An-Najah National University

Faculty of Graduate Studies

Estimation Ten-Year Risk of Coronary Heart Disease in Patients with Schizophrenia

By
Saqer M. Al-qoroum

Supervisor

Prof. Waleed Sweileh

Co- supervisor

Dr. Samah Al- Jabi

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This Thesis was defended successfully on 23/6/2013 and approved by:

Defense Committee Members		**Signatures**
– **Prof. Waleed Sweileh**	**(Supervisor)**	.....
– **Dr. Samah Al- Jabi**	**(Co- Supervisor)**	.....
– **Dr. Nuha EL-Sharif**	**(External Examiner)**	.....
– **Dr. Adnane Sarhan**	**(Internal Examiner)**	.....

الاهداء

فاني اهدي هذا العمل المتواضع إلى

الشمعة التي احترقت حتى توصلني إلى ما أنا فيه إلى من دفعني إلى العلم وبه ازداد افتخارا إلى رمز الرجولة والتضحية ... أبي الغالي

إلى روضة الحب والتي تنبت أزكى الأزهار إلى من يسعد قلبي يلقياها ... أمي الغالية

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إلى الأنامل الملائكية التي تحرك الأمل والحياة ...أطفالي ونبض قلبي حمزة وحسام

إلى كل من مد لي يد العون لأخطو في طريق العلم اهدي هذا البحث...

الشكر والتقدير

أتقدم بالشكر أولا إلى أ.د. وليد صويلح المشرف الرئيسي على هذا البحث لجهوده المتواصل ودعمه وإرشاده وكل ما قدمه لي من مساندة لإتمام هذا البحث ...

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إقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان :

Estimation Ten-Year Risk of Coronary Heart Disease in Patients with Schizophrenia

أقر بان اشتملت عليه هذه الرسالة هي من نتاج جهدي الخاص باستثناء من تمت الإشارة إليه حيثما ورد. وان هذه الرسالة ككل أو إي جزء منها لم يقدم من قبل لنيل درجة أو لقب علمي أو بحثي لدى إي مؤسسة تعليمية أو بحثية أخرى.

Declaration

The work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

Student's Name: **اسم الطالب:**

Signature **التوقيع:**

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Abbreviation	Meaning
APA	American Psychological Association
BMI	Body Mass Index
CHD	Coronary Heart Disease
CVD	Coronary Vascular Disease
CATIE	Clinical Antipsychotic Trial of Intervention Effectiveness
DSM-IV-TR	Diagnostic and Statistical Manual of Mental Disorders
DM	Diabetes Mellitus
FHS	Framingham Heart Study
HDL-C	High density lipoprotein-cholesterol
LDL	Low Density Lipoprotein
MS	Metabolic Syndrome
MOH	Ministry Of Health
OR	Odd Ratio
PTSD	Post Traumatic Stress Disorder
SPSS	Statistical Package For Social Sciences
TCH	Total Cholesterol
US	United State
WHO	World Health Organization
IRB	Institutional Review Board
ICD-10	International Classification of Diseases

Estimation Ten-Year Risk of Coronary Heart Disease in Patients with Schizophrenia

By
Saqer M. Al-qoroum (11054546)
Supervisor
Professor: Waleed Sweileh
Co- supervisor
Dr. Samah Al- Jabi

Abstract

Background: Studies indicated that patients with schizophrenia have shorter life span than that of general population.

Objective: To estimate ten-year risk of coronary heart disease (CHD) in patients with schizophrenia.

Methods: A cross-sectional study was carried out in four governmental primary psychiatric health care centers in northern West-Bank (Nablus, Jenin, Qalqilia, and Tulkarem). 112 patients diagnosed with schizophrenia were recruited for the study. A convenience, non-probability sampling method was used. Ten-year risk of CHD was calculated using Framingham risk scoring formula which includes the following variables: age, gender, smoking status, high-density lipoprotein- cholesterol, systolic blood pressure and history of anti-hypertensive drugs hypertension. Risk of CHD was categorized based on total scores into the followings: Ideal (<5%), low (5-9%), intermediate (10-20%) and high (>20%). Descriptive and analytical statistics was conducted using Statistical Package for Social Sciences (SPSS) version 20.

Results: The mean age of the participants was 43 ± 10.85 years. The majority were males (76; 67%). There was no significant difference between males and females in age (P=0.72), duration of psychiatric illness (P=0.085), systolic blood pressure (P=0.75), diastolic blood pressure (P=0.7) and total cholesterol level (P=0.17). The mean ± standard deviation (SD) ten-year CHD risk score was 5.6 ± 5.8 (median (inter quartile range (Q1 – Q3)): 3 (1 – 9)). The mean ± SD ten-year CHD risk score for females was 1.5 ± 1.58 (median (Q1 – Q3): 0.75 (0.5 – 2)) while that for males was 7.5 ± 6 (median (Q1-Q3): 6 (2–13)). Based on Framingham risk scores, there were 87 (77.7%) patients in low risk, 22 (19.6%) patients in intermediate risk and 3 (2.7%) patients in high risk. Univariate analysis showed that there were significant differences between low <10% risk score and intermediate/high risk ≥ 10% risk score categories with respect to age distribution (P<0.05), gender (P<0.05), smoking (P<0.05), total cholesterol (P<0.05), diastolic blood pressure (P<0.05) and duration of psychiatric illness (P=0.03). However, there was no significant difference between the low <10% and intermediate/high ≥10% categories in terms of systolic blood pressure, waist circumference and HDL-C levels. Multivariate analysis on male patients showed that age [O.R=1.524, 95% CI (1.213-1.914)] and diastolic BP [O.R=1.207, 95% CI (1.045-1.393)] were significant factors associated with intermediate/high ≥ 10% CHD risk.

Conclusions: One fifth of schizophrenia patients had a CHD risk ≥ 10%. Efforts to decrease CHD risks among patients with schizophrenia should be directed mainly toward diastolic BP as modifiable risk factor.

Key words: Schizophrenia, Framingham Risk Score, CHD, Palestine.

Chapter one

Introduction

The occupied Palestinian territories, in which this study was conducted includes two geographically separate areas: West-Bank and Gaza Strip. In the West Bank, mental health care services are provided by the government and by few nongovernmental organizations. Several governmental psychiatric primary health care centers are located throughout West-Bank. north West-Bank consists of four major cities including Nablus, Jenin, Tulkaram, and Qalqilia [1].

According to the Palestinian Ministry of Health (MOH) annual report, the number of newly reported cases in primary mental health care centers was 774 in 2011; approximately 60% of them were treated for psychiatric illnesses [2]. These numbers indicated that there is a real need for good quality mental healthcare services to maintain the physical health of those patients who have serious cognitive impairment.

In the Arab world, mental health services are far away from optimum. There is an urgent need for increased mental health education of the public, psychiatric services and the development of mental health services and policy in all Arab countries [3, 4]. There is also lack of reliable epidemiological studies in the schizophrenia and related disorders in the Arab world which does not enable rational planning for future psychiatric services and research[5].

1.1 Definition of Schizophrenia

Psychosis, a disorder characterized by distortion in individual perception of reality and the presence of hallucinations, delusions or disorganized thoughts, is a common disorder with 3 to 5 percent of the general population experiencing related symptoms during their life time [6, 7].

Psychotic disorders are categorized as schizophrenia, bipolar mania, major depression with psychotic features, schizoaffective disorder, Alzheimer's disease, delirium, brief psychotic disorder, substance induced psychotic disorder, delusional disorder and psychosis secondary to a medical condition [8].

Schizophrenia is diagnosed based on criteria in either the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders, version DSM-IV-TR, or the World Health Organization's International Statistical Classification of Diseases and Related Health Problems, the ICD-10 [9, 10]. Both define symptoms and characteristic impairments of schizophrenia in a similar way [11].

There are three types of symptoms which can help in the definition and diagnosis of schizophrenia: positive symptoms, negative symptoms and cognitive impairment [11, 12]. Positive symptoms involve a loss of contact with reality. They include bizarre behaviors, false beliefs (delusions), or perceptual experiences not shared by others (hallucinations). The presence and severity of these symptoms tends to be episodic over time. Negative symptoms are lack of or greatly decreased state of expressing emotions. Examples of negative symptoms could include: lack of facial expression,

pleasure in activities, diminished ability to clearly communicate with others and withdrawal from sharing activities with others. Cognitive impairment is considered the third component of diagnosis of schizophrenia. It involves loss of patients' attention and concentration. Impairment in role functioning and/or substantial change in personal behavior is clinical features of schizophrenia. Often these symptoms emerge years before the psychotic symptoms [11, 12]. These symptoms can be profound and result in the need for assistance in meeting basic needs, such as: housing, food and medical care. Moreover these symptoms can negatively alter a person's relationship with family and friends. Long-term prognosis for many patients with schizophrenia is not adequate. It is marked by intermittent acute psychotic episodes and impaired psychosocial functioning between acute episodes, with most of the deterioration in psychosocial functioning occurring within 5 years after the first psychotic episode [13].

Schizophrenia leads to poor physical outcomes. The standardized mortality ratio for all-cause mortality is 2.6 for patients with schizophrenia compared to the general population, with excess deaths mainly from suicide during the early phase of the disorder, and later from cardiovascular complications [14]. Persons with mental disorders are less likely to pay attention to symptoms of physical illness.

Consequently, they delay seeking treatment for co-morbid conditions such as diabetes and hypertension. Patients with schizophrenia, relative to peers without mental illness, experience a 3-fold increase in cardiovascular mortality between the ages of 18 and 49 and almost a 2-fold increase in

mortality between the ages of 50 and 75 years [15]. They have a greater incidence of myocardial infarction than demographically similar persons without schizophrenia [16, 17].

People with mental disorders face stigma and discrimination in most societies [18]. The stigmatization of people who have a mental illness not only adds to difficulties in their daily life: it also prevents them from getting access to treatment and care [19]. Mental health nurse can play an important role in the treatment of the mental disorder because they are in a position to recognize the early signs of illness, make referrals to appropriate mental health professionals and help patients and their families cope with the mental disorder [20].

1.2 Epidemiology of Schizophrenia

Schizophrenia is a psychiatric disorder with a median lifetime prevalence of 4.0 per 1,000 and a morbid risk of 7.2 per 1,000 and the prevalence for males and females is similar [14]. The age at onset is typically in adolescence or early adulthood [21]. With onset after the fifth decade of life and in childhood both being rare [22, 23]. The course of schizophrenia is often more severe with earlier onset [21, 24]. The prevalence of schizophrenia varies across the world, within countries and at the local and neighborhood level [25-28].

The total lifetime prevalence rate of schizophrenia in United Arab Emirates (UAE) was found to be 0.7% and showed no gender differences (0.7% for women, 0.7% for men) [29]. The psychiatric morbidity rate for female in Dubai was found to be 22.7% and the prevalence of psychotic disorders for

female was found to be 1.9% [30]. The annual incidence rate of all mental disorders in AL-Ain -UAE was found to be almost 11% [31]. While the average annual incidence rate in Bahrain was 1.29 per 10,000 for all ages [32]. In Morocco the prevalence of schizophrenia was found to be 5.6% [33].

1.3 Coronary Heart Disease (CHD) in Schizophrenia

Coronary heart disease (CHD) refers to the failure of coronary circulation to supply adequate circulation to cardiac muscle and surrounding tissue, a phenomenon that can result in a myocardial infarction [34]. Coronary heart disease is a critical public health issue, nationally and internationally. It was responsible for less than 10% of all global deaths at the beginning of the 20th century, but in 2005 that number was 30% [35]. In developed countries like the United Kingdom, it was found that 39% of deaths to be related to CHD [36]. In Comparison, Arab countries like Jordan has mortality rate as high as 38.2% associated with CHD [37]. In Palestine, Cardiovascular diseases were the main leading cause of death in 2011 [2].

Many studied have suggested that schizophrenia and other psychotic disorders are associated with increasing mortality rates with CHD being the major cause [38-40].

1.4 Framingham risk formula

The equation of the Framingham ten-year risk of CHD derived from the Framingham Heart Study (FHS) has been validated and widely used in different populations to predict the ten-years risk of CHD including angina, myocardial infarction, and cardiac death [41]. The FHS formula has been applied to several racially and ethnically diverse cohorts and has been

found to predict cardiac events reasonably well in Caucasians and African-Americans, but may overestimate risk in Hispanic men and Native American women [42].

The ten-year risk of CHD was calculated using the Framingham scoring which was based on age, gender, total cholesterol, HDL-cholesterol, systolic blood pressure and smoking, this tool is designed for adult aged 20 and older who don't have heart disease or diabetes.

1.5 Study aims and objectives

1.5.1 General Aim

The general aim of the study is to estimate ten-year risk of CHD in patients with schizophrenia.

1.5.2 Specific Objectives

1. To identify impact of gender on ten-year risk of CHD.
1. To identify the association of age, smoking, systolic blood pressure, HDL-C and total cholesterol with high ten-year risk of CHD (≥ 10% Framingham risk score).

1.6 Study problem

In Palestine, few studies were conducted about cardiovascular risk factors in schizophrenic patients. Two studies by Sweileh et al (2012) on 250 schizophrenic patients found that metabolic syndrome and pre-diabetes were prevalent among schizophrenic patients. Furthermore, a master thesis by Ebwini et al (2012, An-Najah national university) had found that dyslipidemia is also common among schizophrenic patients. The above findings indicated that risk factors for CVD are common among

schizophrenic patients which might explain the high mortality among this category of patients [38-40]. One of the most commonly used indicators of future CHD risk in any person is the Framingham calculator. Therefore, we tried to apply the Framingham calculator to estimate the ten-year CHD risk among this category of patients who are physically neglected and already have a disease and drug – induced physical problems. Ultimately, we would like to compare the results obtained with those published elsewhere to find whether schizophrenic patients in our study had higher risk of CHD than those reported elsewhere. In Palestine, the psychiatric services offered are less than optimum [3, 4]. Therefore, we expect that this category to have higher ten-year CHD risk.

1.7 Research Hypotheses

1- There is no association between ten-year risk of CHD ≥ (10% Framingham risk score) and gender of schizophrenia patients.
2. There is no association between ten-year risk of CHD ≥ (10% Framingham risk score) and duration of illness in patients with schizophrenia.

1.8 Significance of the Study

Framingham calculator is an easy and quick method to estimate ten-year CHD risk. Implementing the Framingham calculator in psychiatric primary healthcare canters will help to screen those with high risk and implement interventional methods for modifiable risk factors. This approach will be less costly as opposed to treating this CHD condition and its complications once they are present. In addition to the fact that no published studies have

been carried out using Framingham calculator in Palestine in psychiatry to estimate ten-year risk of CHD is an added value to mental health services in Palestine.

Patients with schizophrenia, relative to peers without mental illness, experience a 3-fold increase in cardiovascular mortality between the ages of 18 and 49 and almost a 2-fold increase in mortality between the ages of 50 and 75 years [15].

Furthermore, antipsychotic medication used was associated with significant weight gain, dyslipidemia and insulin resistance [43]. Long-term use of antipsychotic medications may play an important role in the increased risk for cardiovascular disease [44, 45].

1.9 Expected Outcome of the study

This study gives information that might be helpful to mental health worker to establish appropriate preventive strategies for CHD risk and effective education about healthy living to reduce the risk of CHD in patients with schizophrenia.

In the coming chapter, a literature review of international and local relevant studies about CHD risk among schizophrenic patients will be presented.

Chapter Two

Literature Review

2.1 International Studies for Prevalence CHD Risk Factors among schizophrenic patients.

Goff et al. (2005) conducted a study in the United States (US) to compare the ten-year cardiac risk estimates in schizophrenia patients from the CATIE study and matched controls. Results showed that the ten-year risk of CHD was significantly elevated in male (9.4% vs. 7.0%) and female (6.3% vs. 4.2%) schizophrenia patients compared to controls (P=0.001). Schizophrenia patients had significantly higher rates of smoking (68% vs. 35%), diabetes (13% vs. 3%), hypertension (27% vs. 17%) and lower HDL cholesterol levels (43.7 vs. 49.3 mg/dl) compared to controls (P<0.001). Only total cholesterol levels did not differ between groups. Also, the results found that the ten-year risk of CHD in younger adult schizophrenia patients was increased relative to general population [44].

Jin et al. (2011) compared the ten-year risk of developing CHD among middle-aged and older patients with psychotic symptoms in the general population. Results showed that the mean age of the study sample was 63 (range 40–94) years, 68% were men. The Framingham ten-year risk of CHD was increased by 79% in schizophrenia, 72% in Post Traumatic Stress Disorder (PTSD), 61% in mood disorder with psychosis and 11% in dementia. There were also significant differences in diastolic blood pressure (P<0.01) and HDL-C (P<0.05) among the four diagnostic groups,

with schizophrenia and PTSD patients tending to have higher diastolic blood pressure and dementia patients having the highest HDL-C [46].

In Spain, a study was carried out by Bobes et al. (2007) in order to assess the prevalence of CHD and MS in outpatients schizophrenia treated with antipsychotics showed that the overall risk of CHD in 10 years as assessed by FHS was 6.8% and was likewise significantly greater in males than in females: 8.3 versus 4.5 ($P<0.001$) and 22.1% of patients showed a high/very high risk Framingham (≥10%) function. The abdominal obesity and low HDL-C were more prevalent in women ($P<0.001$) in both cases. Hypertension and hypertriglyceridemia were more prevalent in men ($P<0.01$) in both cases. Ten-year risk of CHD was significantly higher in males than in females ($P<0.001$) [47].

Daumit et al. (2008) performed a randomized study to examine the effects of different antipsychotic treatments on estimates of ten-year risk of CHD calculated by the FHS formula. The results showed that the mean age was 40.7 ± 11.1 years, and the sample was 75% male. Twelve percent of the sample had DM, 58% smoked cigarettes, and 34% had hypertension. CHD risk divided into three categories: risk <5% (39%), risk 5-9% (28%) and risk ≥ 10% (33%). Females' mean ten-year CHD risk was significantly lower than males, at 5.7% compared to 9.5% respectively. Females' lower prevalence of cigarette smoking (50% vs.61%) and higher HDL (47.1 mg/dl vs. 42.0 mg/dl) contributed to lower CHD risk [48].

A study conducted in (2003) to compare cardiovascular risk factors in drug-naive first-episode schizophrenia patients with matched controls. The

results showed that the difference between two groups in HDL-C was not significant. But total cholesterol was lower in schizophrenia patients than match control [49].

Phutane et al. (2011) conducted a study in US aimed to estimate ten-year risk of developing coronary heart disease in a sample of first episode psychosis patients referred to an early intervention clinic and compared with matched controls. Risk was classified in three categories: very high ≥ 20%, moderate 10-19%, and low <10%. The results found that the sample was young (mean 22.5 ± 4.4 years); there was no significant difference in total cholesterol or HDL-C between two groups. The rates of current smoking were high among patients (46% of patients compared to 36% of controls), the frequency of elevations in blood pressure in the patients was (29%) compared to (2%) in the control group. The median duration of illness was 29 weeks, with a range from <1 week to 163 weeks. The median (range) ten-year risk of CHD for patients and controls was 1 (0-5) % and 0 (0-9) % respectively. There was no significant difference between the two groups (P=0.119). Both groups were in the low risk category <10%. Males and females did not differ in any of the measured CHD risk factors in the sample [50].

A study conducted in Canada (2010) aimed to evaluate the prevalence of cardiovascular risk factors and cardiovascular disease in people diagnosed with schizophrenia disorder with match control non-schizophrenic patients. This study showed that the people with schizophrenia had a higher

prevalence of diabetes and cardiovascular disease than those without schizophrenia particularly at a younger age [51].

Said et al. (2012) conducted a study in Malaysia. This study aimed to determine the prevalence of metabolic syndrome and risk of CHD in patients with schizophrenia receiving antipsychotics. Results showed that the ten-year risk of CHD was significantly higher in patients with metabolic syndrome. The proportion of patients with high/very high risk for CHD (Framingham ≥ 10%) was greater in patients with metabolic syndrome than in those with non-metabolic syndrome (31.5% vs. 11.0%)($P<0.001$) and the mean Framingham risk score for the metabolic syndrome group was 7.6% while that for the non-metabolic syndrome group was 5.0% [52].

In a Spanish cross-sectional study of 733 patients with schizophrenia, the most prevalent cardio metabolic risk factor was found to be smoking (71% of patients), followed by hypercholesterolemia (66% of patients)[53].

A study was carried out by Protopopova et al. (2012) in Croatia to predict the risk of premature cardiovascular mortality and assess the prevalence of cardio metabolic risk factors in schizophrenia patients using risk SCORE chart. The results showed that dyslipidaemia was the most frequent cardio-metabolic risk factors and was present in 70% of the patients, and female patients had a higher prevalence of diabetes (12% vs. 3.9%), hypertension (16% vs. 8.8%), increased weight (67% vs. 40%), smoking (18% vs. 12%), average age (47±14 years vs. 40.6±7.6 years) and long duration of psychiatric illness (14.5 years vs. 7.6 years) than males. On the other hand,

the male patients had significantly higher weights, waist circumferences and diastolic blood pressures compared to female patients and the male patients had significantly lower HDL levels. According to the risk SCORE chart, there were 13 patients (10%) with a high (≥ 5%) ten-year risk of fatal cardiovascular events [54].

In addition, a large study involving 46,136 people with severe mental illness and 300,426 healthy controls was conducted in UK to estimate the excess mortality and the contribution of antipsychotic medication in severe mental illness and compared with healthy control Study. This study has demonstrated that the risk ratios for CHD mortality in people with severe mental illness compared with controls were 3.22 (95% CI, 1.99–5.21) for people 18-49 years old, 1.86 (95% CI, 1.63–2.12) for those 50-75 years old and 1.05 (95% CI, 0.92–1.19) for those older than 75 years. For stroke deaths, the risk ratios were 2.53 (95% CI, 0.99– 6.47) for those younger than 50 years, 1.89 (95% CI, 1.50–2.38) for those 50-75 years old and 1.34 (95% CI, 1.17–1.54) for those older than 75 years. Compared with healthy controls, people with severe mental illness who were not prescribed any antipsychotics were at increased risk of CHD and stroke than controls [15].

A descriptive study conducted by McCreadie (2003), that aimed to describe the lifestyle of people with schizophrenia and to report risk of CHD showed that the mean age (years) 45±13, 71(70%) were smokers; 25(86%) females and 50(70%)males were obese, 46 (53%) had a raised cholesterol: HDL ratio In addition, mean ± SD 10-year risk of CHD in males was 10.5% ± 8 and in females 7% ± 6 [55].

Moreover, a study conducted in US to determine the prevalence and characteristics of CHD risk factors in patients with chronic schizophrenia disorder. The results showed that the male patients had an increased risk (8.9%) compared with control subjects (6.3%) ($P<0.001$) and the risk for women was similar for patients (2.6%) and control subjects (2.0%). Total Cholesterol did not differ between patients and control subjects ($P=0.294$) [56].

2.2 Modifiable Risk Factors for CHD in Schizophrenia

Mortality in schizophrenia is largely due to cardiovascular disease [57]. Many of the established modifiable risk factors could contribute to an increasing incidence of CHD in schizophrenia patients. Modifiable risk factors include lifestyle, weight gain and obesity, cigarette smoking, lipid abnormalities, diabetes mellitus (DM), antipsychotic medication and hypertension [58].

The World Health Organization (2009) has identified the modifiable risk factors for early mortality as hypertension, smoking, raised glucose, physical inactivity, obesity and dyslipidaemia, as being the top six modifiable global mortality risk factors; patients with schizophrenia have high levels of all these risk factors [58, 59]. Hypertension, hyperglycaemia and dyslipidaemia are being less ‘visible’ in schizophrenic patients than the others [60].

2.2.1 Sedentary Lifestyle

Our choices of lifestyle are influenced by a variety of factors such as genes, environment and socio-demographic status [61]. In case of schizophrenia,

the illness itself also plays a part [62]. People with schizophrenia on average have a lifestyle which increases their risk for the development of CHD: sedentary lifestyle, lack of regular physical activity, poor diet, substance use and high rates of smoking. Part of these lifestyle factors is influenced by aspects of the illness such as negative symptoms and vulnerability to stress [63-65]. Lifestyle interventions with diet, increased physical activity and smoking cessation, are the first-line treatments to decrease the risk for CHD in people with schizophrenia [34].

A study carried out to compare the lifestyle of people with schizophrenia with that of low social class cohorts found that people with schizophrenia made significantly poorer dietary choices, took less exercise and smoked more heavily than the comparator groups in the general population [55].

A study found that people with schizophrenia tended to do limited exercises than general population and the specific mechanism by which physical activity reduces mortality from cardiovascular disease is unknown but exercise has been shown to improve lipid profiles, glucose tolerance, obesity and hypertension [55].

2.2.2 Weight gain and obesity

Individuals with schizophrenia are more likely than members of the general population to be overweight or obese. Obesity can have serious effects on health and life expectancy through a number of disease processes, including hypertension, coronary artery disease and type II DM [58]. McCredie (2003) also found that women with schizophrenia were significantly more likely to be overweight or obese than women in the

general population. Given that poor diet, smoking and excess weight are potentially modifiable factors associated with increased physical morbidity and mortality [55].

The patient's waist circumference also is a useful risk indicator, a waist circumference of 35 inches or more for women and 40 inches or more for men is associated with increased health risks, including increased risks of high blood pressure, dyslipidemia, and metabolic syndrome [66]. For women, having a waist circumference of 35 inches or more was associated with these risk factors regardless of their body mass index (BMI) category (normal, overweight, or obese). For men, having a high-risk weight measurement incurred somewhat less health risk if their BMI was in the normal range [66].

2.2.3 The role of antipsychotics

Antipsychotic-related weight gain was first reported in association with chlorpromazine in the late 1950s, but it has remained overshadowed by other side effects such as extra pyramidal symptoms and tardivedyskinesia, among the conventional antipsychotics, weight-gain liability appears to be greatest with low-potency drugs, antipsychotic medications contribute substantially to increasing CHD risk factors through effects on weight gain, glucose deregulation and lipid abnormalities [67-70].

Meta-analyses, clinical trials and clinical experience suggest that the atypical antipsychotics can cause marked weight gain during treatment. Not all antipsychotics have the same propensity for causing weight gain but those associated with the greatest gain, clozapine and olanzapine can add

up to 4.5 kg after 10 weeks of treatment at standard dose. Also, patients appear to differ in their weight-gain response to specific drugs. Little is known about individual predictors, but most weight gain appears to occur during the first 2 years of treatment, and it accompanies an increase in appetite, especially for sweet and fatty foods, with no clear impact on basal metabolic rate [71].

The largest study comparing cardiovascular risk factors in chronic schizophrenia patients, drawn from the Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE) Schizophrenia Trial, with age, gender and race matched controls from the U.S. National Health and Nutrition Examination Survey (NHANES) showed that patients had significantly higher ten-year coronary heart disease risk. This was due to higher rates of smoking, diabetes, and hypertension. Also, the mean (SD) duration of antipsychotic use in the CATIE study was 14.4 (10.7) years [72] and long-term use of antipsychotic medications may play an important role in the increased risk for cardiovascular diseases [44, 45]. Antipsychotic medication use is associated with significant weight gain, dyslipidemia, and insulin resistance [43].

2.2.4 Smoking

Smoking is one of the most obvious modifiable risk factors for heart disease. The prevalence of smoking in schizophrenia greatly exceeds that in the general population (75 – 92% vs. 30 – 40%), respectively [73].

Bobes et al. (2010) analyzed the smoking-associated risks for coronary heart disease in 1704 patients with schizophrenia over 10 years and

predicted that smoking cessation would result in an almost 90% reduction in the risk of a coronary heart disease over the next ten-years [73].

2.2.5 Hypertension

Hypertension is an important risk factor for heart disease, Hypertension is often silent, so it is important that all patients are screened [59]. The prevalence of hypertension in schizophrenia is likely to be large [74]. However, meta-analysis found weak evidence to support excess hypertension in patients with mental illness [75]. A study conducted by Daumit, et al. (2007) in patients with schizophrenia has reported high levels of untreated hypertension (50%) [76]. Lewington et al. (2000) reported a twofold increase in stroke death and a twofold increase in ischemic heart disease and vascular death for every 20mmHg increase in systolic blood pressure >115mmHg [77].

2.2.6 Dyslipidemia

Dyslipidemia was defined by the presence of one or more than one abnormal serum lipid concentration [78]. Dyslipidaemia is one of the most significant risks for cardiovascular disease [79]. Elevated cholesterol is associated with coronary heart disease, including ischemic heart disease and myocardial infarction [80]. A 10% increase in cholesterol level is associated with a 20%–30% increase in the risk of coronary heart disease; and lowering the cholesterol level by 10% decreases the risk by 20%– 30% [81]. Newcomer (2007) found that schizophrenic clients are at higher risk of dyslipidemia and at higher risk of dying from cardiovascular diseases

[82]..Dyslipidemia has been observed in patients with early-onset schizophrenia [83].

2.2.7 Diabetes Mellitus (DM)

Patients with schizophrenia may be at a higher risk for developing diabetes than the population at large [84]. The high prevalence of diabetes among people with schizophrenia could be related to the high prevalence of obesity, as 90% of individuals with type II diabetes are obese [85].

2.3 Studies among healthy General Population regarding ten-year CHD risk.

A study conducted among adults populations in the US showed that 81.7% had a ten-year risk for CHD <10% and 18.3% had a risk ≥10% and 34% of male patients had a risk ≥10% ten-year risk of CHD, while 5.2% of female patients had a risk ≥10% ten-year risk of CHD (P<0.001). The proportion of the participants with ten-year risk for CHD ≥10% has increased with advancing age and was higher among males than females [86].

A cross-section study that was conducted among Omani Arabs population and aimed to determine the optimal cut points for BMI and waist circumference associated with risk of cardiovascular disease using Framingham risk score showed that men had a higher prevalence of ten-year CHD risk ≥ 10% compared to women (25% vs. 10%) (P=0.001). Furthermore, the total cholesterol was not significantly different between both genders (P=0.787) [87].

2.4 Local Studies in northern West-Bank

A study conducted on 250 patients with schizophrenia recruited from 4 psychiatric primary healthcare centers in Northern Palestine found that metabolic syndrome (MS) illness was associated with smoking, abdominal obesity, high systolic and diastolic blood pressure, high triglycerides, low HDL-C and high fasting plasma glucose. Multiple logistic regression analysis showed that only systolic blood pressure, high triglycerides, high fasting plasma glucose and low HDL-C were significant predictors of MS in schizophrenic patients [88].

A study was conducted on 250 patients in order to investigate the prevalence of pre-DM and DM in patients with schizophrenia who used antipsychotic drugs and compare it with those published in the general population. The results showed that the prevalence of pre-DM was significantly higher than that reported in the Palestinian general population and prevalence of DM was not significantly different from that in the general population in Palestine [89].

An unpublished thesis showed that 43.4% of patients with schizophrenia had high total cholesterol level, 41.4% had low HDL-C, 48.2% had high triglyceride levels, and 66.5% had at least one abnormal lipid level[90].

Next chapter, the methodology implemented in this thesis to achieve the objectives will be explained.

Chapter Three

Methodology

3.1 Study Design and Site of the Study

This was a cross-sectional study conducted between July 4th and September 10th, 2012 at governmental primary healthcare psychiatric centers in northern West-Bank Governorates (Nablus, Jenin , Tulkaram , Qalqilai).

3.2 Inclusion Criteria

Patients attending the governmental primary healthcare psychiatric centers in north West-Bank during the study period and who met the following inclusion criteria were invited to participate:

1- Their ages were ≥ 20 years old.
2- They were diagnosed with schizophrenia as documented by their medical file.
3- They have been diagnosed with schizophrenia for at least 3 years. (Choose three years for inclusion criteria it was randomly to ensure for patients take long duration of antipsychotic medication. Antipsychotic medication used was associated with significant weight gain, dyslipidemia and diabetes mellitus. So, long-duration of antipsychotic medication may increase risk for CHD).

3.3 Exclusion Criteria

Schizophrenia patients suffering from CHD or DM were excluded from the study (D.M is a major risk for CHD). Diabetes mellitus and CHD were identified based on patient's medical file and/ or the current medications.

3.4 Sampling Size and Sampling methods

The estimated sample size was calculated by using an automated software program was it for random sample [91]. A sample size of approximately 120 patients attending the governmental primary psychiatric healthcare centers in northern West- Bank was needed.

Data was collected over a period of 2 months. During the study period, a total of 153 patients were asked to participate (79.1 %.); 32 refused to give a response. A total of 121 patients were available and agreed to do the interview. Eight patients were excluded because of having DM or CHD. A net total of 113 who gave consent for blood withdrawal were included in the study. An error was made in 1 blood sample and therefore analysis was made on 112 patients. The sample recruitment chart is shown in Figure 1.

A convenience, non probability sampling method was used. In order to collect the sample, the investigator spent two weeks in each center to recruit patients for the study. The visits were made daily and data from patients who met the inclusion criteria were collected.

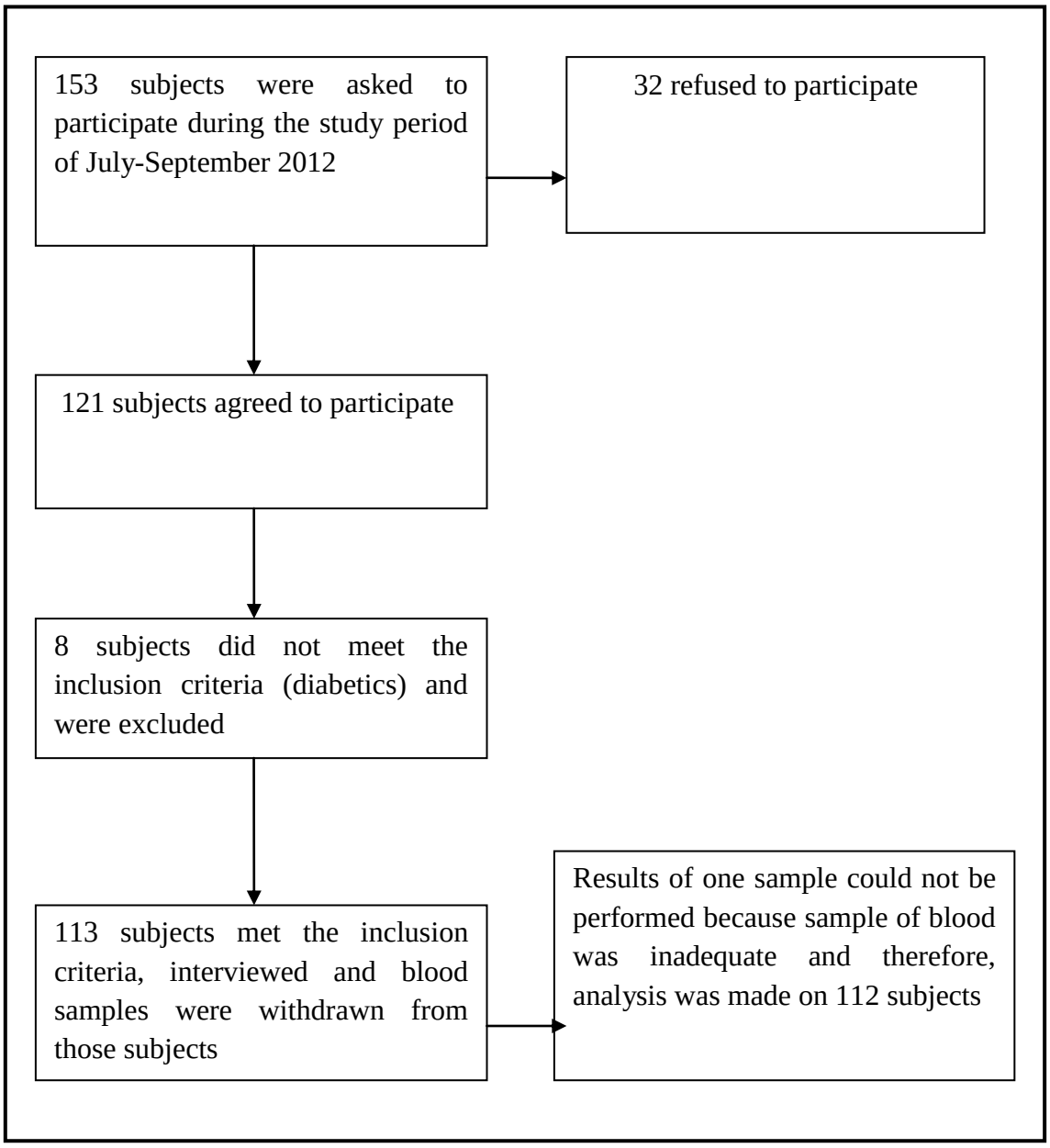

Figure (3.1) :Sample collection process for schizophrenic patients

3.5 Data Collection

Data was collected by researcher itself, through direct and indirect methods. The indirect Methods were included a structured interview questionnaires, the data collection form has been developed for this study. The form included the following variables: age, gender, smoking status,

duration of psychiatric illness and other co-morbid chronic diseases. Direct methods were included: blood pressure measurement, body weight, height, waist circumference, HDL and TCH.

Age (years) was analyzed as continuous variable: the mean (±SD) age was 43±10.85 years and as categorical variable: coded into 4 categories: ≤ 30, 31–40, 41–50 and >50 for graphic purposes.

Duration of the psychiatric illness (was defined as the duration from onset of first psychotic symptom to the date of recruitment). Participants were asked whether they were currently using antihypertensive drug or have other chronic disease.

3.6.1 Measurement of HDL-C and TCH

Blood sample were collected from all subjects after 12 hrs overnight fasting blood was collected from an antecubital vein puncture while the subjects was in a sitting position. All these tests were measured using HUMAN kit, Germany central laboratory at An-Najah National University.

3.6.2 Blood Pressure

Blood pressure was measured to the nearest 5 mmHg in the right arm when the subjects were in the sitting position after 10 minutes of rest, using a standard mercury sphygmomanometer. The mean of two readings was taken as the individual's blood pressure.

3.7 Coronary Heart Disease Risk Estimation

To determine the ten-year risk of CHD, the published equation derived from the Framingham Heart Study has been used[92].

Risk scores were divided into 4 categories: ideal (<5%), low (5-9%), intermediate (10-20%) and high (>20%) (Figure 2)

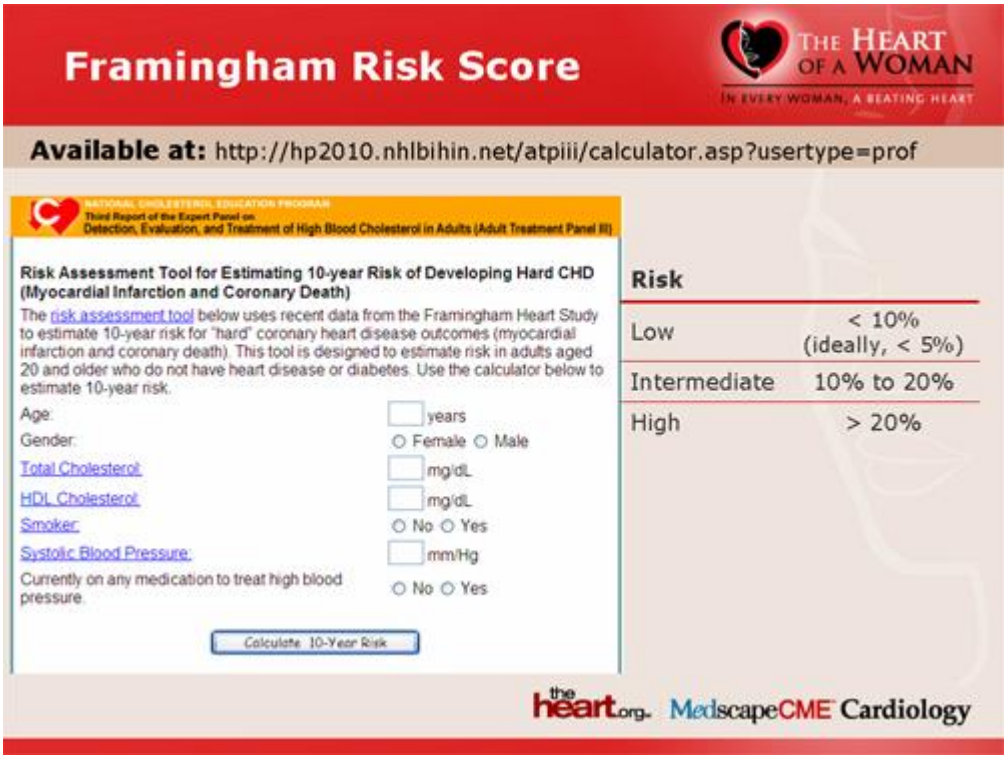

Figure (3.2) : Framingham risk score for estimating ten-year risk of CHD in schizophrenia patients

3.8 Data Analysis

Descriptive statistics for all study variables were computed. These descriptive statistics included frequencies and percentages for all categorical variables. In addition to means, median and standard deviations variables were calculated. The median inter quartile range (Q1-Q3) was used whenever the data were not normally distributed. In addition, the Chi-square or Fisher's exact tests were used, whenever appropriate, to test for significance between categorical variables. The Student's *t*-test was used to compare means of continuous variables. If the assumptions of equality of

variance and normality were not met, the Mann-Whitney *U* test was used as appropriate. Significant difference between males and females regarding the frequency of CHD risk categories was tested using non-parametric Binomial test. All statistical analyses were conducted using Statistical Package for Social Sciences (SPSS; version 20.0; IBM) for Windows. Univariate analysis was used to find significant association between risk factors and high ten-year CHD risk. Variables that showed significance in univariate analysis were used in multivariate analysis to find significant predictors of high ten-year CHD risk. The conventional 5 percent significance level was used throughout the study.

Variables:

Continuous variables: The following variables were coded in SPSS as continuous variables: TCH, HDL-C, age, systolic BP and diastolic BP

Categorical variables: the following variables were coded in SPSS as categorical variables: age, smoking and gender.

3.9 Ethical Consideration

Approval to perform the study was obtained from the Palestinian MOH, the college of Graduate Studies at An-Najah National University and Institutional Review Board (IRB). Also, consent form from the patients or their families was obtained prior to interview and taking the blood (Appendix).

Next chapter presents the findings of the study regarding ten-year risk of CHD.

Chapter Four

Result

During the study period, 112 patients were included in the study; 76 (67%) were male and 36 (33%) were female**.** The mean (± SD) age of the participants was 43 ± 10.85 years. The majority were males (76; 67%). The participants had median (Q1 – Q3) duration of psychiatric illness, systolic blood pressure and diastolic blood pressure of 12 (7.25 – 20) years, 120 (115 – 130) mmHg and 80 (70 – 90) mmHg respectively. Lipid profile of the participants showed that the participants had a mean (± SD) HDL-C value of 44.3 ± 8.7 mg/ dL and TCH of 189.4 ± 39.6 mg/ dL. The majority (65; 58%) of the participants were smokers. Females had significantly lower prevalence of smoking (P<0.05) and significantly higher HDL levels (P<0.05) compared to males. However, there was no significant difference between males and females in age, duration of illness, systolic blood pressure, diastolic blood pressure, and TCH levels. Demographic and clinical data of the participants is shown in Table 1.

Table 4.1: Demographic and clinical characteristics of the participants

Variable	**Statistic (mean ± SD) or median (Q1 – Q3) (Total; N=112)**	**Male 76 (67%)**	**Female 36 (32%)**	**P**
Age (years)	**43 ± 10.85**	**42.83 ± 10.33**	**43.64 ± 12**	**0.72[a]**
Smoker - No - Yes	**47 (42%)** **65 (58%)**	**16 (21.1%)** **60 (78.9%)**	**31 (86.1%)** **5 (13.9%)**	**<0.01[b]**
Systolic blood pressure (mm/Hg)	**120 (115 – 130)**	**120 (115 – 130)**	**120 (115 – 135)**	**0.75 [c]**
Diastolic blood pressure (mmHg)	**80 (70 – 90)**	**85 (70 – 90)**	**80 (70 – 90)**	**0.7 [c]**
High density	**44.3 ±8.7**	**42.25 ± 7**	**48.66 ± 10.35**	**<0.01**

lipoprotein (mg/dl)				[a]
Total cholesterol (mg/dl)	**189.4 ± 39.6**	**185.75 ± 39.05**	**197 ± 40.32**	**0.17** [a]
Duration of illness (years)	**12 (7.25 – 20)**	**13 (9.25 – 20)**	**10 (4 – 17.75)**	**0.085** [c]

Abbreviations: Q1-Q3: inter quartile range, SD: standard deviation.

a Significance of differences estimated with Student's *t*-test

b Significance of differences estimated with Chi-square test

c Significance of differences estimated with Mann-Whitney *U* test

The CHD risk scores were unequally distributed with positive skewness. Based on the Framingham risk score, the mean (± SD) CHD risk score was 5.6 ± 5.8 (median: 3; Q1 – Q3: 1 – 9). The mean (± SD) ten-year CHD risk for females was 1.5 ± 1.58 and the median (Q1 – Q3) was 0.75 (0.5 – 2) while that for males was 7.5 ± 6 with a median (Q1-Q3) of 6 (2-13).

Framingham ten-year CHD risk calculator categorizes patients into 4 categories based on their total risk score. In our study, there were 63 (56.3%) participants who had a total risk score of < 5% (Ideal); 24 (21.4 %) patients with a total risk score of 5 – 9% (Low risk); 22 (19.6 %) patients with a total risk score of 10 - 20% (Intermediate risk) and there were 3 (2. 7 %) patients with a total risk score > 20% (High risk). Based on this, there were 87 (77.7%) participants with low ten-year risk for CHD and there were 25 (22.3%) participants with intermediate/ high ten-year risk of CHD (Table 2). The distribution of Framingham ten-year risk score categories stratified by gender, age categories, smoking, and illness duration is shown in Figures 3–6.

Analysis of gender distribution among the four CHD risk categories showed that there was no significant difference in gender distribution in low risk category. However, there was a significant association between males and intermediate and high CHD risk categories (Table 2).

Table4.2: Frequency of Framingham risk categories stratified by gender

Category	Definition	Frequency (%)	Male	Female	*P**
Ideal	**(< 5%)**	**63 (56.3%)**	**30 (39.5%)**	**33 (91.7%)**	**0.154**
Low risk	**5 – 9%**	**24 (21.4%)**	**21 (27.6%)**	**3 (8.3%)**	**0.043**
Intermediate risk	**10 – 20%**	**22 (19.6%)**	**22 (28.95%)**	**0 (0%)**	**< 0.01**
High risk	**>20%**	**3 (2.7%)**	**3 (3.95%)**	**0 (0%)**	**< 0.01**
Total		**112 (100%)**	**76 (100%)**	**36 (100%)**	

***Statistical difference was tested using non-parametric Binomial test.**

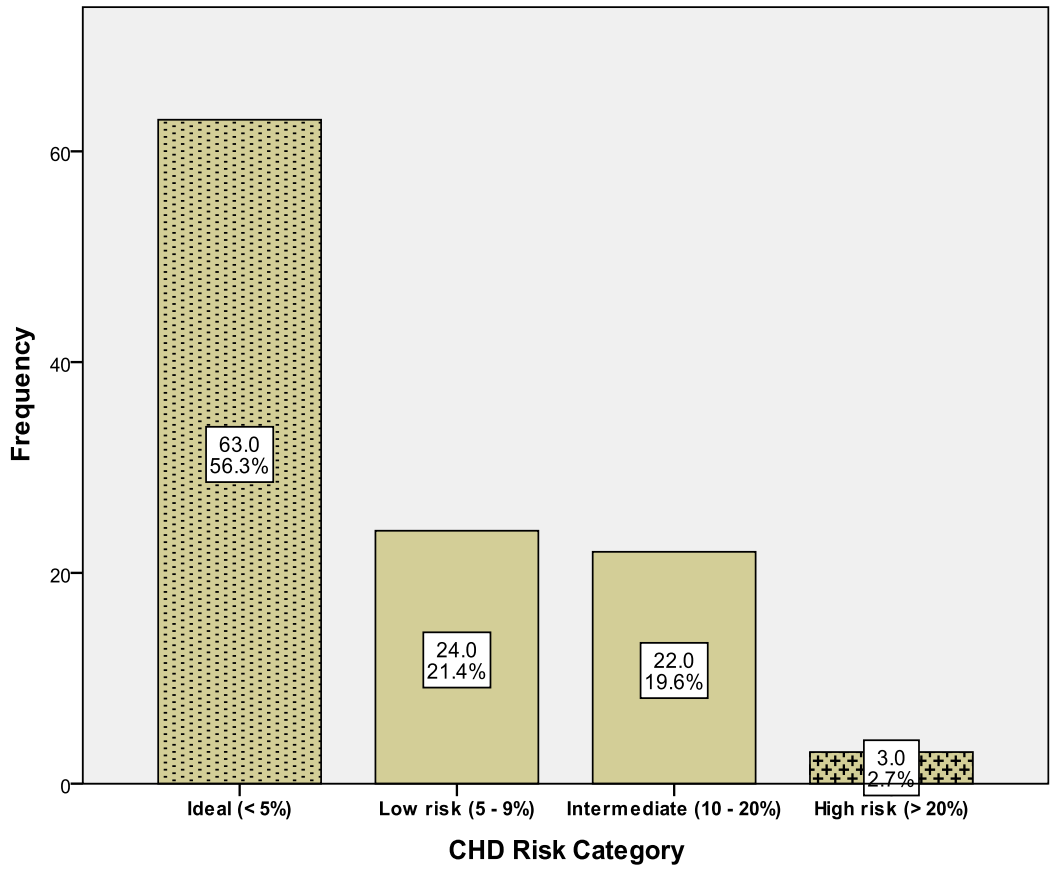

Figure (4.1): Frequency of schizophrenic patients in each CHD risk category

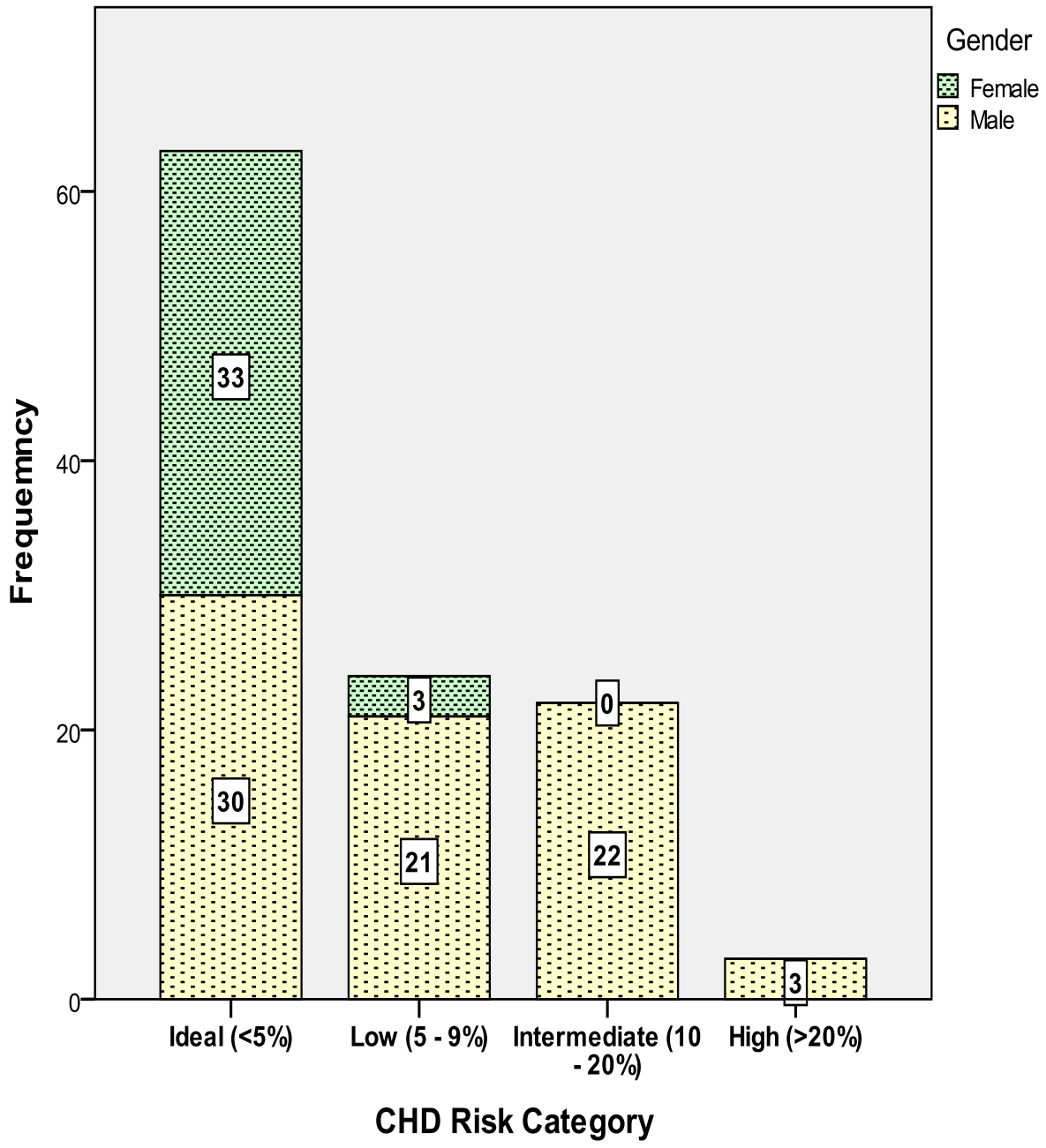

Figure (4.2) : Frequency of schizophrenic male and female patients in each CHD risk category

Age Categories: 1 ≤ 30; 2: 31 – 40; 3: 41 – 50; 4: >50 years

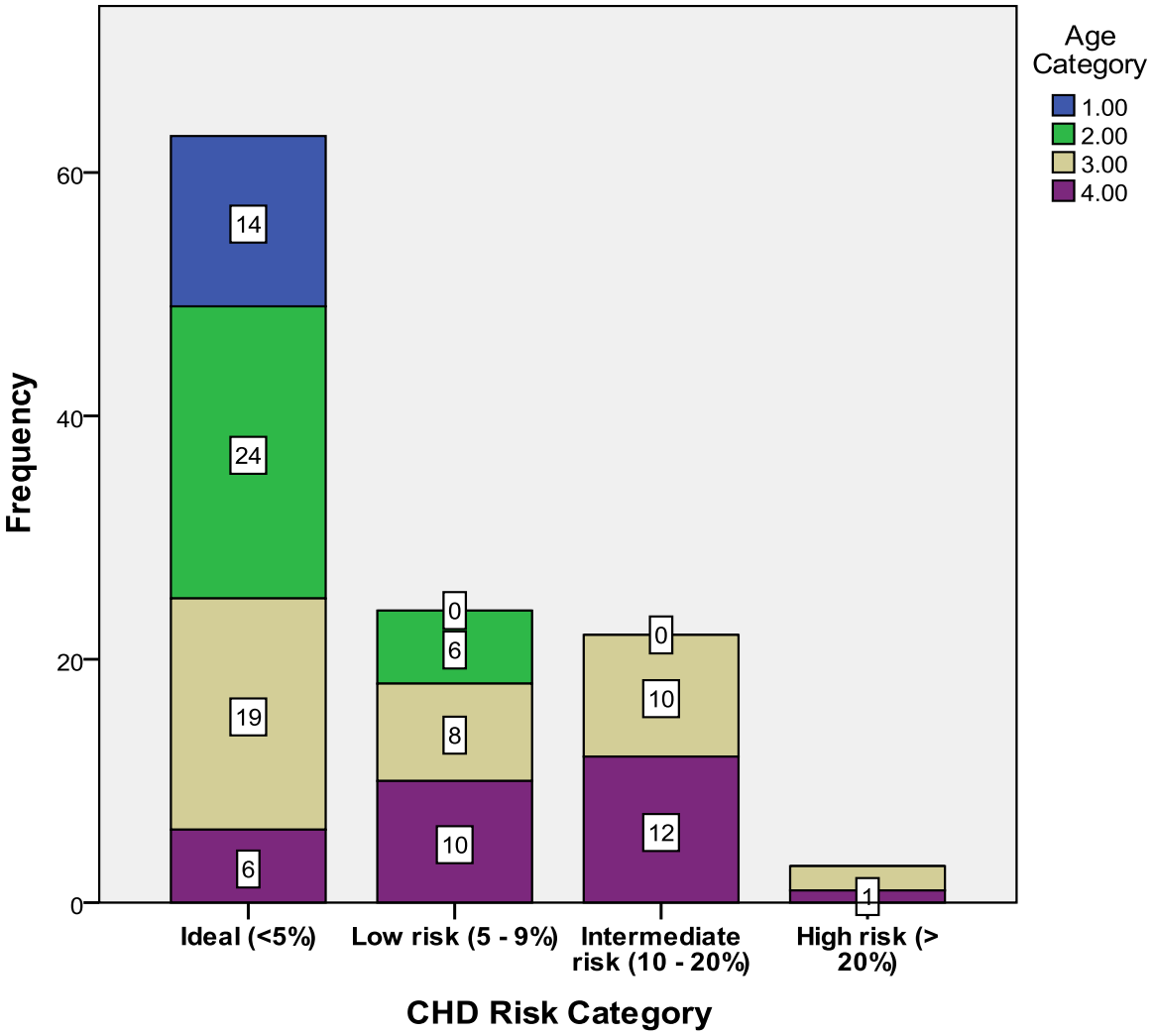

Figure (4.3): Frequency of schizophrenic patients in each CHD risk category stratified by age group

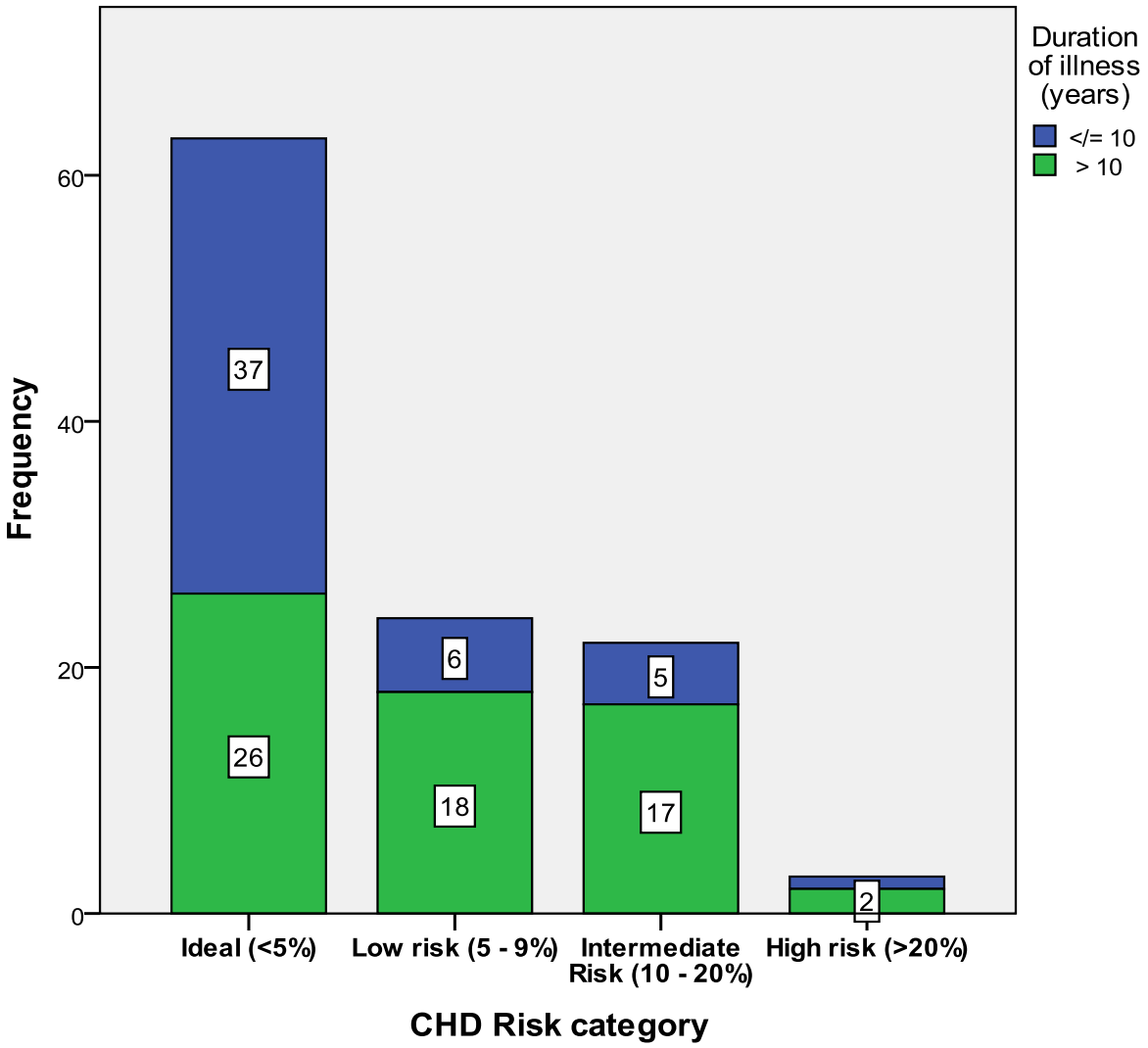

Figure (4.4): Frequency of schizophrenic patients in each CHD risk category stratified by duration of psychiatric illness

Univariate analysis of potential variables that were associated with intermediate/high CHD risk showed that there were significant differences between the low (<10%) and intermediate/high (≥10%) categories with respect to age distribution (P<0.05), gender (P<0.5), smoking (P<0.05), total cholesterol (P<0.05), diastolic BP (P<0.05) and duration of psychiatric illness (P =0.03). However, there was no significant difference between the 2 categories in terms of systolic blood pressure, waist circumference and HDL-C levels (Table 3). All patients in the CHD risk category ≥ 10% were

males and smokers. None of the patients in the CHD risk category were females. Furthermore, there were no smokers in the low <10% CHD risk category.

By including the studied risk factors in the **logistic regression analysis (**Age, diastolic BP, TCH and duration of illness) The results presented in table 4 showed that age was the strongest predictor of CHD risk ≥10% with about [OR= 1.524, 95%CI (1.213-1.914)] followed by diastolic BP about [OR=1.207, 95%CI (1.045-1.393)] and the weak factor for CHD risk ≥10% was TCH which represented about [OR=1.083, 95%CI (1.033-1.136)].

Table 4.3: Univariate analysis of factors associated with low (<10%) and intermediate/ high (≥10%) CHD risk categories

Variable	Low Risk Category Framingham score < 10% n = 87	Intermediate / High Risk Category Framingham score ≥ 10% n = 25	P
	mean ±SD or median (Q1 – Q3)	mean ±SD or median (Q1 – Q3)	
Age (Years)*	**40.94 ±11**	**50.56 ±6.32**	**< 0.01**[a]
Gender* Male (%)	**51 (58.6%)**	**25 (100%)**	**< 0.01**[b]
Smoking -Yes	**0 (0%)**	**25 (100%)**	**<0.01**[b]
Systolic blood pressure (mm/Hg)	**120 (115 - 130)**	**125 (117 - 130)**	**0.219**[c]
Diastolic blood pressure (mmHg)	**80 (70 - 90)**	**90 (80 - 95)**	**<0.01**[c]
High density lipoprotein (mg/dl)	**44.6 (38.6 - 50.4)**	**41.7 (37.4 - 47.8)**	**0.98**[c]
Total cholesterol (mg/dl)	**180.5 (153.5 - 211)**	**215 (183.5 - 243.5)**	**<0.01**[c]

Waist Circumference (cm)	**95 (85 - 102.3)**	**97 (88.5 - 104)**	**0.484** [c]
Duration of illness (years)	**11 (6 - 20)**	**20 (10.5 - 24.5)**	**0.03** [c]

a Significance of differences estimated with Student's *t*-test
b Significance of differences estimated with Chi-square test
c Significance of differences estimated with Mann-Whitney *U* test

Table 4.4: multivariate analysis of factors associated with CHD risk ≥ 10%

	B	S.E.	Wald	P	O.R	95% C.I.for O.R	
						Lower	Upper
Age	.421	.116	13.121	.000	1.524	1.213	1.914
Diastolic BP	.188	.073	6.557	.010	1.207	1.045	1.393
Total Cholesterol	.080	.024	10.829	.001	1.083	1.033	1.136
Duration of illness	-.059	.061	.935	.334	.942	.836	1.063

In the coming chapter, discussion of our results and internationally published studies regarding to CHD risk among schizophrenic patients will be presented.

Chapter five

Discussion

5.1 Introduction

This study aimed to estimate the ten-year risk of CHD in patients with schizophrenia attending governmental primary psychiatric healthcare centers in northern West-Bank, Palestine. Our results indicated that male gender was significantly associated with ≥10% ten-year CHD risk. Actually, all patients who had ten-year CHD risk ≥10% were males and none were females. Similarly, all patients in the high CHD risk category were smokers and none were in low risk category. Therefore CHD risk ≥ 10% was confined to male smokers. Among male gender, age and diastolic BP were significant predictors of CHD risk ≥ 10%.

The findings that there was a significant association between CHD in schizophrenia and modifiable risk factors like diastolic BP may facilitate the development of appropriate preventive strategies. Interventions focused on preventing modifiable risk factor as opposed to treating this CHD condition and its complications once they are present, will not only reduce costs but will provide sufferers with the most effective tools for maintaining and improving their health and well-beings.

5.2 Comparison with literature

Current literature does not provide a clear understanding of which risk factors has the best prediction of the development of CHD in patients with schizophrenia. A study in Spain of 1452 patients with schizophrenia concluded that 20.7% had a ten-year CHD risk of ≥10%; male had

significantly higher ten-year CHD risk than females (8.3% vs. 4.5%) [47]. In a study of 1125 patients with schizophrenia from US, with a mean age of 40.7 years, 33% had a ten-year CHD risk ≥10% ; 37% among men and 19% among women had a ten-year CHD risk ≥10% (P<0.05) [48]. Another study in US showed that the mean ten-year risk of CHD for male patients with schizophrenia was significantly higher than females (9.4% vs. 6.3%, respectively) [44]. A possible reason for higher CHD risk among males compared to females is the high prevalence of smoking among males. High prevalence of smoking among male patients with schizophrenia has been reported [47, 48].

Table 5 shows a comparison of results obtained in different studies carried out among patients with schizophrenia. The table shows that the result obtained in our study regarding frequency of patients in high CHD risk category is lower than that reported by other studies. One potential explanation for this difference in results obtained is the inclusion criteria. In previous studies reported, diabetic patients were included in the analysis which made the CHD risk higher than that reported in our study. Furthermore, our study included patients whose age was above 20 years older while the reported studies included patients whose age is usually above 30 years old which made the expected CHD risk higher than that reported in our study.

Table 5.1: Comparative table of the prevalence of ten-year risk of CHD in Different countries: patients with schizophrenia

Country (Author & year)	Patients	Mean CHD Risk score (Male)	Mean CHD risk score (female)	Age (years)	Tools
U.S (Goff, Sullivan et al. 2005).	Schizophrenia, out Patients included D.M	9.4%	6.3%	40.4	FHS age 18-65yrs
Spain (Bobes, Arango et al. 2007).	Schizophrenia, out Patients included D.M	8.3%	4.5%	40.7	FHS. Age 18-74yrs.
U.S (Daumit, Goff et al. 2008).	Schizophrenia, out Patients included D.M	9.5%	5.7%	40.7	FHS age 18-65 yrs
Scotland (McCreadie 2003).	Schizophrenia, Out Patients, non fasting-blood sample	10.5%	7%	45	Computer program derived from Framingham assessment
Canada (Cohn, Prud'homme et al. 2004).	Schizophrenia, Out and in Patients included D.M	8.9%	2.6%	M=42.4 F=44.5	FHS age ≥20 yrs.
Our study	Schizophrenia, out Patients, excluded CHD and D.M	7.5%	1.5%	43	FHS, age ≥20 yrs.

In addition, table 6 summarizes a comparison between our study ad previous studies regarding the gender differences and the ten year risk of CHD.

Table 5.2: Comparative table of the distribution ten-year risk of CHD in Different countries: patients with schizophrenia

Study (Author & Years)	Risk <10% All Sample	Risk ≥10% All Sample	Mean CHD Risk ≥10% All Sample	Male Risk ≥10%	Female Risk ≥10%
(Daumit, Goff et al. 2008)	67%	33%	NA	37%	19%
(Bobes, Arango et al. 2007)	79.3%	20.7%	20.7%	26.5%	11.7%
Our study	77.7%	22.3%	33%	32.9%	0%

In comparison between our study and general population from U.S [86] and Omani Arabs [87], male participants in all studies had higher prevalence of ten year-risk of CHD than female participants. Furthermore, the proportion of participant's ≥10% ten-year risk of CHD increases with advance age in all studies. However we need to care for schizophrenia patients than general population regarding to CHD risk because these group of patients neglected and less likely to pay attention to symptoms of physical illness.

5.3 Factors associated with CHD risk ≥10%

Regarding age, our results are in agreement with other published studies. Bobes et al showed that 1.8% of patients with ≥ 10% ten-year CHD risk were ≤34 years and 56.6% of patients with ≥10% risk of developing CHD were > 65 years [47]. Jin et al (2011) suggested that the ten-year risk of CHD could increase by at least 50% in middle aged and older patients with schizophrenia [46].

Our results regarding to diastolic blood pressure was a significant predictor of ≥10% ten-year risk of CHD. Another study conducted by Jin et al (2011) showed that schizophrenia patients tending to have higher diastolic blood pressure [46]. Similar findings were obtained by a study conducted in Croatia (2012) which showed that male schizophrenia patients had significantly higher diastolic blood pressure compared to female patients [54].

Our study indicated that patients with ≥10% ten-year CHD risk had longer duration of psychiatric illness (P=0.03). It is possible that the long standing life style risk factors in patients with schizophrenia are increasing their risk of CHD. However, multivariate analysis suggested that the duration of psychiatric illness is not a significant predictor with ≥10% ten-year risk of CHD.

Our results regarding to total cholesterol was not significant predictor with ≥10% ten-year risk of CHD. In contrast other published studies showed that total cholesterol was a significant risk factor for CHD, findings was obtained by McCreadie (2003), which showed that 46 (53%) of schizophrenia patients had raised cholesterol: HDL ratio [55]. In a Spanish cross-sectional study, the most prevalent cardio-metabolic risk factor was found to be hypercholesterolemia (66% of patients) [53]**.**

Finally, regarding smoking, the findings of our study are similar to those obtained by Goff et al (2005) and Phutane et al (2011) in which schizophrenic patients had significantly high rates of smoking (68%,46%) [44, 50]. Our results showed that male schizophrenic patients had higher prevalence of smoking than females (78.9%, 13.9%). Similarly finding

were obtained by Daumit et al (2008) which showed that female schizophrenia patients had lower prevalence of smoking than males (50%,61%) [48].

5.4 Limitations of the Study

1-This was a cross-sectional study, convenience sample collected from different primary health care psychiatric centers and it may not be representative of total population of patients with schizophrenia.

2-Due to the high cost analysis of blood sample for each participant, we were unable to include large sample size and compare patients within match control of general population.

Final limitation is the absence of data on antipsychotic medications taken by the participants as these data may have been helpful in further interpreting the baseline health data and risk factors for CHD in the participants.

5.5 Conclusions

1- This study confirmed the presence of traditional risk factor for CHD among schizophrenic patients, supporting the need for enhanced monitoring for CHD in this category of neglected patients.
2- Male gender and smoking are associated with high ten-year CHD risk.
3- Among males gender, advancing age and high DBP are significant predictors of CHD risk ≥ 10%.

5.6 Recommendation

1- 1-Efforts to decrease CHD risks among patients with schizophrenia should be implemented, particularly among those with high Framingham risk score.

2- 2-Our study emphasize the need of multi-intervention for risk factors of CHD in schizophrenia patients, as risk factor of high diastolic BP can be lessened by strategies and intensified intervention.
3- 3-Mental health nurse should be aware of the blood pressure of each patient with schizophrenia they treat.
4- 4-Psychiatrists should follow guidelines for screening and treating patients who are at a high risk for cardiovascular disease.
5- The importance of routine blood pressure and diet style monitoring for patients with schizophrenia should be noticed, especially among elderly patients.

Finally, further research on the development and evaluation of effective interventions for managing CHD risk factors for people with schizophrenia in psychiatric clinics is needed.

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Appendix

An-Najah National University

Faculty of Graduate Studies

Master of Community Mental Health Nursing

Estimation Ten-Year Risk of Coronary Heart Disease in Patients with Schizophrenia

Data Collection Form

A. **Patient demographic factors:**

A.1 Serial number: _____

A.2 Registration number: _____

A.3 Age: _____ years

A.4 Date of birth: _____

A.5 Gender: □ Male □ Female

A.6 Weight: _____ K g **A.7** Height: _____ cm

A.8 waist circumference: _____cm

B. **Schizophrenia disease related factors**

C. . Duration of illness: _____ years

D. **History and disease co-morbidities**

C1: History of smoking

□ Yes

□ No

C2: Co-morbidities:

C2.1□ Nil **C2.2**□ Hypertension

C2.3□Ischemic heart disease

C2.4□ Diabetes mellitus

C2.5□ Atrial fibrillation

C2.6□ Heart failure

C2.7□ Hypercholesterolemia

C2.8□Renal dysfunction

C2.9□ Asthma / COPD

C2.10□ Hypercholesterolemia

C2.11□ Renal dysfunction

C2.12□others: ……

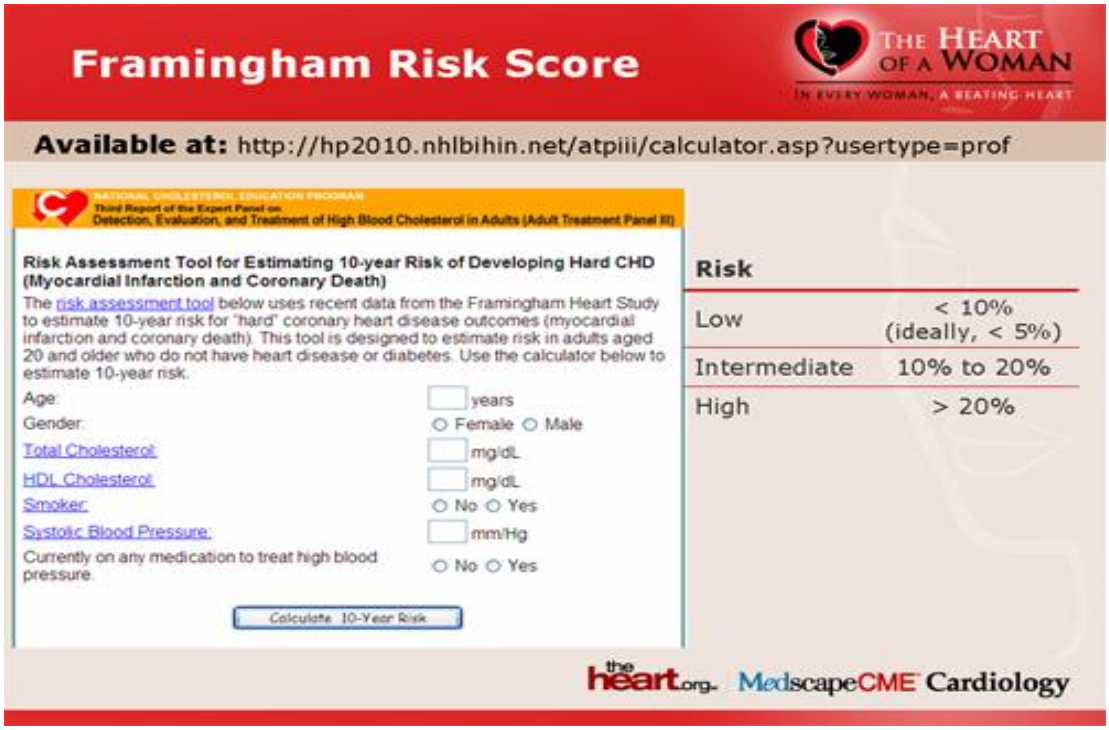
D. **Laboratory and clinical investigation:**

Test	First reading	Second reading
D.1 Blood Pressure		
Systolic		
Diastolic		
D.2 Lipid profile		
Total cholesterol		
HDL		

E. **Current Medications**

	Drug name	Drug dose	Frequency	Route
1				
2				
3				
4				
5				

F. Framingham risk score calculator



Appendix

جامعة النجاح الوطنية

كلية الدراسات العليا

نموذج موافقة على المشاركة في بحث

الباحث: صقر مفيد القرم الطالب في كلية الدراسات العليا / ماجستير صحة نفسية مجتمعية، جامعة النجاح الوطنية

المشرف: البروفيسور وليد صوليح أستاذ في قسم الصيدلة/ كلية الطب وعلوم الصحة/ جامعة النجاح الوطنية و الدكتورة سماح الجابي استاذ مساعد في قسم الصيدلة/ كلية الطب وعلوم الصحة/ جامعة النجاح الوطنية.

الجهة المشرفة: جامعة النجاح الوطنية / كلية الدراسات العليا / قسم التمريض / الصحة النفسية المجتمعية.

عنوان البحث:

تقدير احتمالية الاصابة بالامراض القلبية التاجية لدى مرضى الانفصام الذهاني خلال العشر سنوات القادمة

Estimation Ten-Year Risk of Coronary Heart Disease in Patients with Schizophrenia

يحتوي هذا الملف على :

1. معلومات وتفاصيل البحث

2. شهادة الموافقة على المشاركة في البحث

(سيقدم لكل مشارك نسخة كاملة عن ورقة الموافقة على المشاركة في البحث)

معلومات وتفاصيل البحث

أخي/ أختي المشارك/ة:

أنا الباحث صقر القرم طالب ماجستير صحة نفسية مجتمعية في جامعة النجاح الوطنية يسرني أن أدعوك إلى المشاركة في بحثي المتعلق بتقدير احتمالية الاصابة بالامراض القلبية التاجية لدى مرضى الانفصام الذهاني خلال العشر سنوات القادمة. لك كامل الحرية والارادة في المشاركة في هذا البحث ولك الحق في اخذ الوقت الكافي للتفكير في المشاركة من عدمها وسؤال الباحث عما تراه مناسبا والتحدث لاي شخص او جهة عن هذا البحث.

كما يمكنك الاستفسار عن اي جزء يتعلق في البحث الان او فيما بعد واذا كانت هناك كلمات او اجزاء غير مفهومة بامكانك سؤال الباحث وستجد/ين الوقت والاجابة الكافيتين.

يضمن البحث سرية المعلومات المتعلقة بالمشارك/ة.

الهدف من البحث: يهدف هذا البحث لتقدير احتمالية الاصابة بالامراض القلبية التاجية لدى مرضى الانفصام الذهاني خلال العشر سنوات القادمة. و كذلك يهدف الى التعرف على العوامل الديموغرافية و السريرية المرتبطة بحدوث الامراض القلبية التاجية لدى مرضى الانفصام الذهاني. كما ان مشاركتك ودعمك لهذا البحث سيساهمان في تطوير وتعزيز الواقع الصحي في فلسطين.

طبيعة المشاركة في البحث: بعد الموافقة على المشاركة في البحث تقدير احتمالية الاصابة بالامراض القلبية التاجية لدى مرضى الانفصام الذهاني خلال العشر سنوات القادمة، سنطلب من المشارك اخذ عينة دم منه لقياس مستوى الكولسترول الكلي و الكولسترول الجيد و كذلك قياس الضغط لديه، تليها مقابلة شفوية لاخذ معلومات تتعلق بالعوامل الاجتماعية والديموغرافية التي تلزم لتقدير احتمالية الاصابة بالامراض القلبية التاجية لدى مرضى الانفصام الذهاني خلال العشر سنوات القادمة.

اختيار المشاركين:

سيتم اختيار المشاركين من مرضى الانفصام الذهاني والمراجعين في العيادة النفسية – مديرية الصحة في كل من المحافظات التالية: نابلس، طولكرم، جنين، قلقيلية.

المشاركة طوعية واختيارية وبامكان المشارك الانسحاب من البحث في اي وقت ودون الحاجة لابداء الاسباب وبدون اي تبعات.

المدة المتوقعة لانهاء اجراءات البحث:

عشرة دقائق لكل مشارك.

شهادة الموافقة على المشاركة في البحث:

اقرار من المشارك في البحث: قمت بقراءة المعلومات الواردة في ورقة معلومات البحث واتيحت لي الفرصة ان اسال اي سؤال وقد تمت الاجابة على كافة اسئلتي بشكل كاف، وبناءا على ذلك اوقع طوعيا على المشاركة في هذا البحث.

اسم المشارك.....

توقيع المشارك.....

التاريخ...../...../.....

اقرار من الباحث:

قمت بقراءة المعلومات الواردة في ورقة معلومات البحث بطريقة صحيحة وواضحة، وبذلت جهدي ان يعي المشارك ان البحث سيتضمن:

1. مقابلة المشارك في البحث العيادة النفسية – مديرية الصحة في محاظات الشمال لاخذ عينة دم منه و كذلك قياس ضغط الدم لديه.
2. التحدث الى المريض شفويا لاخذ المعلومات المتعلقة بالعوامل الاجتماعية والديموغرافية.

اؤكد على ان المشارك اخذ الفرصة الكافية للاجابة على اسفساراته بشكل واضح وصحيح وبذلت ما بوسعي لتحقيق ذلك.

اؤكد ان المشارك لم يجبر على التوقيع على الورقة وان مشاركته كانت بمحض ارادته وكامل اختياره.

الباحث:

صقرمفيد القرم

توقيع الباحث.....

التاريخ...../...../.....

جامعة النجاح الوطنية

كلية الدراسات العليا

تقدير احتمالية الإصابة بالأمراض القلبية التاجية لدى مرضى الانفصام الذهاني خلال العشر سنوات القادمة

إعداد

صقر مفيد القرم

إشراف

أ.د. وليد صويلح

د. سماح الجابي

قدمت هذه الأطروحة استكمالا لمتطلبات درجة الماجستير لتخصص تمريض الصحة النفسية المجتمعية بكلية الدراسات العليا في جامعة النجاح الوطنية في نابلس– فلسطين

2013

تقدير احتمالية الإصابة بالأمراض القلبية التاجية لدى مرضى الانفصام الذهاني خلال العشر سنوات القادمة

إعداد

صقر مفيد القرم

إشراف

أ.د. وليد صويلح

د.سماح الجابي

الملخص

الخلفية:

أشارت الدراسات إلى أن المرضى الذين يعانون من مرضى الانفصام الذهاني، لديهم أقصر فترة حياة من عامة السكان.

الهدف:

لتقييم احتمالية الاصابة بالامراض القلبية التاجية عند مرضى الانفصام الذهاني خلال العشر سنوات القادمة.

المنهجية:

نفذت هذه الدراسة المقطعية المستعرضة في أربعة مراكز للرعاية الصحية الأولية الحكومية للأمراض النفسية في شمال الضفة الغربية (نابلس، جنين، طولكرم، قلقيلية). تم استخدام عدم الاحتمالية في أخذ العينات، وقد تم اختيار 112 مريضاً شخصوا بمرض انفصام الذهان. وتم حساب خطر الإصابة بالأمراض القلبية التاجية خلال العشر سنوات القادمة باستخدام صيغة التسجيل فرامنغهام.

(Framingham heart study) الذي يتضمن المتغيرات التالية: العمر،الجنس ،التدخين،الكولسترول الكلي(TCH)،الكولسترول الكلي عالي الكثافة(HDL) وتاريخ أدوية ارتفاع ضغط الدم.صنفت درجة المخاطر إلى أربع مجموعات: المثالي(<5٪)، منخفضة(5-9%)، متوسطة(10-20%)، عالية(>20%). تم التحليل الوصفي والإحصائي باستخدام الرزم الإحصائية للعلوم الاجتماعية (SPSS-20) .

النتائج:

كان متوسط عمر المشاركين 43 ± 10.85 عاما. وكانت الغالبية ذكوراً (67;76٪). ولم يكن هناك فرق كبير بين الذكور والإناث في العمر (P=0.72)، طول فترة المرض النفسي (P=0.085)، ضغط الدم الانقباضي (P=0.75)، ضغط الدم الانبساطي(P=0.7)، الكولسترول الكلي (P=0.17).

كان متوسط ± الانحراف المعياري لمخاطر الإصابة بالأمراض القلبية التاجية خلال العشر سنوات القادمة (5.8 ± 5.6) (الوسيط: 3؛ 1 – 9 :Q3 – Q1)، متوسط ± الانحراف المعياري لمخاطر الإصابة بالأمراض القلبية التاجية عند الإناث (1.58 ± 1.5) (الوسيط: 2 :Q3 – Q1) 0.50 – بينما عند الذكور(7.5±6) (الوسيط: 6؛ 2–13 :Q3–Q1).استناداً إلى صيغة التسجيل فرامنغهام في تصنيف مخاطر الإصابة بالأمراض القلبية التاجية. وكان هناك 87 مريضاً في فئة منخفضة، 22 مريضاً في فئة متوسطة، و3 مرضى في فئة كبيرة. أظهر تحليل أحادي المتغير أن هناك فروقاً ذات دلالة إحصائية بين فئة منخفضة (<10٪) ومتوسطة / عالية المخاطر (≤10٪) فيما يتعلق فئات التوزيع العمري (P<0.05)، نوع الجنس(P<0.05)، التدخين (P<0.05)، الكولسترول الكلي (P<0.05)، ضغط الدم الانبساطي (P<0.05) وطول فترة المرض النفسي (P=0.03). ومع ذلك، لم يكن هناك فرق كبير بين فئة منخفضة (<10٪) والمتوسطة / عالية (≤ 10٪) من حيث ضغط الدم الانقباضي، محيط الخصر والكولسترول الكلي عالي الكثافة. أظهر تحليل متعدد المتغيرات على مرضى الذكور أن العمر[,1.524 =OR] (1.213–1.914) 95%CI و ضغط الدم الانقباضي –1.045) 95%CI ,1.207=OR] [(1.393 كانت العوامل الهامة فقط في التنبؤ بمخاطر الاصابة بالامراض القلبية التاجية خلال العشر سنوات القادمة لدى مرضى الانفصام الذهاني .

الاستنتاجات:

كان (خُمْس) مرضى انفصام الذهان لديهم فئة متوسطة \ عالية (≤10%) للإصابة بالأمراض القلبية التاجية، وينبغي توجيه الجهود لخفض مخاطر الإصابة بالأمراض القلبية التاجية لدى المرضى المصابين بانفصام الذهان أساسا نحو ضغط الدم الانقباضي كعامل خطر قابل للتعديل.