with 95% confidence interval of 1.8 (0.67 - 4.76) and P value of the Chi square test 0.2.

Regarding the regular intake of chicken, both cases and controls were having this type of meat nearly with the same frequency 92.4% and 93.9% with a minute increase in controls but this was unable to make significance results to affect the risk of CRC by making an OR with 95% confidence interval of 0.79 (0.22 - 2.91) with 0.68 P value of the Chi square test.

Fish regular eating was with small higher levels in cases 36.4% than controls 34.1%; this small difference did not give a statistical considerable difference that OR with 95% confidence interval was 1.1 (0.57 - 2.1) and Chi square test P value was 0.75; revealing no link between regular fish intake and the risk of CRC.

Results differences of regular intake of canned meat were nearly the same of that of other type of meat, that controls 20.5% were of small higher in regular intake of this type than cases 18.2% did, but this difference was of no significance to link between this type of meat and CRC risk, the OR with 95% confidence interval was 0.86 (0.38 – 1.95) and the P value of the Chi square test was 0.7.

No type of meat had the significant level to indicate its hazard on the process of having CRC. These study results did not match with those observing the effect of red meat and it's content to increase the potential hazard of CRC (Boyle & Langman, 2001; Flood et al., 2008; Gonzalez & Riboli**,** 2010**).** Otherwise the obtained results may be supported by a study summarizing some of previously performed prospective studies about the correlation between higher consumption of red meat and CRC, raising the idea that these prospective studies collectively gave smaller association between them, and the most risks were below 1.5 (Alexander & Cushing , 2010). In addition, meat results could be explained by small amounts rather than the frequency of meat intake which may be taken by subjects either for red, canned meat, chicken or fish; these amounts of either type may not enough to promote or protect from CRC.

4.2.3.1.2 Meat processing methods and fats used

As found in Table 4.8 the majority of participants were processing meat with low fat methods, percents were 75.8% for cases and 72.7% for controls, when comparing those who were using low fat to those using high fat in meat processing OR with 95%

confidence interval was 0.7 (0.26-1.8), and when comparing persons who use low fat preparing with those using all types of fat in the processing, the given OR with 95% confidence interval was 1.1 (0.39 -3.03); both were with no statistical significant to link between the type of fat used in the processing of meat and CRC risk.

Table 4.8: Processing methods of all types of meat and used fat

Item	Case		Control		P value	OR
	No	%	No	%		
Meat						
High fat	8	12.1	22	16.7	0.42	0.7 (0.26-1.8)
Low fat	50	75.8	96	72.7	-	1.0
All types	8	12.1	14	10.6	0.84	1.1 (0.39 -3.03)
Chicken						
High fat	21	36.8	47	38.2	0.7	1.17 (0.48-2.88)
Low fat	13	22.8	34	27.6	-	1.0
All types	23	40.4	42	34.1	0.38	1.43 (0.59-3.52)
Fish						
High fat	46	80.7	65	55.6	0.001	6.6 (1.77-29.08)
Low fat	3	5.3	28	23.9	-	1.0
All Type	8	14.0	24	20.5	0.1	3.11 (0.64 -16.89)
Fat					1.0	1.0 (0.46- 2.18)
Saturated & Mixed	14	21.2	28	21.2		
Unsaturated	52	78.8	104	78.8		

***Low fat**: low fat processing. **High fat**: high fat processing. All types: **Mixing** between low and high fat processing

Chicken processing was compared for either being prepared using low or high fat; nearly both cases 36.8% and controls 38.2% were using high fats in the processing of chicken by near frequencies; the introduced an OR with 95% confidence interval was of 1.17 (0.48-2.88); this gives no significance to correlate between the fat used in chicken processing and the risk of CRC, also no significance resulted when comparing between using low fat and mixing between all types of fat giving an OR of 1.43 (0.59-3.52).

Regarding to the processing of fish, some considerable differences were found among participants, when comparing those using low fat processing to those using methods

of high fat, cases were more to use fat processing in preparing fish (frying 80.7%) than controls (55.6%); these differences has reached significance to have an OR with 95% confidence interval of 6.6 (1.77-29.08) and a Chi square test P value of 0.001. which means that using high fats methods in fish processing may increase the risk of getting CRC by 6.6 times than those with low fats. This evidence has been strengthened by theory that high temperatures in the frying processing may generate carcinogens and may encourage CRC appearance (Guesmi et al., 2010). When comparing between those using low fat method to those mixing between low and high fat in fish preparing, OR with 95% confidence interval was 3.11 (0.64 -16.89) and P value of the Chi square test of 0.1 which was not to reach significance .

Comparison between types of fats being used generally in cooking (either being saturated or unsaturated) has been performed among cases and controls; it had been observed that cases and controls use saturated or mix between these two types with the same percents, 21.2 % of both cases and controls were using saturated or mix between the two types when comparing between the two types of use the obtained OR with 95% confidence interval was 1.0 (0.46- 2.18) indicating no relation between the fat type used in cooking and CRC increasing of risk, that participants who were using unsaturated fat were 78.8%, with the remaining percent to mix between saturated and unsaturated types in cooking.

4.2.3.1.3 Other types of diets

Comparing between cases and controls for their different patterns of diet has been established; it was done to assess the relation between these diets and the development of CRC. Comparisons gave various evidences of correlation and outcomes as shown in Table 4.9.

The study showed that (97.0%) of controls were having vegetables of more regularly than cases (93.9%). Also having salads more regularly was higher for controls (94.7%) than cases (89.8%) as well. Regular vegetables and salads intake failed to reach a statistical significant level in their differences between cases and controls. OR's and P values of the Chi square test for both vegetables and salad intake

Table 4.9: Types of food that may relate to CRC

Item	Cases		Controls		P value	OR (95% Confidence Interval)
	No	%	No	%		
Vegetables					0.31	0.48 (0.1- 2.4)
Regularly	62	93.9	128	97.0		
Less Regular	4	6.1	4	3. 0		
Salad					0.21	0.49 (0.14- 1.76)
Regularly	53	89.8	125	94.7		
Less Regularly	6	10.2	7	5.3		
Fruits					0.02	0.3 (0.09-0.98)
Regular	57	86.4	126	95.5		
Less Regular	9	13.6	6	4.5		
Cereals					0.036	0.5 (0.25- 0.96)
Regular	17	25.8	54	40.9		
Less Regular	49	74.2	78	59.1		
Beans					0.86	1.09 (0.36 - 3.4)
Regularly	60	90.9	119	90.2		
Less Regular	6	9.1	13	9.8		
Falafel					0.06	2.57 (0. 87 – 8.17)
Regularly	61	92.4	109	82.6		
Less Regular	5	7.6	23	17.4		
White bread					0.14	0.47 (0.15- 1.45)
Regular	58	87.9	124	93.9		
Less Regular	8	12.1	8	6.1		
Bran Bread					0.02	0.44 (0.21- 0.94)
Regularly	13	19.7	47	35.6		
Less Regular	53	80.3	85	64.4		

respectively were 0.48 (0.1- 2.4), P value 0.31 and 0.49 (0.14- 1.76) P value of 0.22, these observations which are shown by this study are with no relationships between CRC and the increased consumption of vegetables or salad, which goes with some results of previous studies that denying the relation of reducing the risk of CRC by high consumption of vegetables (Schatzkin et al., 2007).

Comparing among cases and controls in fruit intake has found that (95.5%) of controls were consuming fruits more regularly than (86.4%) of cases. Fruits have been able to accomplish a significant alterations, OR with 95% confidence interval was 0.3 (0.09-.98) and Chi square test P value of 0.02, thus confirming the idea that, the more frequent to eat fruit the more protection from CRC is gained, this result gave power to the theory of the protective effect of the increased fruit ingestion and the lower risk of CRC (Uchida & et al., 2010; Ramadas & Kandiah, 2009).

Comparisons of cereals intake were of some variation among subjects, that the percent of control group who regularly had cereals was (40.9%) and it was higher than that percent of cases group (25.8%) which has the ability to support the inverse relationships between CRC and cereals intake. From that finding; cereals found to be another type of food that was of significance in the protection from CRC. OR was 0.5 with 95% confidence interval (0.26- 0.96) and p value of 0.036 for the Chi square test, the study was matching with the theory of cereals protection effect (Schatzkin et al., 2007).

On the other hand, Falafel, a traditional type of food of the Palestinian society, was tested as a type of fried food for its risk, 92.4% of cases were more regular to eat Falafel than controls 82.6%, the difference between cases and controls was nearly about to reach significance that OR was 2.6; 95% confidence interval 2.57 (0. 87 - 8.17), and P value 0.06. These findings may point to a link between the increase of eating Falafel and being a CRC patient and the risk is increased by 2.6 times, thus may be by the role of deep frying effect to promote CRC by producing carcinogens through the frying process (Guesmi et al., 2010).

For beans intake cases and controls were the same in their frequency of taking this type of food, and results revealed no significance to find out any association between the increase of eating beans and CRC development as OR was 1.09 (0.36 - 3.4) and Chi square test P value was 0.86, this finding didn't agree with the most of the studies confirming the role of legumes in the reduction of colorectal adenomas which are the precursors of CRC (Agurs-Collins et al, 2006); the suggested protective action of beans as a type of legumes did not succeed to appear in this study, the reason may be that people almost eat beans besides falafel that may enhance the risk.

About bread, the two types of bread which were examined gave different results, thus bran bread was of some variation among participants, that (19.7%) of cases were less regular in having bran bread than controls (35.6%). OR was 0.44 and 95 % confidence interval (0.21- 0.94) while P value of 0.02. The protective role of taking bran bread against CRC was well confirmed by this study, which was agreeing with the study suggesting the protective role of fibers found in grains (Schatzkin et al., 2007). While there were little differences in eating white bread among cases and controls, OR with 95% confidence interval was 0.47 (0.15- 1.45) with Chi square test P value of 0.14 suggesting that white bread was of no link to affect the occurrence of CRC.

Table 4.10: Dairy Products

Item	Case		Control		P value	OR (95% Confidence Interval)
	No	%	No	%		
Cheese					0.17	0.52 (0.18 - 1.48)
Regularly	57	86.4	122	92.4		
Less Regular	9	13.6	10	7.6		
Milk					0.61	0.86 (0.45- 1.6)
Regularly	37	56.1	79	59.8		
Less Regular	29	43.9	53	40.2		
Yogurt					0.39	0.74 (0.35 - 1.57)
Regular	49	74.2	105	79.5		
Less Regular	17	25.8	27	20.5		

Many types of dairy products (cheese, milk and yogurt) have been tested to examine its regular intake associations with CRC as shown in Table (4.10); all of those types were of no relation with emergence of CRC disease in spite of having of some differences in their intake between cases and controls. Results were as followed:

More cheese intake was found through controls (92.4%) against (86.4%) of cases, but it could not reach significant level. OR with 95% confidence interval was 0.52 (0.18 - 1.48) and 0.17 P value of the Chi square test, this pointed to the no link between risk of CRC and eating cheese.

About drinking milk and yogurt, differences among cases and controls in the drinking of these types of dairy products were little and have not been considered valuable to indicate a relation between the frequency of their drinking and having CRC. OR for drinking milk with 95% confidence interval was 0.86 (0.45- 1.6) and p value of the Chi square test of 0.61, while for drinking yogurt OR was 0.74 with 95% confidence interval (0.35 - 1.57) and 0.39 p value of the Chi square test.

The results related to the dairy products may partially match with a meta analysis conducted for the evaluation of the studies related to this issue; it gave the evidence that milk was unrelated to protect from rectal cancer, the inverse relationship of dairy products intake was for the cancer of the distal part of colon rather than its other parts (Huncharek et al., 2009), thus the obtained results may be due to the variation in the affected parts of colon for the available cases. An additional prospective study may support the evidences obtained, it had been conducted for cohorts of females from the United States of America. It suggested no significant association present between CRC and the intake of diet of calcium content (Lin, J., et al., 2005); the current study conducted in Gaza strip consisted of about 60% of females participants, which may explain the same results obtained from United States.

Table 4.11: Coffee and soft drinks

Item	**Cases**		**Controls**		**P value**	**OR (95% confidence interval)**
	No	%	No	%		
Coffee					0.15	0.65 (0.34- 1.2)
Regularly	32	48.5	78	59.1		
Less Regularly	34	51.5	54	40.9		
Soft Drinks					0.57	1.2 (0.59 - 2.49)
Regularly	49	74.2	93	70.5		
Less Regular	17	25.8	39	29.5		

Testing coffee dinking as shown in Table 4.11 revealed that (59.1%) of controls showed an increase in drinking coffee than (48.5%) for cases, OR of 95% confidence interval was 0.65 (0.34- 1.2) and p value of 0.15. The suggested role of coffee in the protection from CRC has not been proved by this study; these results were matching

with some other studies observing that there was no relation between the increase in coffee drinking and the reduction of CRC incidence (Bidel et al., 2010).

About drinking soft drinks, despite of the presence an increase in cases (74.2%) in the intake of such drinks than controls (70.5%), but it was of no significance, OR with 95% confidence interval was 1.2 (0.59 - 2.49), P value 0.57 as shown in Table 4.11. The study revealed that soft drinks were of no risk to improve the process of CRC formation. These results are similar with those appeared from a pooled analysis of 13 cohort studies to find the relation with its drinking and to give no increased risk of CRC (Zhang et al, 2010).

4.2.3.1.4 Food preference

The degree of favoring food was examined through this study. It was done trying to link the disease with some food variables; this testing was performed as another tool in which the frequency may fail to prove it's relation with CRC and either being a risk or a protection factor from the disease. The effect of these variables may be enhanced by the amount taken when being favored and to create the proposed action. Results for favoring food are shown in Table 4.12.

Favoring red meat has been shown from this study to be with more preference among (54.5%) of cases than (36.4%) of controls, OR with 95% confidence interval of 2.1 (1.1-4.0), Chi square test was of significant p value 0.01, which may give a hint to the relation between increase risk of CRC and the increased intake of red meat. This result showed that preferring to eat red meat may increase the risk of CRC by nearly two times. This result may agree with the suggestion of such a relation of CRC in some studies (Boyle & Langman, 2001; Flood et al., 2008; Gonzalez & Riboli**,** 2010**)**.

The preference of eating chicken was assessed, the results showed that (65.2%) of controls were with higher preference to intake chicken and making it as the first choice of types of meat taken than (57.6%) of cases, OR with 95% of confidence interval was 0.73 (0.38- 1.38) while P value was 0.29. The researcher proposed a justification of this result that it might be improved towards the inverse association due to its less fat content (Chao et al., 2005) if the sample sized was enlarged.

Table 4.12: Food preferences

Item	Cases		Controls		P value	OR
	No	%	No	%		
Red Meat					0.01	2.1 (1.1-4.0)
High extent	36	54.5	48	36.4		
Some extent & Never	30	45.5	84	63.6		
Chicken					0.29	0.73 (0.38- 1.39)
High extent	38	57.6	86	65.2		
Some extent & Never	28	42.4	46	34.8		
Fish					0.28	1.5 (0.68- 3.36)
High extent	54	81.8	99	75.0		
Some extent & Never	12	18.2	33	25.0	0.52	
Vegetables					0.05	0.51 (0.24-1.0)
High extent	46	69.7	108	81.8		
Some extent & Never	20	30.3	24	18.2		
Fruits					0.55	0.77 (0.31- 1.97)
High extent	56	84.8	116	87.9		
Some extent & Never	10	15.2	16	12.1		
Dairy products					0.54	0.83 (0.44- 1.57)
High extent	34	51.5	74	56.1		
Some extent & Never	32	48.5	58	43.9		

Making fish as the first choice among types of meat in eating did not much differ among subjects; that (81.8%) cases were to prefer eating fish more than (75.0%) controls, results did not make a significance in the reduction of CRC, its OR with 95% of confidence interval was 1.5 (0.68- 3.36) and Chi square test gave a P value of 0.28. This appeared as nearly an increase in risk among cases for high consumption of fish, but it may be due to the increase of high fat in its processing (frying) among cases (80.7%) and p value 0.001.

Controls with (81.8%) were preferring to eat vegetables with a higher percent from that of cases (69.7%). Controls were preferring to eat vegetables to a higher extent than of cases, OR with 95% of confidence interval was 0.51 (0.24-1.0), Chi square test gave a P value of 0.05 to marginally confirming the suggested relation between the role of plenty amount of fibers found in vegetables (Flood et al., 2008; Boyle and Langman, 2001). Preferring to eat vegetables to a higher extent seemed to give an inverse relationship between its increased consumption and the lower CRC risk introduced.

The preference of having fruit among cases (84.8%) and controls (87.9%) was of small differences, which had not the ability to reach significance, OR with 95% of confidence interval was 0.77 (0.31- 1.97), with the p value the Chi square test 0.55. This result may be explained by the researcher that cases may like to eat fruits but actually they did not eat them much; the reason may relate this finding with the economic status of cases with 47.0 % of them were of low income and with less ability to provide fruits in their diet in higher amounts.

Preferring to have dairy products was with few differences among cases and controls, percentages were 51.5 and 56.1 for cases and controls respectively, this difference was not able to reach statistical significant level to link between its preference and the disease risk, this results was matched with a study suggested this no relation (Lin et al., 2005).

4.2.3.2 Supplementations and medications

Table 4.13 shows the obtained results for testing of the intake of some supplementation (Calcium, Vitamin D and Folic acid) and medications (Aspirin and contraceptives) that may affect the risk of CRC.

About calcium the study noticed that a higher intake of calcium was among (25.0%) of the controls by nearly twice more than cases (10.6%). OR and 95% confidence interval was able to confirm this relation 0.36 (0.13- 0.91) and P value 0.01 which point to the inverse association between higher calcium intake and the initiation of CRC. The obtained observation was matching with various studies confirming such a relation (Park et al., 2007; American cancer society, 2010; Gonzalez & Riboli, 2010).

When studying the differences in the duration of the taken calcium there were no significance, as little difference in the durations were among cases and controls.

Although differences in vitamin D ingestion were present among (6.1%) of cases and (11.4%) of controls, the suggested protecting outcome of its use was not confirmed by the conducted study, OR with 95% confidence interval was 0.5 (0.13- 1.7) and P value of 0.23 which was of no significance. It may be due to the lower percents in taking this type of vitamin in the general study population as a whole (9.6%).

Table 4.13: Supplementations and medications

Item	Cases		Controls		P value	OR (95 % Confidence Interval)
	No	%	No	%		
Aspirin					0.07	0.56 (0.28 - 1.1)
Yes	18	27.3	53	40.2		
No	48	72. 7	79	59.8		
Calcium					0.01	0.36 (0.13- 0.91)
Yes	7	10.6	33	25.0		
No	59	89.4	99	75.0		
Calcium Duration					0.81	0.75 (0.03 -8.97)
≤ 4 years	6	85.7	27	81.8		
> 4 years	1	14.3	6	18.2		
Vitamin D					0.23	0.5 (0.13- 1.7)
Yes	4	6.1	15	11.4		
No	62	93.9	117	88.6		
Folic Acid					0.69	0.86 (0.36 -1.98)
Yes	11	16.7	25	18.9		
No	55	83.3	107	81.1		
Contraceptives					0.61	0.81 (0.33- 1.98)
Yes	12	30.0	27	34.6		
No	28	70.0	51	65.4		

Folic acid consumption was of small differences among cases (16.7%) and controls (18.9%), OR with 95 % confidence interval 0.86 (0.36 -1.98), P value was 0.69 which refer to the unrelated association between taking folic acid and CRC hazard by the

absent of the statistical significance, this raised result may be matched with other studies that found out the non protective consequence of this supplement (American cancer society, 2010), the reduced percent of folic acid consumption among all of the study participants (both case and controls), 18.1% of the total sample may lead to this risen result.

Testing regular aspirin intake found that about (40.2%) of the controls were noticed to have a higher regular use of aspirin than (27.3%) of cases by nearly one and a half time, OR with 95% confidence interval was 0.56 (0.28 - 1.1) and P value of the Chi square test was 0.07 as shown in Table 4.13. Regular use of aspirin was about to reach significance to confirm the suggested protective effect of aspirin intake and decrease the risk of CRC (Baron et al., 2003; American cancer society, 2010; Thun et al., 2010). The bit difference of the p value might have been influenced by the small sample size which may affect these results.

Contraceptive intake which was supposed to protect against CRC was unassociated to do this action in this current study, the tiny difference between cases (30.0%) and controls (34.6%) were of no significance OR 0.81 (0.33- 1.98) and 0.614 P value. This result may be interpreted by the strongest reduction in risk was among current users only (Calle et al., 1995), also the total percentage of contraceptive users in the study population was generally low.

4.2.3.3 Life style

4.2.3.3.1 Physical activity

Some patterns of physical activities were tested in this study for observing their role in either the risk of or the protection from CRC, Table 4.14 will illustrate the achieved result through this study.

Although about (45%) of the controls were walking regularly, which resembled nearly half of them, cases (43.9%) were also almost with same percent to walk regularly, which was nearly the same of controls; the influence of walking practice as a physical activity in the protection against CRC was absent in this study through the non statistical significant obtained, OR with 95% confidence interval 0.94 (0.5 - 1.7) and 0.83 P value. This finding may contradict with the study suggesting the protection role of walking against CRC (Halle & Schoenberg, 2009). The walking duration

taken by controls could be with short times which is not enough to provide the protection effect from the disease, thus may explain this result, or other tool may be proposed to measure the exerted physical activity by participants.

Regular home exercise was also of little differences between cases (14.4%) and controls (13.6%) which was of no significance in this study as cases and controls were nearly the same in practicing these exercises, OR 0.94, 95% confidence interval of (0.37 - 2.37), and P value of 0.88. This obtained finding may appear as a result of the lower percent of practicing home exercise among all participants and might reveals that minority of the population were to play such exercises.

Table 4.14: Types of Physical activity and CRC

Item	Cases		Controls		P value	OR (95 % Confidence Interval)
	No	%	No	%		
Walking					0.83	0.94 (0.5 - 1.7)
Regularly	29	43.9	60	45.5		
less Regular	37	56.1	72	54.5		
Home Exercise					0.88	0.94 (0.37 - 2.37)
Regular	9	13.6	19	14.4		
Less regular	57	86.4	113	85.6		
Watching T.V						
≤ an hour	27	45.8	46	35.4	-	1.0
>1 ≤ 2 hours	16	27.1	41	31.5	0.28	0.66 (0.29 -1.5)
> 2 hours	16	27.1	43	33.1	0.22	0.63 (0.28- 1.42)
Internet					0.35	0.48 (0.07- 2.57)
≤ 1 hour	64	97.0	124	93.9		
> 1 hour	2	3.0	8	6.1		
Home Cleaning					0.28	0.72 (0.37-1.39)
Daily & Regular	40	60.6	90	68.2		
Less Regular	26	39.4	42	31.8		

Times spent in watching television were studied to be as an indicator of less exerted effort and activity by participants. Controls were watching television for more durations than cases did, but it appeared with a small difference, ORs and P value of

the Chi square test was of no significant to have a relation between increase of watching television duration to increase the risk of initiating CRC, disclaiming the theory stating that reducing physical activity may be a trigger for the risk to develop CRC (Boyle and Leon, 2002).

Also using internet for long times did not give a link between making less physical activity and CRC, the duration spent in using internet was short in both controls (93.9%) and cases (97.0%), OR and with 95% confidence interval 0.48 (0.07- 2.57), P value was 0.35. Generally the prevalence of using internet was low among all of the study participants, that about 94.9% of the participants was using internet for an hour or less per week, this evidence may be due to the reason that participants were almost females who tend not to use internet.

Findings when examining regular home cleaning were of the same result of other studied physical activity to be with no significance, (39.4%) cases were less regular to perform their home cleaning by themselves, but it was with little differences in relation to controls (31.8%), OR with 95% confidence interval was 0.72 (0.37-1.39) and P value of the Chi square test was 0.28. These findings may match with the studies suggesting that just only the recreational physical activity spent is the type of activity which may decrease the CRC hazard (Boyle and Leon, 2002).

4.2.3.3.2 Smoking

Smoking habit was with little differences among cases (19.7%) and controls (22.7%), OR with 95% confidence interval was 0.83 (0.4- 1.7), and P value 0.62 for the Chi square test, which did not point out to a significant relation between smoking habit to increase the risk of CRC.

As presented in Table 4.15; this result of the study may relate to a little extent to other study suggesting that smoking habit was with a marginal significance in increasing the chance of CRC occurrence (Nordenvall et al., 2011), another idea for the justification of this result, that cases could be of more colon cancer than rectum with the latest to be the more influence with the increased hazard by tobacco smoking (Zhao et al., 2010; Nordenvall et al., 2011).

Table 4.15: Smoking and obesity

Item	Case		Control		P value	OR (95% Confidence Interval)
	No	%	No	%		
Smoking					0.62	0.83 (0.4- 1.7)
Yes	13	19.7	30	22.7		
No	53	80.3	102	77.3		
Secondary Smoking					0.47	1.2 (0.68- 2.3)
Yes	30	45.5	53	40.2		
No	36	54.5	79	59.8		
Obesity					0.15	1.5 (0.81- 2.9)
Obese	31	47.0	48	36.4		
Not Obese	35	53.0	84	63.6		

Also the positive association between tobacco smoking and CRC may could not be proven by this study due to the higher percent of females participation (60.4%), who may tend not to smoke rather than males (39.6%) who may of more to get use of this habit.

Regarding being a secondary smoker, Table 4.15 showed that (45.5%) of cases were of higher exposure to smoking from closed persons who practicing this habit than controls (40.2%), these few difference did not give a significance in raising the risk of CRC. OR with 95% confidence interval was 1.2 (0.68- 2.3), P value with 0.47.

4.2.3.3.3 Obesity

Checking the relation between obesity and CRC in this study had revealed some differences among cases and controls for being obese, it was (47.0%) and (36.4%) for cases and controls respectively as seen from Table 15. These introduced differences totally among both gender in the study was not of significance level, OR with 95% confidence interval was 1.5 (0.81- 2.9), and P value was 0.15. But separately when examining these differences among females, cases (57.5%) were obese against (37.5%) of controls who were obese, OR with 95% confidence interval was 2.2 (1.04- 4.88), P value of the Chi square test was 0.03, thus a statistical significance evidence showed that the increase in CRC risk for obese women to be by nearly two times of more risk than non obese to get CRC. About men the results were different that

controls (32.7%) were faintly of more obese than case (30.8%), the difference were not significant to create a relation with the risk of CRC and being obese. OR with 95% confidence interval was 0.92 (0.33- 2.5), Chi square P value was 0.86.

Obesity findings were different from some other studies suggesting that the risk of CRC was increased for obese men rather than women (American cancer society, 2010), thus may be related to the decreased male participants in this study (39.4.%), which may results in the failure to prove the risk. Moreover, about the discovery of the obese female risk, a study suggested the increased risk of obese women in rectal cancer types (Campbell et al., 2004), which perhaps present in the sample for being of more than that of colon type for the female participants.

According the examination of alcohol drinking as a life style risk factor of CRC, this variable was denied making consideration to the conservative nature of the Palestinian society.

4.2.3.4 Health education and knowledge

Table 4.16 shows the study observations related to certain types of health educational lectures and the health knowledge in affecting the risk of CRC.

The study showed that nearly almost of the participants had not attended any lectures educating about CRC and its related risk factors or even about the factors that may protect against this disease. 7 subjects only of the control group had attended such lectures comparing with only one person in the cases group, but this difference was of no significance to correlate between such lectures and the protection from CRC. Attending CRC related lectures OR with 95% confidence interval was 0.28 (0.03 - 2.3), P value of chi square test was 0.2, this no link may be due to the shortage of such type of lectures in the presented health educational programs for the majority of the population in general.

Attending health educational lectures about the healthy diet and healthy life style, that should be adopted by people to improve their health was another concern of this study; (36.4%) of controls attended more of such lectures than cases (22.7%); this difference among cases and controls was of marginal significant level for the protection action of attending these lectures to reduce appearance of CRC. OR with 95% confidence interval 0.52 (0.26- 1.0), P value of the chi square test was 0.05.

These finding may support the theory suggesting that disease can be reduced by a considerable burdens by means of diet and life style modification (Colditz, 2009; WHO, 2009[a]; Kirkegaard et al., 2010).

Table 4.16: Attendance of health education lectures and health knowledge

Item	Case		Control		P value	OR (95 % Confidence Interval)
	No	%	No	%		
CRC lectures					0.2	0. 28 (0.03 - 2.3)
Yes	1	1.5	7	5.3		
No	65	98.5	125	94.7		
Diet & life styles Lectures					0.05	0.51 (0.25- 1.0)
Yes	15	22.7	48	36.4		
No	51	77.3	84	63.6		
No. of lectures						
Don't attend	51	77.3	84	63.6	-	1.0
1-4 times	10	15.2	37	28.0	0.03	0.45 (0.19-1.0)
> 4 times	5	7.5	11	8.4	0.41	0.75 (0.21- 2.51)
CRC Knowledge					0.08	0.59 (0.3- 1.13)
Yes	23	34.8	63	47.7		
No	43	65.2	69	52.3		
Fiber rich food					0.009	2.38 (1.17 - 4.86)
little	50	75.8	75	56.8		
Medium & Good	16	24.2	57	43.2		

Although controls were attending of more lectures than cases, marginal significant appeared only when comparing the group whom attended (1- 4 times) to persons who did not attend lectures at all OR of 95% confidence interval 0.45 (0.19-1.0) and P value of the Chi square test was 0.039, while when comparing the group who attended lectures of more than 4 times to who did not attend lectures, the gained results failed to introduce a relation to obtain a trend in the reduction of risk to develop CRC when increasing the number of attending lectures times. P value of the Chi square test was 0.41 whereas OR of 95% confidence interval was 0.75 (0.21- 2.51). It may be due to decreased number of participant to attend such lectures of more than 4 times of about 8% of them.

The assessed knowledge about CRC and its related risk factors enhancing its progress among cases and controls introduced some differences, (47.7%) of the controls were of more knowledge about the disease and it's risk factors than cases knowledge (34.8%), significance of these differences were about to be obtained. OR with 95% confidence interval was 0.59 (0.3- 1.13) and Chi square P value was 0.08. The provided result may point to the need of other studies that may provide a better association between the increase of awareness of this disease among population and a further reduction of its appearance.

The knowledge about fiber rich food had been also of elevated differences among controls, (43.2%) of the controls were of higher knowledge than cases (24.2%) about food rich in fibers, and that may protect against CRC, OR with 95% confidence interval 2.4 (1.2 - 4.6), P value of Chi square test was 0.009. The result indicates that poor knowledge about fiber rich food could increase the risk of getting CRC by 2.4 times and confirms a strong inverse association between the increase of the knowledge about diet containing fiber to reduce CRC risk, thus the increased of this knowledge may have a reflection or an influence in people to modify their diet to contain more food of fiber contents to improve their health in general and become protected from CRC.

4.2.3.5 Screening tests of colorectal cancer

Table 4.17 shows the differences of performing the screening tests related to CRC.

Table 4.17: Screening tests of CRC

Item	Case		Control		P value	OR (95% Confidence Interval)
	No	%	No	%		
FOBT					0.000	18.7 (6.29- 59.69)
Yes	28	42.4	5	3.8		
No	38	57.6	127	96.2		
Colonoscopy or Segm.					0.000	160.9 (46.47 -608.49)
Yes	57	86.4	5	3.8		
No	9	13.6	127	96.2		

***FOBT**: Fecal occult blood. **Segm**: Segmoidoscopy

The findings related to the screening tests reveals that using fecal occult blood has been performed significantly for cases (42.4%) just to facilitate their diagnosis rather than being used as a screening test, which is supposed to be used to protect against the development of CRC through the early detections of its related problem, whereas the percentage of controls performing the test was too low 3.8%.

Regarding performing segmoidscopy or colonoscopy as screening tests; findings introduced significantly that the majority of cases (86.4%) had performed one of these tests just to confirm their diagnosis for being CRC patients, and not for the purpose of screening to play its role in the secondary prevention of the disease. Controls percentage of performing such tests was 3.8% and being done just for the diagnosis purposes as well.

Chapter 5
Conclusion and Recommendations

Conclusion

This study attempted to identify the major risk factors that may trigger the appearance of CRC in the area of the Gaza Strip. This case control study was conducted in two main types of the health services. It was mainly started at the two oncology clinics at Al Shifa and European Gaza hospitals to select cases, and then matched with controls chosen from the primary health care centers with the same locality of cases. The study consisted of 132 subjects (66 cases and 132 controls). The study observations show some of the risk factors that may be associated with the development of CRC. These factors were classified to many groups:

5.1 Socioeconomic factors

The study reveals that income has been showed to affect the risk of getting CRC, that with the decreasing in people income it increases the risk of having CRC. Additionally, a marginal association between the educational level obtained and the risk of CRC with the low level of education was found to increase the risk of this disease. Low profession also resembles as risk, that's when having a previous occupation of this type an increase of CRC risk occurred.

About the other socioeconomic factors the study failed to prove the association with other related factors such as marital status, number of family members, current occupation and the duration of working either of the current or the previous ones, besides living outside the strip for long periods.

5.2 Non modifiable factors

Some of the studied non modifiable factors have been proven to be associated with the risk of the disease and other has not. Family history of CRC was found to increase the risk of the development of this disease and having any member of the family with CRC increases the risk by nearly four times. Also, chronic bowel disturbances were related with risk of CRC and having several types of these disturbances for long times may be related with the risk of CRC. However, the duration of these disturbances was not able to show a link to the CRC hazard.

For having a family history of any other type of cancer than CRC, the study observed that there was no relation between such a family history and the increase of risk of CRC. Furthermore, results of diabetes mellitus gave no association to the CRC hazard. Cholecystitis and Cholecystectomy as well have been observed not to correlate with the risk of the tested disease.

5.3 Modifiable factors

Observations about the tested modifiable factors varied between being with increased the risk, being with no link of the risk or being protective.

5.3.1 Dietary habits

Neither of the types of meat tested (beef, lamb, fish, chicken, and canned meat) have been showed to associate with the increase of risk when being highly consumed. The type which was different among the observed results was for the high consumption of cold meat which seemed to be protective from the disease; this result could be focused on by other studies recheck this association.

The used methods in meat processing either for being with low or high fat were of no relation to higher the risk of CRC, except for fish processing, as the frying of fish was observed to elevate the risk of CRC by nearly six and a half times than the low fat preparing, where as the regular used of fat types in cooking generally, for either using saturated or unsaturated ones was of no relation with the hazard of CRC.

Regular intake of vegetables, salad, beans and white bread were all of no relation to neither to increase nor to decrease the CRC risk. But regular intake of fruit, cereals, and bran bread were found to protect against the CRC. Falafel regular eating was nearly to be observed to increase the risk of CRC, which may suggest conducting other studies to check its effect.

Dairy products (cheese, milk and yogurt) regular intake has not seen to have an effect on the CRC risk. Moreover regular drinking of both coffee and soft drinks did not have an influence in either risk of or protection against the disease.

When tested the degree of food preference, observations found out that preferring to eat red meat was to increase the risk of CRC by nearly two times, while preferring to

eat vegetables was to protect against the disease, other food preference testing (fish, chicken, fruits and dairy products) all were of no link either to provide more risk or to protect against this disease.

5.3.2 Life style

Studying various types of physical activity including the effect of walking, home exercise, and home cleaning as an example of increased activity gave no relation with the disease, also studying watching television and using internet as examples of decreased activity, results also did not give a relation to the risk of CRC.

Smoking as well with all of its types, frequency or duration were not found to relate to the risk of CRC when was examined as a life style risk factor. Whereas; obesity has been found to be a risk factor of CRC only in females, but it has not linked for males in the area of Gaza Strip.

5.3.3 Supplementations and medications

Calcium is the element which has been shown to protect against CRC when its intake is increased, but its intake duration was not of any association in this study. While neither vitamin D nor folic acid where found to give such an effect. Results from the tested medications gives that aspirin was to indicate a protective influence when it was regularly taken, whereas regular intake of contraceptives were of no influence.

5.3.4 Health education and knowledge

The study showed that the level of health knowledge about CRC was decreased among the total sample in general, that it was unable to give an influence over the development of the disease, but knowledge about fiber rich food and attending health educational lectures about healthy diet and life style were found to decrease the risk of CRC, but with no trend is appeared with the increasing of the attending number of lectures to decrease the risk of the disease.

5.3.5 Screening of CRC

Screening tests of CRC were found to be performed for the diagnosis of cases rather than being performed for controls as a method of the disease secondary prevention, in which it may share in the protection from the disease.

In conclusion from the socioeconomic factors, a decreased income and low profession as a previous occupation were strongly related to the increase of the CRC risk in the Gaza Strip area, in addition to the decreased personal educational level when being of less than the primary school to increase the risk of CRC. Whereas marital status, increased number of family members, current occupation and living outside the area of Gaza Strip for long times were all of no link of the CRC risk. From the non modifiable factors CRC family history and chronic bowel disturbances but not with its duration was to increases the risk. While family history of other types of cancer than CRC, diabetes mellitus, cholecystitis and cholecystectomy all were of no relation of the disease risk. From the modifiable factors some dietary habits were majorly to influence the risk of CRC. Fruits, cereals and bran bread when taken regularly, besides, preferring to eat vegetables reduce the risk of CRC. Increased of Falafel intake was nearly to increase the risk, in addition to prefer eating red meat. While from the processing methods eating fried fish was to increase the risk of CRC. Other types of food or its processing were of no correlation with CRC in this study. Life styles including smoking and physical activity were also of no relation, while just only obesity in females was found to increase the risk of this disease. Increasing calcium and aspirin intake was to reduce the CRC risk beside to the provision of health education and knowledge about healthy life style and food was also found to protect from the CRC.

5.4 Recommendations of the study

1- Improving of the cancer cases registry and the archiving system at the oncology clinics in Gaza Strip. Thus may include applying of the full electronic documentation of patient's data, medical files, visits and appointments.

2- Giving more attention and concern to the health educational programs that may be presented through either the primary health care centers or by other facilities of media concentrating on the CRC related modifiable risk factors particularly dietary habits and encouraging the healthy life styles, more over a special concern should be given to the risky people as at target groups .

3- Making more concern to the CRC screening tests (Fecal occult blood, segmoidscopy, and colonoscopy) which may early detect the colon and rectum

problems, which may induce the cancer in these parts of the body, particularly to those with more risk (those with chronic bowel disturbances and those with family history of the disease), in addition to the special consideration given to the efficiency, effectiveness and social aspects of using such of these tests in our society.

4-Recommendation for future research by the encouragement of more scientific research studies about cancer in general, and colorectal cancer in particular, these studies to be conducted with a larger sample size and concentrating on the variables that were able to correlate with the risk of CRC in this study, those which was to correlate marginally with the disease and other unstudied ones. Besides providing researchers with facilitation needed to perform of such studies in financial and administrative manners.

Chapter 6
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Annex 1

Colorectal Cancer Risk Factors in Gaza Governorates

A Questionnaire Introduced for thesis requirement of master of Public Health

Serial Number	1. Case year……. 2. Control	
Tel:	Name	
Governorate ……..... Residential status: 1-City…….. 2-Camp……. 3-Village……		Health Facility……
Part I Demographic Variable		
1-Age in years……	2- Sex 1. Male 2. Female	3- Marital Status 1. Single 2. Married 3. Divorced 4. Widow
4- No of family members ……	5- Educational level attained..... …..years	
6- Current occupation ……		
7- For how long have you been working in this occupation?.....years		
8- Did you have a previous occupation? a- Yes Mention ……..... Duration…… b- No		
9- What is your income range in NIS? 1- Less than 1000 NIS 2- 1000 – 2000 NIS 3- 2000 – 3000 NIS 4- More than 3000 NIS		
10- Could you mention your exact income in numbers?.....NIS		
11- Did you live outside Gaza Strip before? 1- Yes 2- No (Move to Qs 15)		
12- Where did you Live?.....		
13- For how many years did you live there?.....		

14- What was your occupation while you were living outside Gaza Strip?.....
Part II Non modifiable Factors & Medical History
15- Does any of your family members suffer or have suffered from any type of cancer? 1- Yes 2- No (move to Qs 17) 3- DK (move to Qs 17)
16- What's your relation with this person? He/she is…… 1- Father 2- Mother 3- Sister 4- Brother 5- Second relative/ mention……
17-Does any of your family members suffer from colorectal cancer? 1- Yes 2- No (move to Qs 19) 3- DK (move to Qs19)
18- What's your relation with this person? He/she is…… 1- Father 2- Mother 3- Sister 4- Brother 5- Second relative/ mention……
19- Have you ever suffered from any type of cancer? 1- Yes mention…….. 2- No
20- Have the doctor ever told you that you suffer from diabetes mellitus? 1- Yes 2- No (move to Qs 25)
21- For how long have you been suffering from diabetes mellitus?.....
22- What type of treatment do you have? Circle all possible 1- Insulin Injection 2- Tablets 3- Food Regimen 4- Herbs
23- Is your blood sugar controlled? 1-Yes 2- No
24- Mention your last test for blood sugar level or Hba1c if possible?.....
25- Do you suffer from chronic bowel disturbances (constipation, diarrhea)? 1- Yes Describe type…… 2- No (move to Qs 27)
26- For how long have you been suffering from these disturbances?.....
27- Have the doctor ever told you that you suffer from Crohns Disease (a chronic inflammation of the intestine with persistent or recurrent diarrhea, abdominal pain, fever, reddening and inflammation of the eye, joint pain, skin lesions and sores in the mouth). 1- Yes 2- No (move to Qs 29)
28- For how long have you been suffering from Crohns Disease?.....

29- Have the doctor ever told you that you suffer from ulcerative colitis?(chronic inflammation of the large intestine leading to ulcers accompanied with weight loss plus diarrhea distinguished with blood and mucus) 1- Yes 2- No (move to Qs 31)
30- For how long have you been suffering from ulcerative colitis?.....
31- Have the doctor ever told you that you suffer from Familial Adenomatous Polyposis (an inherited disease accompanied with rectum bleeding, diarrhea or constipation, abdominal pain, low blood counts and unexplained weight loss) 1-Yes 2- No (move to Qs 33)
32- For how long have you been suffering from Familial Adenomatous Polyposis?.....
33- Have the doctor ever told you that you suffer from cholecystitis before? 1-Yes 2- No (move to 35)
34- Did you have your gallbladder removed? 1- Yes 2- No
35- Have you ever taken aspirin medication regularly? 1-Yes 2- No (move to Qs 37)
36- For how long have you been taking aspirin regularly?.....
37- Have you ever taken calcium supplementation? 1-Yes 2- No (move to Qs 39)
38- For how long have you taken calcium supplementation?.....
39- Have you ever taken vitamin D supplementation? 1-Yes 2- No (move to Qs 41)
40- For how long have you taken vitamin D supplementation?.....
41- Have you ever taken folic acid supplementation?..... 1-Yes 2- No (move to Qs 43 -46 for females only, for males move to 47)
42- For how long have you taken folic acid supplementation?.....
43- Have you ever used any contraceptives? 1-Yes 2- No
44- For how long have you been using these contraceptive?.....

45- Have you ever received any post menopausal hormones?..... 1- Yes 2- No
46- For how long have you received post menopausal hormones?.....
Part III Health education and screening
47- Have you ever attended any health educational program about colorectal cancer? 1- Yes 2- No (move to Qs 52)
48- How many times have you attended such programs?.....
49- Have you ever attended health educational programs about healthy food and healthy life styles 1- Yes 2- No (move to Qs 53)
50- How many times have you attended such lectures?
51- Where have you attended these lectures?.....
52- What was the group of people that the health educational programs focused on? a- Adults b- Old over 50 years c- Pregnant women d- Smokers e- others mention…….
53- What do you think is the major reason/s that increases the chance of colorectal cancer?
54-Mention three types of fiber rich food?.....
55- Have you ever been asked to perform a test called occult blood? 1- Yes 2- No (move to Qs 57)
56- What was the reason to perform that test?.....
57- Have you ever exposed to segmoidoscopy or colonoscopy? 1- Yes 2- No (move to Qs 59)
58 – What was the reason to perform that exam?.....
Part IV Life Style
I Smoking
59- Do you smoke any of the tobacco products? 1- Yes 2- (No move to Qs 63)
60- What type of tobacco do you smoke? 1- Cigarettes 2- Hubble-bubble (Move to Qs 62) 3- Others (mention please)……. (Move to Qs 62)
61- How many cigarettes do you smoke a day?.....

62- For how long have you been smoking?.....

63- Is any smoking person living or working with you?

1- Yes (whom?)…….. 2- No

II Physical Activity

64- How frequent do you practice the following physical activities?

Type of activity	Daily	Weekly	1-2 time a month	Never	Rare	Duration
Walking						
Running						
Swimming						
Riding bicycle						
Home exercise						
Watching Television						
Using Internet						
Home cleaning						
Work physical activity						
Others						

Part V Dietary Habits

63- How often do you have the following food?

Type of food	Daily	2-3 times/ Week	Weekly	Once/ 2 Weeks	Monthly	Rare	Never
Beef meat							
Lamb							
Chicken							
Fish							
Canned meat							
Vegetables							
Salad							
Fruits							
Cereals (Wheat, oats, groats)							
Beans & Homos							
Flafel							
White bread							
Bread with Bran							

Dairy products (cheese)							
Milk							
Yogurt							
Coffee							
Soft Drinks or Soda							

65- To what extent do you prefer to eat the following food?

Type	To high extent	To some extent	Never
Red Meat			
Chicken			
Fish			
Vegetables			
Fruits			
Dairy product			

66- How do you prefer to eat your meat meal?

1- Fried 2- Grilled 3- Steamed 4- Barbecued 5- Boiled

67-How do you prefer to eat your chicken meal?

1- Fried 2- Grilled 3- Steamed 4- Barbecued 5- Boiled

68-How do you prefer to eat your fish meal?

1- Fried 2- Grilled 3- Steamed 4- Barbecued 5- Boiled

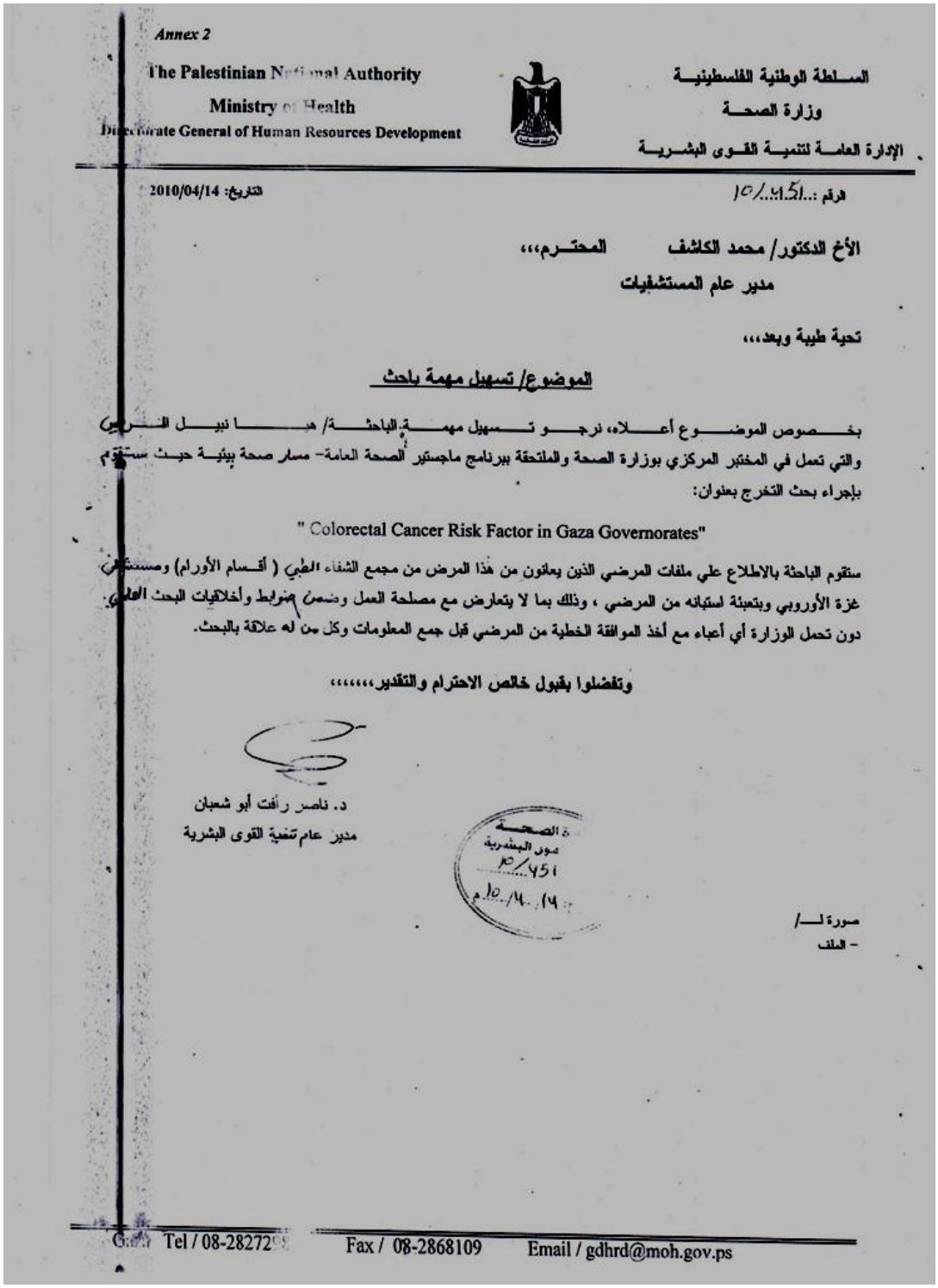
69- Which type of fat do you prefer in food?

1- Butter 2- Vegetable oil 3- Hydrogenated oils (margarine) 4- Olive oil

5- Mixed Mention……

70- What's your weight in Kg?.....	Body Mass Index……
71- What's you height in cm?.....	

Annex2



Annex 2

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

السلطة الوطنية الفلسطينية
وزارة الصحة
الإدارة العامة لتنمية القوى البشرية

التاريخ: 2010/04/14

الرقم: ...15/451

الأخ الدكتور/ محمد الكاشف المحترم،،،
مدير عام المستشفيات

تحية طيبة وبعد،،،

الموضوع/ تسهيل مهمة باحث

بخصوص الموضوع أعلاه، نرجو تسهيل مهمة الباحثة/ هبا نبيل الشريف والتي تعمل في المختبر المركزي بوزارة الصحة والملتحقة ببرنامج ماجستير الصحة العامة- مسار صحة بيئية حيث ستقوم بإجراء بحث التخرج بعنوان:

" Colorectal Cancer Risk Factor in Gaza Governorates"

ستقوم الباحثة بالاطلاع على ملفات المرضى الذين يعانون من هذا المرض من مجمع الشفاء الطبي (أقسام الأورام) ومستشفى غزة الأوروبي وبتعبئة استبانه من المرضى ، وذلك بما لا يتعارض مع مصلحة العمل وضمن ضوابط وأخلاقيات البحث العلمي دون تحمل الوزارة أي أعباء مع أخذ الموافقة الخطية من المرضى قبل جمع المعلومات وكل من له علاقة بالبحث.

وتفضلوا بقبول خالص الاحترام والتقدير،،،،،،

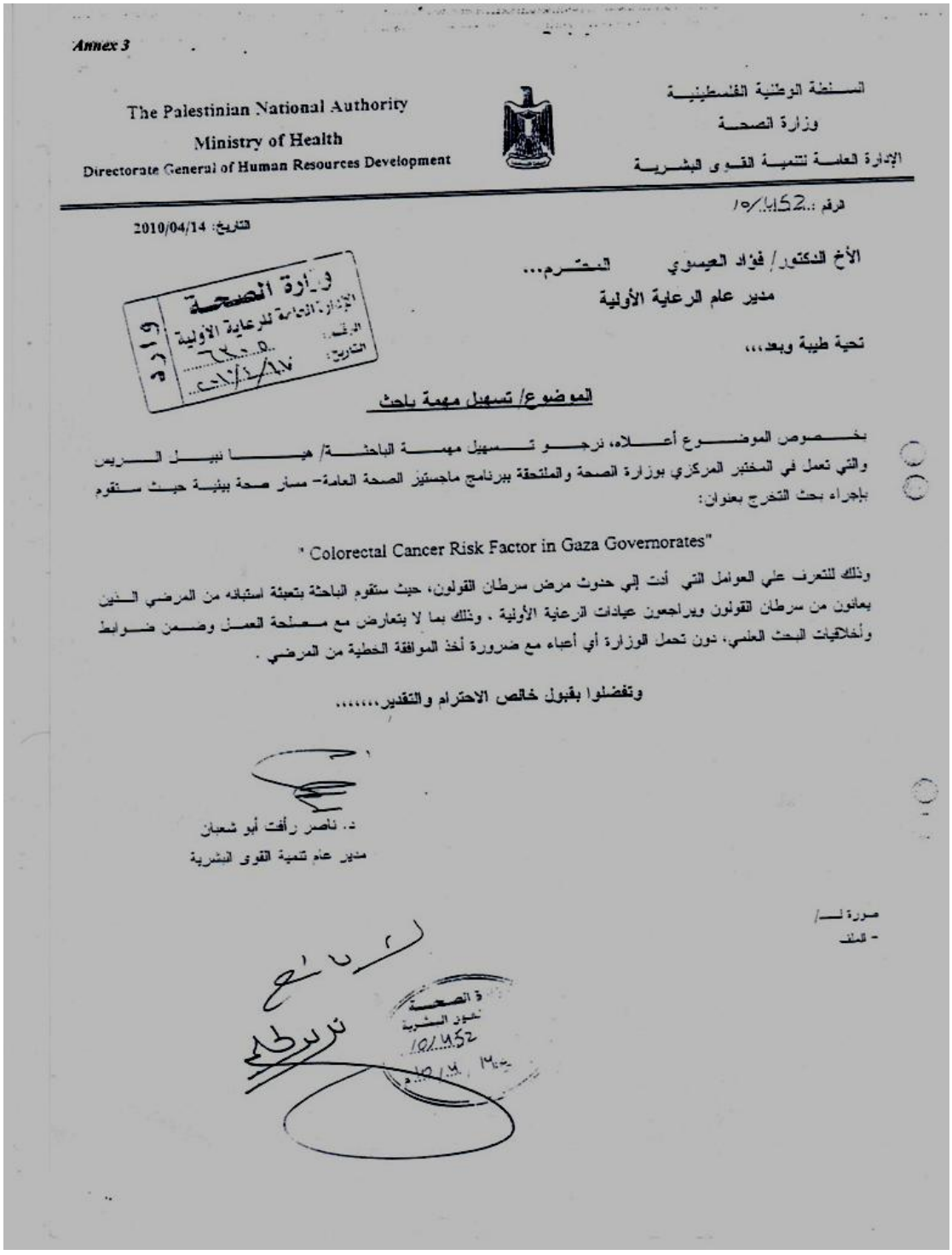
د. ناصر رأفت أبو شعبان
مدير عام تنمية القوى البشرية

وزارة الصحة
شؤون البشرية
15/451
15/4/19

صورة لـ/
- الملف

Gaza Tel / 08-28272[illegible] Fax / 08-2868109 Email / gdhrd@moh.gov.ps

Annex3



Annex 3

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

السلطة الوطنية الفلسطينية
وزارة الصحة
الإدارة العامة لتنمية القوى البشرية

الرقم: ..452/10

التاريخ: 2010/04/14

وزارة الصحة
الإدارة العامة للرعاية الأولية
الرقم: ...
التاريخ: ...
219

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

تحية طيبة وبعد،،،

الموضوع/ تسهيل مهمة باحث

بخصوص الموضوع أعلاه، نرجو تسهيل مهمة الباحثة/ هيا نبيل الريس والتي تعمل في المختبر المركزي بوزارة الصحة والملتحقة ببرنامج ماجستير الصحة العامة- مسار صحة بيئية حيث ستقوم بإجراء بحث التخرج بعنوان:

" Colorectal Cancer Risk Factor in Gaza Governorates"

وذلك للتعرف على العوامل التي أدت إلى حدوث مرض سرطان القولون، حيث ستقوم الباحثة بتعبئة استبانه من المرضى الذين يعانون من سرطان القولون ويراجعون عيادات الرعاية الأولية ، وذلك بما لا يتعارض مع مصلحة العمل وضمن ضوابط وأخلاقيات البحث العلمي، دون تحمل الوزارة أي أعباء مع ضرورة أخذ الموافقة الخطية من المرضى .

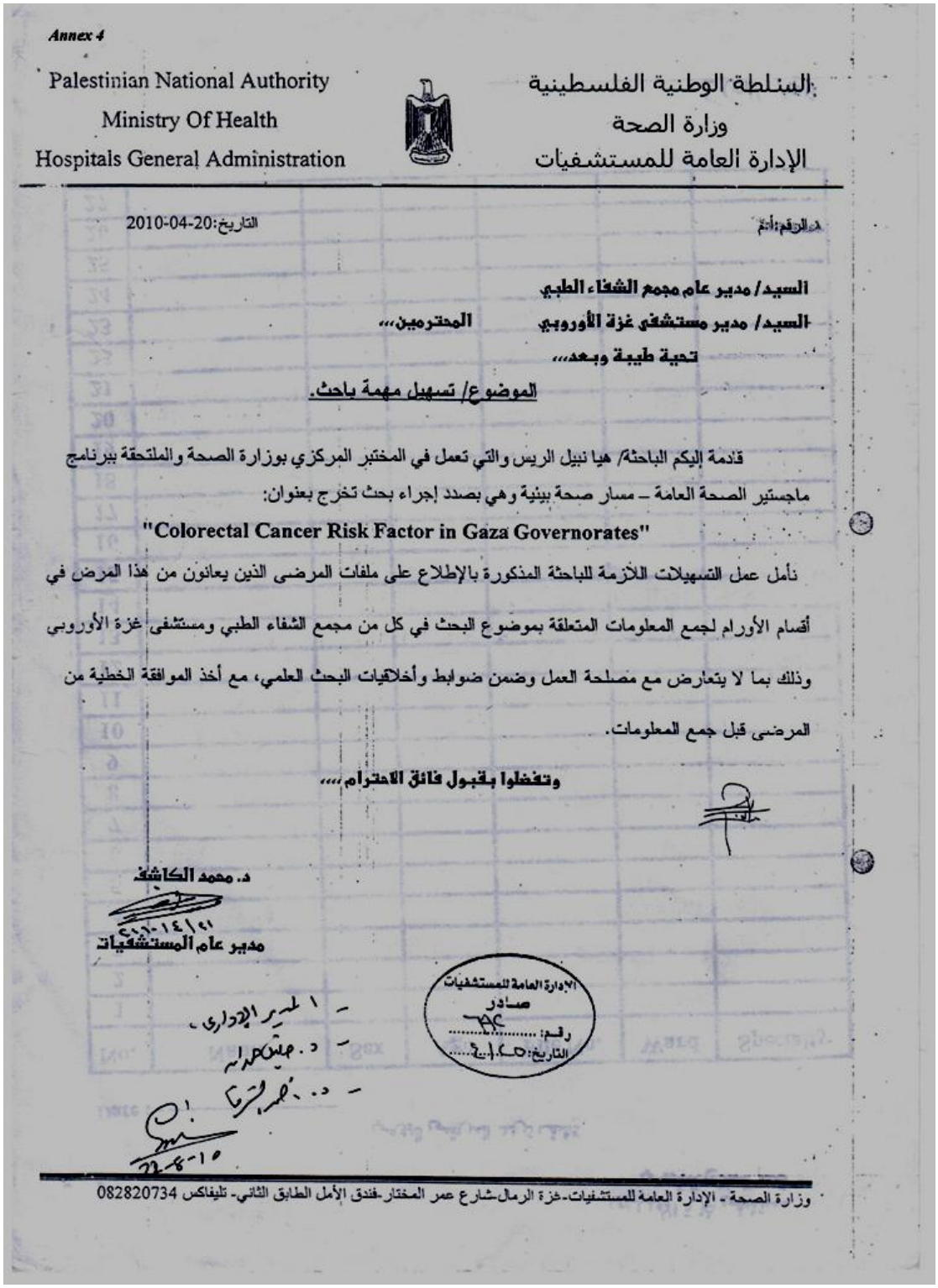
وتفضلوا بقبول خالص الاحترام والتقدير.....

د. ناصر رأفت أبو شعبان
مدير عام تنمية القوى البشرية

صورة لـ/
- الملف

وزارة الصحة
تطوير الشرية
10/452

Annex4



Annex 4

Palestinian National Authority
Ministry Of Health
Hospitals General Administration

السلطة الوطنية الفلسطينية
وزارة الصحة
الإدارة العامة للمستشفيات

الرقم:أ.ع التاريخ:20-04-2010

السيد/ مدير عام مجمع الشفاء الطبي
السيد/ مدير مستشفى غزة الأوروبي المحترمين،،،
تحية طيبة وبعد،،،

الموضوع/ تسهيل مهمة باحث.

قادمة إليكم الباحثة/ هيا نبيل الريس والتي تعمل في المختبر المركزي بوزارة الصحة والملتحقة ببرنامج ماجستير الصحة العامة – مسار صحة بيئية وهي بصدد إجراء بحث تخرج بعنوان:

"Colorectal Cancer Risk Factor in Gaza Governorates"

نأمل عمل التسهيلات اللازمة للباحثة المذكورة بالإطلاع على ملفات المرضى الذين يعانون من هذا المرض في أقسام الأورام لجمع المعلومات المتعلقة بموضوع البحث في كل من مجمع الشفاء الطبي ومستشفى غزة الأوروبي وذلك بما لا يتعارض مع مصلحة العمل وضمن ضوابط وأخلاقيات البحث العلمي، مع أخذ الموافقة الخطية من المرضى قبل جمع المعلومات.

وتفضلوا بقبول فائق الاحترام،،،

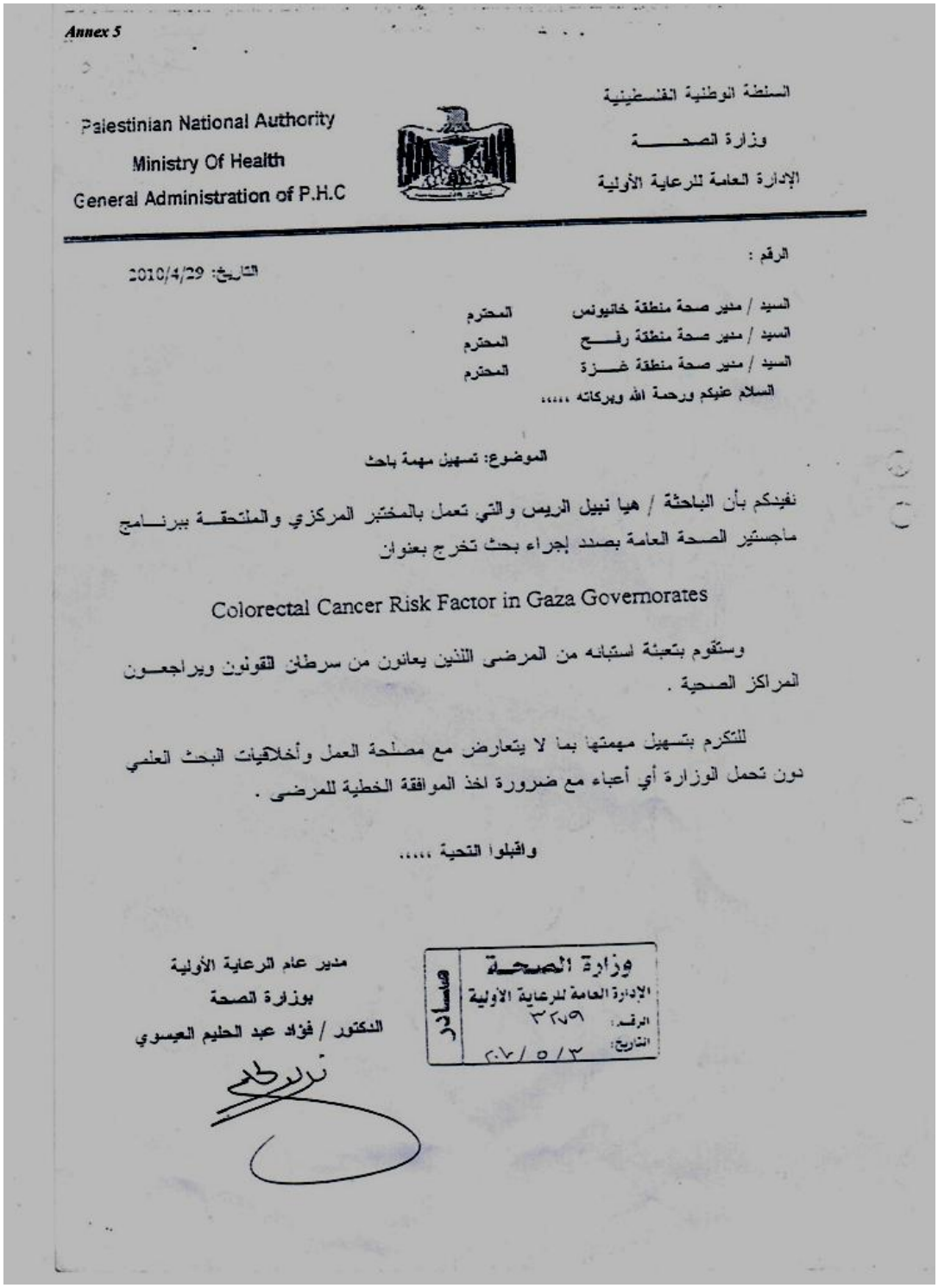
د. محمد الكاشف
مدير عام المستشفيات

الإدارة العامة للمستشفيات
صادر
رقم: .....
التاريخ: ٢٠١٠/٤/٢٠

- المدير الإداري.
- د. عايش عبد الله
- د. أحمد الترك

وزارة الصحة - الإدارة العامة للمستشفيات-غزة الرمال-شارع عمر المختار-فندق الأمل الطابق الثاني- تليفاكس 082820734

Annex5



Annex 5

السلطة الوطنية الفلسطينية
وزارة الصحـــــة
الإدارة العامة للرعاية الأولية

Palestinian National Authority
Ministry Of Health
General Administration of P.H.C

الرقم :
التاريخ: 2010/4/29

السيد / مدير صحة منطقة خانيونس المحترم
السيد / مدير صحة منطقة رفـــح المحترم
السيد / مدير صحة منطقة غـــزة المحترم
السلام عليكم ورحمة الله وبركاته .....

الموضوع: تسهيل مهمة باحث

نفيدكم بأن الباحثة / هيا نبيل الريس والتي تعمل بالمختبر المركزي والملتحقـة ببرنـامج ماجستير الصحة العامة بصدد إجراء بحث تخرج بعنوان

Colorectal Cancer Risk Factor in Gaza Governorates

وستقوم بتعبئة استبانه من المرضى اللذين يعانون من سرطان القولون ويراجعـون المراكز الصحية .

للتكرم بتسهيل مهمتها بما لا يتعارض مع مصلحة العمل وأخلاقيات البحث العلمي دون تحمل الوزارة أي أعباء مع ضرورة اخذ الموافقة الخطية للمرضى .

واقبلوا التحية .....

مدير عام الرعاية الأولية
بوزارة الصحة
الدكتور / فؤاد عبد الحليم العيسوي

وزارة الصحة
الإدارة العامة للرعاية الأولية
الرقم: ٣٢٧٩
التاريخ: ٢٠٠٧/٥/٣
صادر

Annex6

Annex 6

5

Palestinian National Authority
Ministry of Health
Helsinki Committee

السلطة الوطنية الفلسطينية
وزارة الصحة
لجنة هلسنكي

التاريخ 7/6/2010

Name:

الاسم : هيا نبيل الريس

I would like to inform you that the committee has discussed your application about:

نفيدكم علماً بأن اللجنة قد ناقشت مقترح دراستكم حول:-

Colorectal cancer risk factors in Gaza Governorates.

In its meeting on June 2010

و ذلك في جلستها المنعقدة لشهر 6 2010

and decided the Following:-

و قد قررت ما يلي:-

To approve the above mention research study.

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 7

إقرار موافقة

أتقدم أنا الباحثة هيا نبيل الريس من كلية الصحة العامة جامعة القدس - قسم الدراسات العليا بالطلب من سيادتكم التكرم بالموافقة على المشاركة بالبحث تحت عنوان"العوامل التي قد تؤدي إلى زيادة خطر ظهور سرطان القولون في محافظات غزة". وذلك للحصول على درجة الماجستير في الصحة العامة.

قد تساعد هذه الدراسة على التقليل من ظهور هذا النوع من السرطان وحماية بعض الأرواح ، وذلك من خلال التعرف على أكثر هذه العوامل خطرًا وشيوعاً في محافظات غزة. مع التأكيد على مطلق الحرية التامة بالمشاركة، ولكن يسعدنا مشاركتكم بها. في حال الموافقة عليك الإجابة على استبيان مخصص من خلال مقابلة تجرى مع الباحثة بالإضافة ، مع العلم أنه لا يوجد إجابة صحيحة أو خاطئة وقد تستغرق هذه المقابلة ١٥ دقيقة لتعبئة الاستبيان، ولك أن تستغرق الوقت الذي تراه كافياً لتعطي أدق وأقرب إجابة ممكنة.

احترام سرية وخصوصية البيانات المجموعة الخاصة بالمشاركين ستكون من أولويات الباحثة. وأخيرا أؤكد على مطلق الحرية للاشتراك في هذه الدراسة شاكرةَ حسن تعاونكم.

الباحثة : هيا الريس

تقرير الموافقة :

لقد قمت بقراءة المعلومات السابقة جيداً وأعلم تماما أنه بإجابتي على هذا الاستبيان أكون قد أقررت بالموافقة على المشاركة بهذه الدراسة.

العوامل التي قد تزيد من خطر ظهور أورام القولون والمستقيم في محافظات غزة

ملخص

سياق الدراسة: تعتبر أورام القولون والمستقيم من المشاكل الصحية المهمة، وهي من الأنواع الأكثر شيوعاً في المجتمع الفلسطيني، فضلاً عن كونها أكثر الأمراض الخبيثة الخاصة بأمراض الجهاز الهضمي انتشاراً، وقد نتج من خلال بعض الدراسات السابقة بعضاً من العوامل التي تزيد أو تقي من خطر ظهور هذا النوع من الأورام، وتتضمن هذه العوامل تأثير كلاً من العوامل الوراثية و البيئية و التي بدورها تشمل بعضاً من الامراض المزمنة، والعادات الغذائية، إضافةً إلى بعض العادات التي يمارسها الإنسان خلال نشاطه اليومي و تمثل نظام حياته المتبع.

هدف الدراسة: أجريت هذه الدراسة في الفترة ما بين سبتمبر– ديسمبر ٢٠١٠ لتحديد أكثر العوامل شيوعاً وارتباطاً بحدوث أورام كلاً من القولون والمستقيم في محافظات غزة، والتي قد تزيد أو تقي من خطر ظهور هذا النوع من الأورام بين سكان هذه المنطقة.

نمط الدراسة: تضمنت الدراسة المقارنة بين عينة وعينة ضابطة، فقد تم اختيار ٦٦ مريضاً من مرضى أورام القولون أو المستقيم المسجلين بعيادات الأورام في القطاع (مستشفى الشفاء ومستشفى غزة الأوروبي) بالإضافة إلى عينة ضابطة تكونت من١٣٢ فرداً تم اختيارهم من مراكز الرعاية الأولية الحكومية في القطاع ، ومن شروط إختيار أفراد العينة الضابطة ألا يعاني الفرد من هذا النوع من الأورام، مع الأخذ بالاعتبار المطابقة بين العينة والعينة الضابطة من حيث العمر والجنس والمحافظة التي يقطنها المريض. وقد تمت المقارنة بإجراء مقابلة مع المشاركين بالدراسة لتعبئة الاستبيان الخاص بها، حيث تضمن بعض المتغيرات الإجتماعية، العوامل الوراثية، بعضاً من الأمراض المزمنة، العادات الغذائية المتبعة، الأنماط الحياتية، وبعض الأدوية والعناصر والفيتامينات التعويضة، بالإضافة إلى الثقافة الصحية لدى العينة بخصوص هذا المرض و الفحوصات المستخدمة في الكشف المبكر عنه.

النتائج: أشارت نتائج البحث أن العوامل التي قد تزيد من خطر ظهور أورام القولون والمستقيم هي: انخفاض كلاً من الدخل والمستوى التعليمي، بالإضافة إلى ممارسة بعض الأعمال المهنية. وأثبتت الدراسة أن العوامل الوراثية والإضطرابات المزمنة في عملية الإخراج من العوامل التي قد تزيد نسبة الخطر. وتبين أن استخدام طريقة القلي في طهي السمك وتفضيل تناول اللحوم الحمراء من العوامل الغذائية التي تزيد الخطر، بينما كاد تناول الفلافل بشكل منتظم أن يكون من العوامل المرتبطة بظهور المرض. كما أن السمنة لدى النساء وكذلك قلة الثقافة الصحية

الخاصة بمعرفة انواع الطعام الغنية بالألياف النباتية كانت من الأنماط الحياتية التي قد تزيدالخطر.

وأوضحت الدراسة أن التناول المنتظم لكلٍ من الفواكه والحبوب وخبز الردة، بالإضافة إلى تفضيل تناول الخضار يعتبر من العوامل التي قد تقي من خطر ظهور هذا النوع من الأورام. وتبين أن تناول الكالسيوم بشكل تعويضي قد يقي من هذا المرض، كذلك حضور المحاضرات الصحية التثقيفية حول الغذاء و النمط السليم في الحياة. بينما تناول الاسبرين كاد أن يحقق مثل تلك العلاقة. بينما كان الغرض من إجراء الفحوصات الخاصة بالكشف المبكر عن تلك الأورام تشخيصياً فقط للحالات عوضاً عن إجراءها للحد من انتشار هذا المرض.

وعلى ضوء تلك النتائج توصي الدراسة بالآتي:

تنمية البرامج الصحية والتثقيفية للمجتمع، والتي تركز على هذا النوع من الأورام والعوامل التي قد تزيد أو تقي من خطر ظهوره، بالإضافة إلى تنمية البرامج التي تحث على اتباع النظام الصحي السليم في الغذاء و نمط الحياة، وذلك عن طريق مراكز الرعاية الأولية ووسائل الإعلام. وتبني فحوصات الكشف المبكر لأورام القولون والمستقيم مع الأخذ بعين الاعتبار إختيار الفحوصات المناسبة لمجتمعنا الفلسطيني مادياً وتطبيقياً.

كما أوصت الدراسة بضرورة التطوير لعملية تسجيل مرضى الأورام وبياناتهم ومواعيد زياراتهم، مع السعي للتوثيق الالكتروني الكامل للحالات، و إجراء دراسات أخرى تركز على الأورام بشكل عام و أورام القولون والمستقيم بشكل خاص والنتائج المنبثقة عن هذه الدراسة.