Al-Najah National University

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Prevalence of Dyslipidemia among Schizophrenic Clients in Northern West Bank

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Dedication

To my family and my fiancee

Acknowledgment

I would like to express my gratitude to my supervisor's special thanks and appreciation to An-Najah National University for supporting this work. Lastly, I offer my regards and blessings to Dr. Mahmud Khresheh to help me during take blood sample from clients.

الاقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان :

Prevalence of dyslipidemia among schizophrenic clients in northern West Bank

أقر بأن ما اشتملت عليه هذه الرسالة إنما هي نتاج جهدي الخاص، باستثناء ما تمت الإشارة إليه حيثما ورد، وأن هذه الرسالة ككل، أو أي جزء منها لم يقدم لنيل أية درجة أو لقب علمي أو بحثي لدى أية 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:**

Date: **التاريخ:**

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List of Abbreviations

Abbreviation	Full Name
AACE	American Association of Clinical Endocrinologists
ADA	American Diabetes Association
APA	American Psychiatric Association
CHD	Coronary Heart D
CRI	Chronic Renal Insufficiency
CVD	Cardiovascular Disease
DSM-IV-TR	Diagnostic and Statistical Manual of Mental Disorders fourth edition-Text revision
HDL-C	High-Density Lipoprotein Cholesterol
LDL-C	Low-Density Lipoprotein Cholesterol
MOH	Ministry Of Health
NAASO	North American Association for the Study of Obesity
NCEP ATP III	National Cholesterol Education Program, Adult Treatment Panel III
NGOs	Non-Governmental Organizations
NHNES	National Health and Nutrition Examination Survey
NIH	National Institute of Health
TC	Total Cholesterol
TGs	Triglycerides
UNRWA	The United Nations Relief and Works Agency
WHO	World Health Organization

Prevalence of dyslipidemia among schizophrenic clients in northern West Bank

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Abstract

BACKGROUND

Individuals with major mental disorders lose 25 or more years of life expectancy, with coronary heart disease (CHD) as the leading cause of death. Dyslipidemia is a common health problem worldwide, and defined by the presence of one or more than one abnormal serum lipid concentration**,** and schizophrenic clients are at higher risk of dyslipidemia and at higher risk of dying from cardiovascular diseases.

AIM: The aim of the study is to determine the prevalence of dyslipidemia among schizophrenic clients who are attending governmental psychiatric clinics in northern West Bank of Palestine.

METHOD: Data was analyzed from a cross-sectional study that included a Convenience sampling of 251 schizophrenic clients attending governmental psychiatric clinics in northern West Bank of Palestine (Jenin, Tulkaram, Nablus and Qalqilia), Aged 16 years and older. According to the NCEP ATP III criteria, High total cholesterol (TC) was defined as TC ≥200 mg/dl and hypertriglyceridemia as serum triglyceride level ≥150 mg/dl. Low high-density lipoprotein cholesterol (HDL-C) was defined as serum

HDL-C <40 mg/dl. High low-density lipoprotein cholesterol (LDL-C) was defined as serum LDL-C ≥130 mg/dl.

RESULTS: The analysis shows an of a total of 251 subjects, 43.4% had high TC level, 33.8% had high LDL-C, 41.4% had low HDL-C, 48.2% had high triglyceride levels, and 66.5% had at least one abnormal lipid level. The prevalence of dyslipidemia in schizophrenic clients was significantly higher than from general population in other country. The prevalence of dyslipidemia in male more than female in all plasma lipids, with significant relationship in low HDL-C (p/0.02). The prevalence of hypercholesterolemia, hypertriglyceridemia, high LDL-C, and abnormally low HDL-C, were higher in all age groups.BMI was associated with high triglycerides, and there was significant relationships between high total cholesterol and smoker.

CONCLUSION AND RECOMMENDATION: This study confirmed the high prevalence of dyslipidemia among clients diagnosed with schizophrenia, which necessitates appropriate the institution of community-based intervention strategy for prevention, detection and treatment of dyslipidemia.

CHAPTER 1

INTRODUCTION

1.1 Overview and Background

In the area of North West Bank, where the study took place in Nablus, Tulkaram, Qalqilia and Jenin; mental health clinics are responsible for the largest burden of the work due to the lack of centers specialized in the treatment of this group of people. Mental health providers are responsible for supervision, regulation, licensure and control of the whole health services.

Ministry of Health (MOH) is considered one of the main four providers of primary mental health in Palestine. The other three providers are : health services belonging to national and international non-governmental organizations (NGOs), the United Nations Relief and Works Agency (UNRWA), and some private health sector (for profit) organizations.

1.2 Introduction

Schizophrenia is a psychotic disorder that causes severe mental disturbances that disrupt thought, speech, and behavior, Despite its devastating effect on people who suffer from it, schizophrenia is difficult to diagnose with a broad range of symptoms that a schizophrenic patient might display **(Heather Barnett 2007).**

According to the American Psychiatric Association (APA) schizophrenia diagnosed based on the Diagnostic and Statistical Manual of Mental Disorders fourth edition-Text revision (DSM-IV-TR), the three following diagnostic criteria must be met:

a- Characteristic symptoms: Two or more of the following, each present for most of the time during a one-month period (or less, if symptoms remitted with treatment).

- Delusions.
- Hallucinations.
- Disorganized speech, which is a manifestation of formal thought disorder.
- Grossly disorganized behavior (e.g. Dressing inappropriately, crying frequently) or catatonic behavior.
- Negative symptoms: Blunted affect (lack or decline in emotional response), alogia (lack or decline in speech), or avolition (lack or decline in motivation).

If the delusions are judged to be bizarre, or hallucinations consist of hearing one voice participating in a running commentary of the patient's actions or of hearing two or more voices conversing with each other, only that symptom is required above. The speech disorganization criterion is only met if it is severe enough to substantially impair communication.

b- Social or occupational dysfunction: For a significant portion of the time since the onset of the disturbance, one or more major areas of functioning such as work, interpersonal relations, or self-care, are markedly below the level achieved prior to the onset.

c- Significant duration: Continuous signs of the disturbance persist for at least six months. This six-month period must include at least one month of symptoms (or less, if symptoms remitted with treatment)**(APA, 2000).**

Patients diagnosed with schizophrenia, unlike patients diagnosed with other chronic mental illnesses, are often unemployed, have limited access to health care, and live in suboptimal conditions **(Gilbody and Petticrew 1999).**

During recent years, mortality from cardiovascular diseases has been increasing in both men and women with schizophrenia **(Straus, Bleumink et al. 2004**; **Heila, Haukka et al. 2005)**. In addition, elevated lipid levels have been observed in patients with early-onset schizophrenia **(Saari, Jokelainen et al. 2004).**

1.2.1 Causes of schizophrenia

Schizophrenia has become an area of active research in over the past four decades **(Rajiv Tandon a 2008)** and as shown in figure (1)

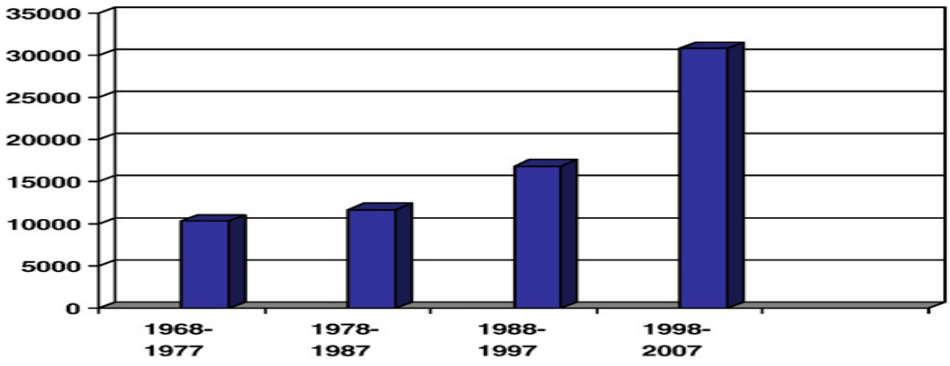

Figure (1): Number of schizophrenia related articles in Pub Med over the past four decades.

Also many factors have been suggested that may contribute to the development of schizophrenia as in the following.

1.2.1.1 Inherited factors

Schizophrenia is a multi factorial disorder, and the greatest risk factor is a positive family history. While the lifetime risk in the general population in just below 1%, it is 6.5% in first degree relatives of patients **(Kendler, McGuire et al. 1993)**, and it rises to more than 40% in monozygotic twins of affected people **(Cardno, Marshall et al. 1999).**

1.2.1.2 Biochemical factors

Have centered mainly on the dopamine hypothesis this argues that schizophrenia might be related to problems in the regulation of the neurotransmitter dopamine in the prefrontal cortex **(Kapur 2003)**.

1.2.1.3 Environmental factors

Systematic reviews of epidemiological studies have indicated that the rate of schizophrenia and related disorders is affected by some environmental factors **(March, Hatch et al. 2008; McGrath, Saha et al. 2008)**.

Living in an urban environment during childhood or as an adult has consistently been found to increase the risk of schizophrenia by a factor of two **(Picchioni and Murray 2007; Van Os 2009)**.

1.2.1.4 Substance abuse

It is well known that stimulants like cocaine and amphetamines can induce a picture that is clinically identical to paranoid schizophrenia, and recent reports have also implicated cannabis **(Picchioni and Murray 2007)**.

1.2.1.5 Pre-birth factors

Viral infections of the central nervous system during the prenatal or perinatal period may contribute to the increased risk of subsequent development of schizophrenia **(Tsuang 2000).**

1.2.2 Epidemiology of schizophrenia

The lifetime prevalence and incidence of schizophrenia are 0.33-0.60% and 10.2-22 per 100 000 person-years, respectively **(McGrath, Saha et al. 2008).** The incidence of schizophrenia shows prominent variation between sites. The median incidence of schizophrenia was 15.2/100,000 persons, and the central 80% of estimates varied over a fivefold range (7.7–43.0/100,000). The rate ratio for males versus female was 1.4:1. Prevalence estimates also show prominent variation **(McGrath, Saha et al. 2008).**

1.2.3 Physical healthcare

The association between schizophrenia and poor physical health is well established **(Marder, Glynn et al. 2003)**. Reports on the mortality of people with schizophrenia indicate that there is an increased risk of death from circulatory conditions, infections and endocrine disorders **(Psychiatrists 2010).** Furthermore, people with schizophrenia have higher rates of cardiovascular disease, including myocardial infarction, than the general population **(Hennekens, Hennekens et al. 2005; Lawrence, Holman et al. 2003; Osborn, Levy et al. 2007).**

Moreover, people with schizophrenia are also less likely to exercise and are more likely to have diets higher in fat and lower in fiber than the general population **(Brown, Birtwistle et al. 1999** ; **Osborn, Nazareth et**

al. 2007). This may partly explain the higher rates of cardiovascular diseases in this group of patients.

In conclusion, schizophrenia is related to negative lifestyle, socioeconomic and treatment-related factors that may translate to adverse physical health outcomes and increased mortality **(Saha, Chant et al. 2007)** .

Accordingly, further knowledge about the role of psychosis in the onset of dyslipidemia would be increasingly important as these two conditions are also becoming increasingly common in adolescents **(Ogden, Carroll et al. 2006)**.

A Pub med search showed that the occurrence of dyslipidemia among clients with schizophrenia has not been adequately studied, so this research work aims to study the prevalence of dyslipidemia among patients with schizophrenia attending governmental psychiatric clinics in northern Palestine.

1.3 Objectives of the Study:

1. To investigate the prevalence of dyslipidemia among clients with schizophrenia.
2. To investigate the association of dyslipidemia with demographic variables (age and gender).
3. To investigate the association of dyslipidemia with clinical variables (BMI, WC, family history of DM, duration of the psychiatric illness).

1.4 Significance of the study

1- This is the first study of its kind to be carried out in Palestine on schizophrenic clients.
2- Schizophrenic clients are often neglected in spite of their need for especial care and treatment.
3- There are many factors associated with dyslipidemia among schizophrenic clients; therefore Schizophrenic clients tend to have shorter life due to cardiovascular disease.
4- There is lack of knowledge among psychiatric health service providers about dyslipidemia in schizophrenic clients.

1.5 Research question

This study was designed to examine two research questions as detailed below:

1. What is the prevalence of dyslipidemia among clients with schizophrenia?
2. Is there an association between the prevalence of dyslipidemia in clients with schizophrenia and any of the tested variables?

1.6 Study Hypothesis

The Hypotheses for the above research questions were:

1. This research question has no hypothesis because it is an exploratory question.
2. There is no prevalence of dyslipidemia among schizophrenic clients.
3. There is an association between various demographic, clinical and medication variables and the presence of dyslipidemia.

Chapter 2

Literature Review

2.1 Definitions of dyslipidemia.

2.2 Causes and prevalence of dyslipidemia.

2.2.1 Etiology and pathophsiology of dyslipidemia.

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2.3.1 Obesity in schizophrenic clients.

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2.3.5 Smoking and schizophrenic clients.

2.3.6 Side effect of antipsychotic medication.

2.4 Metabolic syndrome and schizophrenia.

2.1 Definitions of dyslipidemia

Dyslipidemia is a common health problem worldwide **(WHO 2002; He, J. et al. 2004).** The prevalence of which is rising steadily (**Schaefer 2002).** The prevalence of dyslipidemia varies depending on the population studied, geographic location, socioeconomic development and the definition used **(Zhao, Zhang et al. 2007; Steinhagen-Thiessen, Bramlage et al. 2008)**.

Individuals with major mental disorders lose 25 or more years of life expectancy, with coronary heart disease (CHD) as the leading cause of death **(Hennekens 2007; Newcomer 2007).** However, the increased prevalence of cardiovascular disease (CVD) can be explained, by under monitoring and under-treatment of risk factors for CVD in patients with major mental disorders compared with the general population **(Morrato, Newcomer et al. 2008).** Patients younger than 50 years are shown to carry the greatest risk **(Osborn, Levy et al. 2007).** Newcomer Found, schizophrenic clients are at higher risk of dyslipidemia and at higher risk of dying from cardiovascular diseases **(Newcomer 2007).**

Dyslipidemia was defined by the presence of one or more than one abnormal serum lipid concentration **(Ram VinodMahato1 2011).**

Dyslipidemia including elevated serum total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), triglycerides (TGs), and low high-density lipoprotein cholesterol (HDL-C) levels, are modifiable major risk factors for CHD, whereas high levels of HDL-C appear to be protective **(Gordon, Probstfield et al. 1989; Schaefer 2002; NCEP ATP III, 2002)**.

A more practical system categorizes dyslipidemia as primary or secondary and characterizes them by increases in cholesterol only (pure or isolated hypercholesterolemia), increases in TGs only (pure or isolated hypertriglyceridemia), or increases in both cholesterol and TGs (mixed or combined hyperlipidemia). This system does not take into account specific lipoprotein abnormalities (eg. low HDL or high LDL) that may contribute to disease despite normal cholesterol and TG levels **(Merck Sharp, 2011).**

In table 2.1 shown the Measuring of fasting lipoprotein in all plasma lipids in the blood stream, they are listed according to the Third Report of The National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (NCEP ATP III, 2002).

Table 2.1 National Cholesterol Education Program Adult Treatment Panel III Approach to Dyslipidemias

1. Measure fasting lipoprotein (in mg/dl):		
	TC (mmol/L)	
	< 200 (<5.17)	Desirable
	200–239 (5.17–6.18)	Borderline high
	≥ 240 (≥ 6.20)	High
	LDL-cholesterol	
	< 100 (<2.58)	Optimal
	100–129 (2.58–3.33)	Near optimal/above optimal
	130–159 (3.36–4.11)	Borderline high
	160–189 (4.13–4.88)	High
	≥ 190 (≥ 4.91)	Very high
	HDL-cholesterol	
	< 40 (< 1.03)	Low
	≥ 60 (≥ 1.55)	High
	TG	
	< 150 (< 1.695)	Desirable
	150–199 (1.695–2.249)	Borderline high
	200–499 (2.26–5.639)	High
	≥ 500 (≥ 5.65)	Very high

HDL = high density lipoprotein; LDL = low density lipoprotein; TC = total cholesterol; TG = triglyceride.

The Third Report of The National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III): final report. Circulation 106, 3143–3421 (2002).

2.2 Causes and prevalence of dyslipidemia

2.2.1 Etiology of dyslipidemia

Dyslipidemia may be classified as primary, when it results from genetic defects that directly affect the metabolism of lipoproteins, or secondary, when it results from other disorders that indirectly affect the metabolism of lipoproteins, such as diabetes mellitus, hypothyroidism, sepsis, autoimmune diseases, different classes of drugs, liver disease, and chronic renal insufficiency (CRI) **(Rader and Hobbs, 2007; Malloy and Kane, 2006; Kwan et al., 2007; Mahley et al., 2008),** and antipsychotic drugs (**Mahley et al., 2008).**

2.2.2 Prevalence of dyslipidemia in Arab country

A total of 1121 subjects were taken to determine the prevalence of dyslipidemia among adult Jordanian. The results were: 48.8% had high TC level, 40.7% had high LDL-C, 40.1% had low HDL-C, 43.6% had high triglyceride levels, and 75.7% had at least one abnormal lipid level **(Khader, Batieha et al. 2010)**.

Another study conducted at a private hospital in Dubai during a six month period to determine their lipid profiles in 311 samples, the analysis shows an increased prevalence of Low Density Lipoprotein (LDL) hypercholesterolemia with relatively higher Low Density Lipoprotein Cholesterol (LDL-c) values in male subjects ($p<0.016$) as well as with the Middle East ethnic origin group ($p<0.025$), while desirable High Density

Lipoprotein (HDL-c) was found among female subjects (p=0)**(Vela, Alhessi et al. 2008).**

In a study conducted at middle east in Iran, to determine prevalence of Serum lipid levels in an Iranian adult's population **(Azizi, Rahmani et al. 2003)**.. Thirty-one percent of population had TC values between 200 and 239 and 24% had values of 240 mg/dl or greater. Mean low-density lipoprotein cholesterol (LDL-C) was 129 and 135 mg/dl in males and females, respectively (p < 0:0001). Twenty-seven percent had LDL-C values between 130 and 159 and 23% had values 160 mg/dl or greater. The mean triglycerides (TGs) values were 190 and 162 mg/dl for males and females, respectively (p < 0:0001). The mean high-density lipoprotein cholesterol (HDL-C) was 39 in males and 45 mg/dl in females (p < 0:0001). The results showed higher levels of TC, LDL-C and TGs and slightly lower HDL-C in Tehranian adults than other studies in the industrialized countries.

Another study beside the Arab region that determines Prevalence of dyslipidemia and associated risk factors among Turkish adults was shown that dyslipidemias are very common and an important health problem among the adult population of Trabzon (Cihangir Erem 2008).

2.3 Predisposing factors of dyslipidemia in schizophrenic clients

2.3.1 Obesity in schizophrenic clients

The prevalence of obesity remains high in many countries and is still increasing worldwide (WHO 2002). Obesity results when energy intake chronically exceeds energy expenditure, creating a positive energy balance **(Papas, Alberg et al. 2007)**, The high overweight and obesity prevalence

is associated with increased morbidity and mortality risk **(Brown, Tzoulaki et al. 2009)**.

The lifestyle change, which includes healthy eating habits and physical exercise as its major measures, plays an important role in primary care and, consequently, in dyslipidemia reduction **(Pearson, Blair et al. 2002), (Lien, Brown et al. 2007), (Manfredini, D'Addato et al. 2009)**.

Overweight and obesity is a particular problem in individuals with schizophrenia compared with the general population **(Saari, Lindeman et al. 2005)**, this is probably accounted for by a multitude of factors like sedentary life style, lack of exercise, use of drugs and alcohol and use of antipsychotic drugs**.**

2.3.2 Age and dyslipidemia clients

Age is strongly associated with dyslipidemia. Many studies have reported that the prevalence of dyslipidemia increased with age **(J. He, Reynolds, 2004; de Souza, Souto Filho et al. 2003**; **Azizi, Rahmani et al. 2003; Grabauskas, Miseviciene et al. 2003; Li, Yang et al. 2005)**.

2.3.3 Activity and schizophrenic clients

(Brown, Birtwistle et al. 1999) and **(McCreadie 2003)** found that people with schizophrenia tended to take only small amounts of exercise. The reason for this has not been demonstrated, but factors such as features of the illness, sedative medication and lack of opportunity and general motivation may be relevant. The relative risk of atherosclerosis in physically inactive individuals is higher than in those who are more active**.**

2.3.4 Unemployment in schizophrenic clients

People with schizophrenia living in the community are not only dealing with the disease process but also with other problems secondary to it such as Unemployment **(Minato and Zemke 2004)**. With respect to coronary heart disease, however, indicators of socioeconomic status, such as education, occupation, and income, have been associated both inversely and positively with coronary heart disease risk factors, morbidity, and mortality **(Kaplan and Keil 1993)**.

2.3.5 Smoking and schizophrenic client

The prevalence of smoking in schizophrenia greatly exceeds that in the general population (30 – 40%)(Kelly 2005). In the general population of the United States, approximately 25% are current cigarette smokers compared with approximately 75% among patients with schizophrenia **(Charles Hennekens and Boca Raton 2005).**

Smoking is known to impair insulin action and may lead to insulin resistance **(Tahtinen, Vanhala et al. 1998)**. The inverse relationship between cigarette smoking and weight is also well documented **(Erem, Arslan et al. 2004)**. Cigarette smokers have higher cholesterol levels **(Grabauskas, Miseviciene et al. 2003; Polychronopoulos, Panagiotakos et al. 2005)**, and lower HDL-C levels **(Garrison, Kannel et al. 1978)**

2.3.6 Side effect of antipsychotic medication

Antipsychotics play an important role in the management of patients with schizophrenia in that they are indispensable for not only relieving psychotic symptoms in the acute phase **(Leucht, Arbter et al. 2009;**

Leucht, Corves et al. 2009) but also preventing relapse in the maintenance phase **(Leucht, Barnes et al. 2003)**.

Metabolic syndrome and elevated lipids are higher in schizophrenia than the general population, and this may be due to multiple factors including induction or exacerbation of these effects by treatment with antipsychotic medication **(Meyer, Davis et al. 2008; Stahl, Mignon et al. 2009).**

Elevated blood lipids, particularly triglycerides, are associated with some typical antipsychotic agents **(Kelly 2005).** Shortly after their introduction, phenothiazines were found to elevate serum triglyceride and total cholesterol levels **(Kelly 2005)**.

The American Diabetes Association (ADA) guidelines recommended that the frequency of lipid monitoring is clearly insufficient to identify patients who develop dyslipidemia during antipsychotic drug treatment because it can occur from a few months to several months of antipsychotic drug treatment **(Graham, Cho et al. 2008; Newcomer, Ratner et al. 2009).**

Over the past few years, hypertriglyceridemia and hyperlipidemia have been reported to be associated with use of atypical antipsychotics and weight gain **(Meyer et al. 2008)**.

Olanzapine (OLZ)/ Clozapine (CLZ) -treated subjects had significantly higher prevalence of dyslipidemia (high triglyceride (TG) and low high-density lipoprotein cholesterol (HDL-C) levels) than unmedicated subjects **(ADA, APA, AACE, and NAASO 2004)**. They suggest monitoring fasting lipids 3, 6, and 12 months after initiation of an antipsychotic drug and then annually **(Hasnain, Fredrickson et al. 2010).**

They suggest monitoring fasting lipids 3, 6, and 12 months after initiation of an antipsychotic drug and then annually **(Hasnain, Fredrickson et al. 2010)**.

2.4 Metabolic syndrome and schizophrenia

Metabolic syndrome (MS) is comprised of dyslipidemia, hypertension, hyperglycemia and abdominal obesity **(NCEP ATP III, 2001)**. Metabolic syndrome is increasingly recognized as a major cause of cardiovascular disease (CVD)-related mortality and morbidity, both in the general population and in people with psychiatric illnesses such as schizophrenia **(Hennekens, 2007; Grundy et al., 2004; Meyer et al., 2005).** A recent population-based period-prevalence study in Canada showed that patients with schizophrenia have an elevated prevalence of diabetes mellitus (DM), hypertension, hyperlipidemia and cardiovascular diseases **(Bresee, Majumdar et al. 2010)**.

Dyslipidemia has also been reported to be common in schizophrenic patients treated with clozapine or olanzapine **(Melkersson and Dahl, 2004)**.Type II diabetes has been reported to be common in patients with schizophrenia and the emerging evidence suggests that antipsychotic treatment, in particular second-generation antipsychotics such as clozapine and olanzapine, may cause or elicit diabetes type II and insulin resistance **(Melkersson and Dahl, 2004)**.

CHAPTER 3

MATERIALS AND METHODS

3.1 Introduction

3.2 Study design and Site of the Study

3.3 Study Population and eligibility criteria

3.4 Sample size and Sampling Method

3.5 Data Collection

3.6 Data Analysis

3.7 Ethical Consideration

3.1 Introduction

This chapter is devoted to specify the steps and the methodology taken in carrying out the research endeavor. In this chapter I will present the Study design and Site of the Study, Study Population and eligibility criteria, Sample size and Sampling Method, data collection, statistical analysis, and ethical considerations.

3.2 Study design and Site of the Study

A cross sectional study was conducted between August 2011 and February 2012 at governmental primary psychiatric health care centers in Northern West-Bank, Palestine. The centers included in the study were those in Nablus, Jenin, Tulkaram, and Qalqilia.

3.3 Study Population and eligibility criteria

The sample study population was (251) schizophrenic clients diagnosed based on DSM IV attending any mental healthcare clinics in Northern West-Bank. Clients were selected from both gender and carried out in 4 governmental primary mental health care centers.

All clients attending the above mentioned Psychiatric Health centers during the study period were invited to participate. Patients who fulfilled the following criteria were ***included*** in the analysis:

1) Their age was above 16 years old.
2) They were diagnosed with schizophrenia as defined by DSM-IV.
3) They had not been suffering from an acute attack of illness during the past year.

4) Their drug regimen had not been changed in the last 6 months and

5) Had no diagnosis of dyslipidemia as documented in his file.

Exclusion criteria

Clients who had the following characteristics were excluded from the study

1) Newly diagnosed patients.
2) Clients with current acute psychiatric attack.(mean clients have agitation , suspicious, mistrust , and I studied stable schizophrenic clients on medications).
3) Schizophrenic clients who are not on antipsychotic medications.

3.4 Sample size and Sampling Method

A convenience, non-probability, sampling method was used. In order to estimate with sufficient precision the prevalence of dyslipidemia. The sample size was calculated with a 99% confidence interval. Based on this, the sample size approximately 251 clients currently attending the governmental primary psychiatric healthcare centers in North West - Bank.

3.5 Data Collection

Data was collected through direct and indirect methods. The indirect methods included a structured interview questionnaires , The assessment sheet covered the following areas: sociodemographic details and living arrangements; employment, length of psychiatric history; pharmacological treatment currently used; history of psychiatric hospitalization, , while the direct method include measurement of biomedical information (body weight, height, waist circumference, and lab test include total cholesterol

(TC), low-density lipoprotein cholesterol (LDL-C), triglycerides (TGs), and low high-density lipoprotein cholesterol (HDL-C) levels).

Variables

1. **Weight and Height**: They were measured with the participant in standing position without shoes and heavy garments and recorded to the nearest kilogram, and full cm. Electronic balance scales were used. Testing with standard weight was done twice every day. The zero level was checked every day before starting measurements and immediately afterwards. Waist circumference was measured in centimeters using the meter scale. BMI (weight/height (m^2)) was calculated and classified according to the criteria established in WHO **(WHO 2002)**.

2. **Waist circumference (WC)** was measured and recorded to the nearest centimeter. The WC was considered normal when the value was less than 102 cm for men and less than 88 cm for women. This is based on the ATP III guidelines for definition of metabolic syndrome (ATPIII 2002; Fedder, Koro et al. 2002).

3. **LDL-C, HDL-C, TC, and TG:** Blood samples were collected from all subjects between 8:00 and 9:00 (A.M.) after 12 hr overnight fast. Blood was collected from an ante-cubital vein punctures and was collected while the subject or client in a sitting position. All these tests were measured using HUMAN kit, Germany.
4. According to NCEP ATP III criteria for all plasma lipid was, Values for LDL-C were divided to the following categories: less than 100 mg/ dl (optimal); 100 – 129 mg/dl (near optimal to above optimal); 130 – 159 mg/dl (borderline high); 160 – 189 mg/dl (High); and more than 190

mg/dl very high. Values for HDL-C was divided according to the following categories: less than 40 mg/ dl (low); 40 – 60 mg/ dl (medium); and more than 60 mg/ dl is considered high. Values for total cholesterol were classified according to the following categories: less than 200 mg/ dl (normal); 200 – 240 mg/ dl (borderline high); more than 240 mg/ dl (high). Values for TG were classified according to the following categories: less than 150 mg/ dl (normal); 150.1 – 200 mg/ dl (borderline high); High level and very high is greater than 200mg/dl.

5. **Independent Variables***:* Independent variables include age; Age was coded into 4 categories: less than 30; 30 – 40, 40 – 50 and above 50 years. gender, number of years of education, place of residence (city, village or camp), marital status (married, single and divorced), smoking, duration of the psychiatric illness, number of psychiatric hospitalizations, body weight (in kilograms), height in (meter), waist circumference (in cm), occupation and family history of dyslipidemia and other chronic illnesses.

3.6 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, standard deviations and ranges for all continuous variables.

All statistical analyses were conducted using Statistical Package for Social Sciences (SPSS; version 18.0) for Windows. The conventional 5 percent significance level was used throughout the study.

3.7 Ethical Consideration

Approval to perform the study was obtained from the Palestinian ministry of health and the college of Graduate Studies at An-Najah national University and Institutional Review Board (IRB). Also, a verbal consent from the client and his family was obtained prior to interview and blood withdrawal.

CHAPTER 4

RESULT

General descriptive statistics of the study sample

A total of 251 schizophrenic clients have met the inclusion criteria for the study. Therefore, analysis was made on 251 who participated in this study. Out of the 251 clients participated in the study, 69 clients (27.5%) were female and 182 clients (72.5%) were male.

The mean age of the clients was 42.1 ± 12 (CI 95%: 40.5 – 43.4; range: 16 – 70) years. No significant difference in age mean was found between male and female clients (the mean was 40.3 for females versus 42.5 years for males; $p = 0.2$). Approximately half of the clients came from villages (145, 57.8%) while the remaining (106, 42.2%) came from Refugee camps or cities.

The mean number of psychiatric hospitalization of the clients during their lifetime was 1.9±3.2, (range: 0 – 20 times, and 95% CI was 1.5 – 2.3). The mean duration of illness was 15.9 ±9.5 (95% CI: 14.7 - 17; range: 1 – 40) years. 214(85.2%) of the clients studied to secondary stage only and more than half 153(61%) were smokers. The majority of the clients 198(78.9%) were unemployed. More than half 138 (55%) of the clients were either unmarried 114 (45.4%) or divorced 24 (9.6%).

Based on normal values for waist circumference (WC); 56 (82.4%) female clients had WC above the normal limit while only 58 (31.9%) male clients had a WC above the normal limit. Abdominal obesity was significantly associated with females ($p < 0.01$). The mean body mass index (BMI) of the clients was 28.4 ± 6.1 (95% CI: 27.6 – 29.2; range: 15 – 47.8). There

was a significant difference BMI between males and female (30.3 ± 6.2 for females versus 27.7 ± 5.9 for males; p = 0.003).

Details regarding basic demographic and clinical characteristics of the clients are shown in Table 4.1.

Table 4.1 Basic demographic and clinical data of the total sample.

Variable	Results N (%)
Gender Male Female	 182 (72.5%) 69 (27.5%)
Duration (years)	15.9 ±9.5
Age (years) < 30 30 – 40 40 – 50 > 50	42.1 ± 12 43 (17.1%) 76 (30.3%) 80 (31.90) 52 (20.7%)
Residence City Village Camp	 85 (33.9%) 145 (57.8%) 21 (8.3%)
Number of years of education (years) < 9 10 – 12 > 12	 110 (43.8%) 104 (41.4%) 37 (14.8%)
Marital Status Married Single Divorced	 113 (45% 114 (45.4%) 24 (9.6%)
Smoker Yes No	 153 (61%) 98 (39%)
Employment Employee None employee	 53 (21.1%) 198 (78.9%)
Positive family history DM Dyslipidemia	 113 (45%) 27 (10.8%)

Waist Circumference (cm) - Male - Female	 98 ±14.1 102.2 ± 12.4
Abnormal Waist Circumference Male >102cm Female >88cm	 58/ 182 (31.9%) 56/69 (82.4%)

The body mass index of the study group was classified into three categories (WHO. 1995):

1. Normal weight with a BMI < 25 kg/m^2
2. Overweight with a BMI 25-29.9 kg/m^2
3. Obese with a BMI ≥ 30 kg/m^2.

Table 4.2 describes the BMI for schizophrenic clients. The table shows the clients between male and female groups, and the BMI for each group, male or female, was calculated.

Out of the 251 clients, 82 clients (33% if the total number of clients) had normal BMI. 69 of these were male representing 37.7% and 13 were female, representing 19.1%.

A total of 56 male clients (30.6% of total clients) and 22 female clients (32.4% of total clients) had a BMI between 25 and 29.9 kg/m^2, which is considered overweight. The total numbers of male and female clients who are overweight are 78 clients out of the total number of the sample, 251 clients, representing 31% of the total study sample.

There were some clients with a BMI above 30 kg/m^2, which are considered obese. A total of 58 male clients representing 31.7% and 33 female clients representing 48.5% of the study sample were found to have a BMI above

30, which indicates obesity. The total number of male and female clients with BMI above 30 is 91 clients, representing 36% of the study sample.

Table 4.2 Distribution of study group by body mass index

BMI	Male N (%)	Female N (%)	Total N (%)
Acceptable(<25)	69(37.7%)	13(19.1%)	82 (33%)
Overweight (25-29.9)	56(30.6%)	22(32.4%)	78(31%)
Obese(>30)	58(31.7%)	33(48.5%)	91(36%)

The study group was also classified into three groups according to the level of cholesterol in their blood according to NECP 2002.

1. Group 1: subjects having less than 200mg/dl is considered as the desirable group
2. Group 2: subjects having cholesterol level at 200-240 mg/dl is considered as the borderline group.
3. Group 3: subjects having cholesterol level more than 240mg/dl is considered as the high level group.

Table 4.3 describes the total cholesterol level for schizophrenic clients. In the table, the clients are distributed according to the level of cholesterol in their blood, and the cholesterol level was measurement in the lab.

Out of 251 schizophrenic clients a total 142 clients (56.6%) had a desirable or normal cholesterol level of <200 mg/dl; a total of 72 clients (28.7%) had a borderline high cholesterol level of between 200-240 mg/dl.

There were some clients with cholesterol levels above 240 mg/dl, which is considered a high cholesterol level. A total of 37 clients, representing 14.7% of the total number of clients, have a cholesterol level above 240 mg/dl.

The prevalence of hypercholesterolemia – indicated by a cholesterol level above 200 mg/dl – from a total sample of 109 clients was 43.4% in this study.

Table 4.3 Distribution of study group by total cholesterol level

Total Cholesterol	N (% of Total N)	Mean ± Std. Deviation
Normal < 200 mg/ dl	142 (56.6%)	157 ± 30.2
Borderline 200 – 240 mg/ dl	72 (28.7%)	217 ± 11.6
High > 240 mg/ dl	37 (14.7%)	295 ± 55.8
Total	251(100%)	195 ± 58.6

To study the level of TG among the studied subjects the group was classified into four divisions according to the level of TG in the blood, according to NECP, 2002. As we show in table 4.

1. Normal where TG level is less than or ≤150 mg/dl.
2. Borderline where TG level is between 150.1-200mg/dl.
3. High level and very high is greater than 200mg/dl.

Table 4.4 describes the Triglyceride level for schizophrenic clients. In the table, the clients are distributed according to the level of triglyceride in their blood, and the triglyceride level was measurement in the lab.

Out of 251 schizophrenic clients a total 130 clients (51.8%) had desirable or normal triglyceride level of ≤150 mg/dl; a total of 39 clients (15.5%) had a borderline triglyceride level between 150.1 and 200mg/dl.

There were a large number of clients with triglyceride levels above 200 mg/dl, which is considered a very high triglyceride level. A total of 82 clients, representing 32.7% of the sample, had triglyceride levels above 200 mg/dl.

The prevalence of Hypertriglyceridemia from a total sample of 121 clients who have a triglyceride level above 150 mg/dl was 48.2% in this study.

Table 4.4 Distribution of study group by Triglyceride level

TG category	N (% of Total N)	Mean ± Std. Deviation
Normal ≤150 mg/dl	130 (51.8%)	100 ± 29.3
Borderline 150.1 – 200 mg/dl	39 (15.5%)	174 ± 13.8
High/ very High > 200 mg/ dl	82 (32.7%)	1130 ± 573
Total	251(100%)	193 ± 180

The study group was classified into five groups according to their LDL-C in blood, according to NECP, 2002.

- Group 1: subjects having less than 100 mg/dl which is considered as the optimal group.
- Group 2: subjects having an LDL-C level at 100-129 mg/dl which is considered as a near optimal group.
- Group 3: subjects having LDL-C level at 130-159 mg/dl which is considered as the borderline level group.
- Group 4: subjects having LDL-C level at 160–189 mg/dl which is considered as the high level group.
- Group 5: subjects having LDL-C level more than ≥ 190 mg/dl which is considered as very high level group

Table 4.5 describes the LDL-C level for schizophrenic clients. In the table the clients are distributed according to the level of LDL-C in their blood, and the LDL-C level was measurement in the lab.

Out of 251 schizophrenic clients a total 84 clients (33.5%) had the optimal LDL-C level of <100 mg/dl; a total of 82 clients (32.7%) had the near optimal or above optimal level with LDL-C levels 100-129 mg/dl. A total of 53 clients (21.1%) had borderline levels of 130-159 mg/dl and a total of 20 clients (8%) had high levels of LDL-C in the 160–189 mg/dl range. Lastly, only 12 clients (4.7%) had a very high LDL-C level of ≥ 190 mg/dl.

The prevalence of High LDL-Cholesterolemia, which is indicated by a LDL-C level above 130 mg/dl, was 33.8% (85 clients out of the total number of clients). This is shown in table 4.5.

Table 4.5 Distribution of study group by low density lipoprotein-cholesterol level

LDL-C category	N (% of Total N)	Mean ± Std. Deviation
Optimal <100 mg/dl	84 (33.5%)	76 ± 16.4
Near optimal 100-129 mg/ dl	82 (32.7%)	114 ± 7.8
Borderline 130-159 mg/ dl	53 (21.1%)	141 ± 7.4
High 160-189 mg/ dl	20 (8%)	173 ± 7.8
Very High ≥ 190 mg/ dl	12 (4.7%)	206 ± 13.4
Total	251 (100%)	116 ± 38.3

To study the level of HDL-C among the studied subjects the group was classified into three divisions according to the level of HDL-C in the blood, according to NECP, 2002.

1. Low level where HDL-C level is less than 40 mg/dl.
2. Medium where HDL-C level is between 40-60 mg/dl.
3. High HDL-C level is greater than 60 mg/dl.

Table 4.6 describes the HDL-C levels for schizophrenic clients. In the table the clients are distributed according to the level of HDL-C in their blood, and the HDL-C level was measurement in the lab.

Out of 251 schizophrenic clients a total 104 clients (41.4%) had low HDL-C levels of <40 mg/dl. This is considered a high risk factor for ischemic heart disease. A total of 130 clients (51.8%) had medium HDL-C levels in the 40-60 mg/dl range.

Only 17 clients from the total sample (6.8%) had HDL-C levels above 60 mg/dl. These clients have the least probability for heart disease. The prevalence of low HDL-Cholesterolemia of this study was 41.4%.

In this study the mean and SD values of plasma TG, TC, LDL and HDL-C were as follows: 193 ±180 mg/ dl, 195±58.6 mg/ dl, 116 ±38.3 mg/ dl, and 44.6±10.9 mg/ dl respectively.

Table 4.6 Distribution of study group by high density lipoprotein-cholesterol level

HDL-C category	N (% of Total N)	Mean ± Std. Deviation
Low < 40 mg/ dl	104 (41.4%)	35.2 ± 3.7
Medium 40 – 60 mg/ dl	130 (51.8%)	48.6 ± 5.8
High > 60 mg/ dl	17 (6.8%)	70 ± 9.8
Total	251 (100%)	44.6 ± 10.9

Table 4.7 the prevalence of elevated total cholesterol, high LDL, low HDL and high triglyceride concentrations adjusted for sociodemographic and medication

Variable	High triglycerides	High LDL cholesterol	High total cholesterol	Low HDL cholesterol
Sex Male Female	 60(33%) 22(32.4%)	 19(10.4%) 13(19.1%)	 28(15.4%) 9(13.2%)	 82(45.1%) 21(30.9%) (p/0.02)
Age, year <30 30-40 40-50 >50	 9(20.9%) 30(39.5%) 27(33.8%) 16(31.4%)	 1(2.3%) 8(10.5%) 18(22.5%) 5(9.8%) (p0.008)	 1(2.3%) 9(11.8%) 16(20%) 11(21.6%) (p0.02)	 23(53.5%) 33(43.4%) 29(36.3%) 18(35.3%)
Number of years of education (years) < 10 10 – 12 > 12	 35(32.1%) 31(29.8%) 16(43.2%)	 13(11.9%) 13(12.5%) 6(16.2%)	 17(15.6%) 15(6%) 5(13.5%)	 41(37.6%) 46(44.2%) 16(43.2%
Smoker Yes No	 46(30.1%) 36(37.1%)	 22(14.4%) 10(10.3%)	 29(19%) 8(8.2%) (p0.02)	 61(39.9%) 42(43.3%)
BMI Acceptable Overweight Obese	 17(20.7%) 23(29.9%) 42(46.2%) (p0.001)	 12(14.6%) 9(11.7%) 11(12.1%)	 15(18.3%) 9(11.7%) 13(14.3%)	 31(37.8%) 32(41.6%) 40(44%)

The prevalence of elevated total cholesterol, high LDL, low HDL and high triglyceride concentrations segregated socio-demographics is shown in Table 4.7.

This study shows that there is more of a prevalence of dyslipidemia in males than in females in all plasma lipids, with a significant relationship in low HDL-C (p/0.02).

The prevalence of hypercholesterolemia, hypertriglyceridemia, high LDL-C, and abnormally low HDL-C, increased in all age groups. The increase was most prominent in the middle age group (30-50 years), significant with high LDL-C and high total cholesterol (p/0.008, 0.02) respectively.

On the other hand, there are significant relationships between high total cholesterol levels and smokers; the prevalence in smokers was 19% and in non-smokers was 8.2% (p/0.02). The relationship between dyslipidemia and obesity has been clearly shown in hypertriglyceridemia; 29.9% had BMI in the overweight category and 46.2% of the clients were obese (p/0.001).

The prevalence of dyslipidemia – at least one abnormal lipid concentration – was recorded in 66.5% of clients; 72.5% in men and 27.5% in women.

CHAPTER 5

DISCUSSION

Discussion

To the best of our knowledge, this is the first study in the West Bank to specifically assess the prevalence of dyslipidemia in schizophrenic clients. The burden of dyslipidemia is alarming in terms of morbidity, mortality, and medical costs **(Khader, Batieha et al. 2010)**. Dyslipidemia is one of the four established conventional risk factors for coronary heart diseases besides cigarette smoking, diabetes, and hypertension **(Verschuren, Jacobs et al. 1995)**. Heart disease is the number one killer of women and men in the United States **(NIH 2001)**. Each year, more than a million Americans have heart attacks, and about a half million people die from heart disease **(NIH 2001)**.

Dyslipidemia is defined by the presence of one or more than one abnormal serum lipid concentration (Ram VinodMahato1 2011). The result in this study showed prevalence's of hypercholesterolemia (>200 mg/dl or > 5.17 mmol/L), elevated LDL-C (>130 mg/dl or >3.36mmol/L), low HDL-C (<40 mg/dl or <1.03mmol/L), and hypertriglyceridemia (>150 mg/dl or > 1.7 mmol/L) **(NCEP 2002)** were as follows: 43.4%, 33.8%, 41.4%, and 48.2%, respectively. Of these measures, at least one abnormal lipid concentration was recorded in 66.5% of clients in this study.

The results of this study demonstrated that the average level of plasma lipids is significantly higher than the levels required for the prevention of coronary heart diseases.

A study on a Brazilian general population **(Luiz José de Souza 2003)** reported the following prevalence for: dyslipidemias 24.2%, hypercholesterolemia 4.2%, elevated LDL-C 3.5%, low HDL-C 18.3%, and of hypertriglyceridemia 17.1%. The study also reported following

mean levels for: cholesterol 187.6± 33.7 mg/dl, LDL-C 108.7± 26.8 mg/dl, HDL-C 48.5±7.7 mg/dl, and triglycerides150.1±109.8 mg/dl. When compared to the current study, the prevalence of dyslipidemia in schizophrenic clients is higher than that in the Brazilian study in all plasma lipid levels.

A study conducted in Taiwan **(Huang and Chen 2005)** on patients with acute-phase schizophrenia reported the following results: mean ± SD of plasma TG, TC, HDL-C, and LDL-C were 113.3±84.4, 174±35.2, 43.2±13.9, 109±33.1 respectively. When compared with this study, our current study showed that the prevalence of dyslipidemia in stable schizophrenic clients in northern West Bank is higher than the schizophrenic clients in acute phase**.**

Another study conducted in Turkish adults in the Trabzon region **(Erem, Hacihasanoglu et al. 2008)** reported that the prevalence of high TC, high LDL-C, high triglycerides, and low HDL-C were 37.5%, 44.5%, 30.4%, and 21.1% respectively. Again, when compared with these results, our current study showed that schizophrenic clients had obvious elevation in lipid profile except in LDL-C.

Another study in the Turkish population living in the province of Tokat **(İlhan ÇETİN1 2010)** reported the mean total serum cholesterol level was 186 ±42 mg/dl with 33.7% of the participants having hypercholesterolemia and the mean triglyceride level was 142±82 mg/dl with 36.1% of the participants having high triglycerides levels; The HDL-C level was 42±11 mg/dl and 50.9% of the participants had low HDL-C levels; The LDL-C level was 119 ±37 mg/dl and 36.2% had high LDL-C

levels. The current study results show that the prevalence of plasma lipid among a sample is significantly higher in TC and TG, but minimally lower than in LDL-C and HDL-C compared with the Turkish study.

The current study also shows that the prevalence of dyslipidemia is higher in male clients than in females in all plasma lipids, with a significant difference in low HDL-C (p/0.02). Most studies state that dyslipidemia is more prevalent among men than among women **(Li, Yang et al. 2005) (Azizi, Rahmani et al. 2003)**. Meanwhile, other studies indicate that dyslipidemia is more prevalent among women **(Primatesta and Poulter 2000) (al-Nuaim, Mirdad et al. 1997)**. The variation may be explained by the differential distribution in risk factors (e.g., genetic predisposition, dietary factors, smoking, and lack of physical activity) between women and men **(Lorenzo, Serrano-Rios et al. 2002)**.

A study in an urban Indian population **(Gupta, Gupta et al. 2002)** showed that the prevalence of dyslipidemia in both males and females was as follows: low HDL-cholesterol (males 54.9%, females 54.2%), high total cholesterol levels (males 37.4%, females 4.1%), high LDL-cholesterol levels (males 37.0%, females 45.8%) and high levels of triglycerides (males 32.3%, females 28.6%). Compared with the current study, the result shows low HDL-cholesterol (males 45.1%, females 30.9%), high total cholesterol levels (males 15.4%, females 13.2%), high LDL-cholesterol levels (males 10.4%, females 19.1%) and high levels of triglycerides (males 33%, females 32.4%). The result shows high prevalence of hypertriglyceridemia in both males and females, and high levels of total cholesterol in the female group, unlike the male group; LDL-C and HDL-C in this study have low prevalence.

In a study in the West Bank **(Abdul-Rahim, Husseini et al. 2001)**, the authors have shown that hypertriglyceridemia in the urban population, both in men and women, was (77 (40.5%); 94 (31.1%)); while in the rural population, it was (53 (25.4%); 60 (20.6%)) respectively. The study also found low HDL-C levels in the urban population in men and women (128 (69.9%); 165 (55.7%)) and in the rural population (69 (33.2%); 72 (24.8%)) respectively. As we have shown in the results section above, the data of schizophrenic clients demonstrated high prevalence in elevated serum triglycerides compared to both urban and rural samples except in urban men. The prevalence of low HDL-C in our sample is higher than in the rural population of the aforementioned study, but lower than the urban population, which means that schizophrenic clients in the current study are at a higher risk for ischemic heart disease compared to the general population.

5.1 Prevalence of hypercholesterolemia

High blood cholesterol is one of the major risk factors for heart disease (NIH 2001). Hypercholesterolemia currently causes 4.3 million deaths per year worldwide and 39 million disability-adjusted life years lost **(Ezzati, Vander Hoorn et al. 2005)**. Based on the NCEP ATP III criteria, the current study has shown the prevalence of hypercholesterolemia (>200 mg/dl or >5.17 mmol/L) to be 43.4%.

Furthermore, in the current study, the hypercholesterolemia prevalence increased with age (p/0.02). Our study has similar findings to other studies

such as one conducted in a Brazilian population **(Luiz José de Souza 2003)**, Iranian adult population **(Azizi, Rahmani et al. 2003)**, Saudi Arabia **(al-Nuaim, al-Rubeaan et al. 1996)**, and in the United States **(Brown, Higgins et al. 2000)**. The exact mechanisms of the impact of age on lipid plasma levels are unknown.

Additionally, there is a significant relationship between high total cholesterol and cigarette smoking. Cigarette smokers have higher cholesterol levels **(Grabauskas, Miseviciene et al. 2003), (Polychronopoulos, Panagiotakos et al. 2005)** and lower HDL-C levels **(Garrison, Kannel et al. 1978).** In the current study, the prevalence of hypercholesterolemia was 19% in smokers while in non-smokers it was 8.2% (p/0.02).

Compared with other surveys in other countries in the world, the prevalence of hypercholesterolemia in schizophrenic clients in the Northern West Bank region is higher than that in the general population in Saudi Arabia **(al-Nuaim, al-Rubeaan et al. 1996)**, Guadeloupe (Foucan, Kangambega et al. 2000), Jeddah- Saudi Arabia **(Abalkhail, Shawky et al. 2000)** and India **(Singh, Sharma et al. 1997)**, but lower than the prevalence in Finland **(Vartiainen, Jousilahti et al. 2000),** and the USA **(Arnett, McGovern et al. 2002)**.

5.2 Prevalence of Hypertriglyceridemia

The National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III) defined hypertriglyceridemia as an abnormal concentration of triglyceride in the blood of 150 mg/dl and higher (NCEP 2001).

In the current study, the prevalence hypertriglyceridemia (plasma level>150 mg/dl or >1.7 mmol/L) was 48.2% within the sample, with a mean plasma level of 193 ±180 mg/ dl. In comparison with a study in Spain (Bernardo, Canas et al. 2009) in which the prevalence of hypertriglyceridemia in schizophrenic patients sample was 38%, and a mean plasma level of 123.7 ± 67.6, schizophrenic clients in the current study had a high prevalence of hypertriglyceridemia.

Being overweight or obese is a particular problem in individuals with schizophrenia compared to the general population **(Saari, 2005)**. The association between dyslipidemia and BMI was reported in the National Health and Nutrition Examination Survey, 1999 to 2004, which showed that the prevalence of dyslipidemia substantially increases with an increased BMI **(Nguyen, Magno et al. 2008)**. In the current study triglyceride plasma levels increased with an increased BMI, however 76.1% of total sample were overweight and obese (p/0.001). The relationship between dyslipidemia and obesity has been clearly shown in Table 7.4.

Compared with other studies in different countries in the world, the prevalence of hypertriglyceridemia in the schizophrenic clients in the Northern West Bank region is higher than those reported in Spain **(Perez-Iglesias, Mata et al. 2009, Rejas, Bobes et al. 2008),** the USA **(Ford, Li et al. 2009)**, and in Japan (Sugawara, Yasui-Furukori et al.). While the prevalence was lower than those reported in Jordan **(Faris H. Haddad 2008)**, and the United States **(McEvoy, Meyer et al. 2005).**

5.3 Prevalence of High LDL-Cholesterolemia

Coronary heart disease (CHD) is the leading cause of death in the United States, accounting for 27% of all deaths in 2005 **(Kung, Hoyert et al. 2008)**. The NCEP ATP III places a primary focus for cholesterol management on elevated levels of low-density lipoprotein cholesterol (LDL-C), the major atherogenic lipoprotein **(Kuklina, Yoon et al. 2009).** An established body of evidence points to reducing low-density lipoprotein (LDL) cholesterol as one of the most effective ways to prevent and treat CHD (Upadhyay, Waddell et al. 2010). Borderline-high and high values of LDL-cholesterol (>130 mg/dl or >3.36mmol/L) were noted in the current study. The prevalence of high LDL-Cholesterolemia was 33.8% and a mean plasma level of 116 ±38.3 mg/ dl within the total sample. The prevalence of high LDL-Cholesterolemia was higher in women (19.1%) than in men (10.4%) and the high LDL-Cholesterolemia increased with age until 50 years (p/0.008).

In comparison with other studies in different countries in the world, the prevalence of high LDL-Cholesterolemia in the schizophrenic clients in the Northern West Bank region is higher than those reported in China (He,

Gu et al. 2004), Taiwan (Huang and Chen 2005), Spain (Perez-Iglesias, Mata et al. 2009), and in Finland **(Koponen, Vuononvirta et al. 2008)** and lower than those reported in United States **(Ford, Li et al. 2009)**, India **(Gupta, Gupta et al. 2002)**, and in Dubai **(Vela, Alhessi et al. 2008)**, while similar data was reported in Mexico **(Aguilar-Salinas, Olaiz et al. 2001)**.

5.4 Prevalence of low HDL-Cholesterolemia

Population studies have consistently shown that a high-density lipoprotein cholesterol (HDL-C) level is a strong, independent inverse predictor of cardiovascular disease (Barter, Gotto et al. 2007). HDL-C has a more complex relationship with coronary artery disease than was once thought, Although low levels of HDL-C predict coronary disease, raising these levels does not necessarily lower this risk **(Ansell 2007)**. The third report of the NCEP ATP III reaffirmed that HDL-C levels<40 mg/dl are a major risk factor for CHD while HDL-C levels >60 mg/dl are protective **(NCEP 2001).**

The prevalence of low HDL-Cholesterolemia in the current study was (45.1%, n=82) in men and (30.9%, n=21) in women; the total sample prevalence was 41.4% with a mean plasma level of 44.6±10.9 mg/dl, with a significant p value equal to 0.02.

Compared with the results of other surveys from other countries in the world, the prevalence of low HDL-C in the schizophrenic clients in the Northern West Bank is higher than those reported in Taiwan **(Huang and**

Chen 2005), Mexico **(Aguilar-Salinas, Olaiz et al. 2001),** Belgium (Hanssens, De Hert et al. 2006); and lower than those reported in Greece **(Benetou, Chloptsios et al. 2000)**, Brazil **(Leitao-Azevedo, Guimaraes et al. 2006)**, and northern Finland (Saari, Jokelainen et al. 2004), while similar data was reported in the United Kingdom (UK) **(Holt, Abdelrahman et al. 2010)**.

Turning to dyslipidemia, a study conducted in seven Latin American cities (Vinueza, Boissonnet et al. 2010), reported the prevalence of dyslipidemia in a total sample and in males and females, as follows: in Barquisimeto 59.6% (75.7% in men and 49.1% in women), Bogota 58.2% (70.5% in men and 48.6% in women), Buenos Aires 38.7% (52.4% in men and 27.1% in women), Lima 68.1% (73.4% in men and 63% in women), Mexico City 50.1% (63.3% in men and 34.6% in women), Quito 45.7% (52.6% in men and 38.1% in women), and Santiago 42.7% (51.5% in men and 34.6% in women). Compared with the current study, the prevalence of dyslipidemia in the total sample was 66.5% (72.5% in men and 27.5% in women). It can be concluded that the prevalence of dyslipidemia in schizophrenic clients in the Northern West Bank is higher than those reported in all the seven Latin American cities. Within the gender, females in the above study had a higher prevalence of dyslipidemia than females in the current study except for the data of Buenos Aires.

5.5 Limitation of the Study

Our analyses had a number of limitations. First, the cross-sectional nature of this study limits the ability to establish a temporal relationship of that exposure to the development of dyslipidemia. Second, the sample size

that we enrolled was small, which may have limited our ability to detect other statistically significant risk factors associated with dyslipidemia. Third, the medical chart data may have been inaccurate or incomplete, and there may have been misclassification in the identification of dyslipidemia.

5.6 Conclusions and Recommendations

This is the first study of its kind to be carried out in Palestine concerning schizophrenic clients. This study confirmed the high prevalence of dyslipidemia among clients diagnosed with schizophrenia. Prevalence of hypercholesterolemia, hypertriglyceridemia, high LDL-C and abnormally low HDL-C was found to be higher in this study compared to other studies discussed above. Schizophrenic clients are neglected, despite their need for special care. Dietary changes and less physical activity may be the causes for the increases in the prevalence of different types of dyslipidemia**.** This highlights the need for an appropriate community-based intervention strategy for prevention, detection and treatment of dyslipidemia. The current study also contributed to the confirmation of the high prevalence of dyslipidemia risk factors in people with schizophrenia.

Recommendations:

1. Mental health providers should be aware of the lipid profile of each patient with schizophrenia they treat. Psychiatrists should follow National Cholesterol Education Program guidelines for screening and treating patients who are at a high risk for cardiovascular diseases as part of the routine care plan.
2. The lipid panel should include measurements of total cholesterol, low density Lipoprotein (LDL) and HDL cholesterol, and triglyceride levels.
3. As a group, individuals with schizophrenia should be considered to be at high risk for coronary heart disease. As a result, lipid screening should be carried out at least once every 2 years when the LDL level is normal and once every 6 months when the LDL level is greater than 130 mg/dl.
4. If any of the plasma lipids are within high levels, the mental health-care provider should refer the patient to a primary care provider or to an internist. If a referral cannot be arranged, the mental health care provider should advise the patient to change his/her diet to reduce fat intake. If any of the plasma lipid levels do not fall into the normal range, a cholesterol-lowering drug should be initiated.

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Appendix

معلومات وتفاصيل البحث

مقدمة:

أخي المشارك:

إنا الممرض القانوني سامي محمد شاكر العبويني في ماجستير الصحة النفسية المجتمعية جامعة النجاح الوطنية يسرني إن ادعوك إلى المشاركة في بحثي المتعلق في معدل انتشار الدهنيات في مرضى الفصام العقلي في شمال الضفة الغربية العيادات النفسية (مراكز الرعاية الاوليه النفسية) في محافظات نابلس وطولكرم وجنين و قلقيلية لك كامل الحرية والإرادة في المشاركة في هذا البحث ولك الحق في اخذ الوقت الكافي للتفكير في المشاركة من عدمها وسؤال الباحث عما تراه مناسبا والتحدث لأي شخص أو جهة عن هذا البحث.

كما يمكنك الاستفسار عن إي جزء يتعلق في البحث ألان أو في ما بعد وإذا كانت هناك كلمات أو أجزاء غير مفهومة بإمكانك سؤال الباحث وستجد الوقت والإجابة الكافيتين يضمن البحث سرية المعلومات .

الهدف من البحث

يهف هذا البحث لدراسة معدل انتشار خلل دهنيات الدم في مرضى الفصام العقلي كما إن مشاركتكم ودعمكم لهذا البحث ستساهم في تطوير وتعزيز الواقع الصحي في فلسطين و الوطن العربي.

طبيعة المشاركة في البحث

بعد الموافقة على المشاركة في البحث ستكون هناك مقابلة شفوية لأخذ معلومات تتعلق بالعوامل الاجتماعية والديموغرافية والعلاج الدوائي

اختيار المشاركين

سيتم مشاركه المرضى المراجعين المشاركة طوعية واختيارية وبإمكان المشارك الانسحاب من البحث في إي وقت ودون الحاجة لإبداء الأسباب وبدون إي تبعات.

شهادة الموافقة على المشاركة في البحث

إقرار من المشاركة في البحث:

قمت بقراءة المعلومات الواردة في ورقة معلومات البحث وأتيحت لي الفرصة إن اسأل إي سؤال وقد تمت الإجابة على كافة أسئلتي بشكل كاف، وبناءا على ذلك أوقع طوعيا على المشاركة في هذا البحث.

اسم المشارك.....

توقيع المشارك.....

التاريخ.....\.....\.....

إقرار من الباحث:

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

1. مقابلة المشارك في البحث في الاجتماعية والديموغرافية والعلاج السريري، والتاريخ الدوائي

أؤكد على إن المشارك اخذ الفرصة الكافية للإجابة على استفساراته بشكل واضح وصحيح وبذلت ما بوسعي لتحقيق ذلك.

أؤكد إن المشارك لن يجبر على التوقيع على الورقة وان مشاركته كانت بمحض إرادته وكامل اختياره.

الباحث سامي محمد شاكر العبويني

توقيع الباحث.....

التاريخ.....\.....\.....

(يتم عمل نسختين من هذه الشهادة واحدة للباحث وأخرى للمشارك إن رغب بذلك)

Data collection sheet

Diaphragmatically Data

1. Name …….

2. Age: …….

3. Location □ City □ Village □ Camp
……..

4. Education □ Elementary □ Secondary □ Diploma □ B.A

5. Marital Status: □ Married □ Single □ Divorce

6. Smoker □ yes □ no

7. Occupation: □ employee □ labor □ non

8. Type of job: …….

9. File number in clinic……

Physical Data:

- Weight ……..
- Height ……..
- Waist circumstances: …….
- BP……..

History of Mental Illness:

1. Diagnosis ……

2. Duration of the disorder…….

3**.** How many times admitted to hospital……

Medical history for clients and family:

1. …….

2. …….

3. ……..

4. Anybody in family have problem in lipid Yes: ……

No: …….

Drug profile:

Drug Name	Dose	Route	Frequency	Duration

Result of investigations:

Lipid profile	Result
TG	
TC	
LDL	
HDL	

Important comments:

……

ورقة جمع البيانات

البيانات الشخصيه:

1- الإسم:.....

2- العمر:.....

3- مكان المعيشة : □ مدينه □ قريه □ مخيم

4- التعليم: □ أساسي □ ثانوي □ دبلوم □ بكالوريس

5- الحالة الإجتماعية: □ أعزب □ متزوج □ مطلق

6- التدخين : □ يدخن □ لا يدخن

7- العمل : □ موظف □ عامل □ لا يعمل

8- نوع العمل:.....

9- رقم الملف في العيادة النفسية:.....

البيانات الجسديه

- الوزن:.....
- الطول:.....
- محيط الخصر:.....
- ضغط الدم:.....

تاريخ المرض العقلي:

- التشخيص:.....
- مدة المرض:.....
- عدد مرات الدخول لمستشفى الأمراض النفسية:.....

تاريخ المرض الباطني للمريض:

- .....
- .....
- هل يوجد أحد في العائلة لديه مشكلة في دهنيات الدم: □ نعم □ لا

أدوية المريض:

إسم الدواء	الجرعه	طريقة الإعطاء	التكرار اليومي	مدة أخذ الدواء

نتائج الفحوصات:

دهنيات الدم	النتيجة
مستوى الدهون الثلاثية	
الكولسترول الكلي	
الكوليستيرول الدهني المنخفض الكثافة	
الكوليستيرول الدهني المرتفع الكثافة	

An-Najah
National University
Faculty of Medicine

بسم الله الرحمن الرحيم

جامعة
النجاح الوطنية
كلية الطب

IRB Approval letter

Study title:
Prevalence of dyslipidemia among schizophrenic clients in northern West Bank

Submitted by:
Sami Al-Abwini

Date Reviewed:
Feb 14, 2012

Date approved:
April 15, 2012

Your study titled "Prevalence of dyslipidemia among schizophrenic clients in northern West Bank." Was reviewed by An-Najah National University IRB committee & approved on April 15, 2012

IRB

Samar Musmar,MD, FAAFP
IRB Committee Chairman,
An-Najah National University

نابلس - ص.ب ٧٠٧,٧ هاتف: ٠٩-٢٣٤٢٩٠٢/٤/٧/٨/١٤، فاكسميل ٠٩-٢٣٤٩٧٣٩ (٩٧٢)
Nablus - P.O.Box 7,707 - Tel. (972)(09)2342902/4/7/8/14 - Facximile (972)(09)2349739
Web Site:www.najah.edu

Palestinian National Authority
Ministry of Health – Nablus
General Directorate of Higher & Continuing Education

السلطة الوطنية الفلسطينية
وزارة الصحة- نابلس
الإدارة العامة للتعليم الصحي

Ref.: ....
Date: ....

الرقم: ....
التاريخ: ....

الأخ مدير عام الرعاية الصحية الأولية والصحة العامة المحترم،،،

تحية واحترام...

الموضوع: تسهيل مهمة طلاب – جامعة النجاح الوطنية

تماشياً مع سياسة وزارة الصحة المتعلقة بتعزيز التعاون مع الجامعات والمؤسسات الأكاديمية بإتاحة فرص التدريب أمام الطلبة والخريجين والباحثين في المؤسسات الوطنية وإسهاماً في تنمية قدراتهم.

يرجى تسهيل مهمة طلاب ماجستير الصحة النفسية/ جامعة النجاح الوطنية التالية اسماؤهم بعمل مقابلات مع مرضى الصحة النفسية في عيادات (طولكرم، نابلس، قلقيلية، جنين) وسحب دم لمرضى الفصام العقلي:

Among prevalence of dyslipidemia schizophrenic client in northern West Bank	1- سامي شاكر العيويني
Blood profile of selected schizophrenic client in northern Palestine	2- هشام زاهر زهران
Prevalence & imperial glucose resolution (IGR) among schizophrenic client	3- صلاح علي دلال
Prescribing pattern of antipsychotic schizophrenic client in northern Palestine	4- جهاد محمد بني عودة

- شريطة
- موافقة المرضى أو ذويهم.
- الحفاظ على سرية معلومات المرضى
- موافاتنا بنسخة من نتائج البحث.

مع الاحترام...

الدكتور سعيد الهموز
مدير عام التعليم الصحي

نسخة/ الأخ نائب الرئيس للشؤون الأكاديمية المحترم- جامعة النجاح الوطنية.

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جامعة النجاح الوطنية

كلية الدراسات العليا

نسبة إنتشار خلل دهنيات الدم في مرضى الفصام العقلي في شمال الضفة الغربية

إعداد

سامي محمد شاكر صالح العبويني

إشراف

د.إياد العلي

أ.د. وليد صويلح

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

2012

نسبة إنتشار خلل دهنيات الدم في مرضى الفصام العقلي في شمال الضفة الغربية

إعداد

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إشراف

د.إياد العلي

أ.د. وليد صويلح

الملخص

الخلفية والأهداف: الأفراد الذين يعانون من إضطرابات نفسية كبيرة يفقدون خمسة وعشرون سنة أو أكثر من العمر المتوقع لهم ، بسبب أمراض الشرايين والقلب وهذا يسبب الوفاة. خلل الدهنيات في الدم هي مشكلة صحية عامة وقد عرفت في جميع أنحاء العالم وتم تعريف الخلل بالدهنيات على أنه وجود واحد أو أكثر من الخلل في تركيز الدهنيات في الدم, ومرضى الفصام العقلي هم أكثر خطورة للخلل في دهنيات الدم وهم الأكثر عرضة للموت بسبب أمراض القلب والشرايين.

الهدف :الهدف من هذه الدراسة هو تحديد مدى إنتشار خلل الدهنيات في مرضى الفصام العقلي الذين يحضرون إلى العيادات النفسية الحكومية في شمال الضفة الغربية من فلسطين.

منهجية البحث: تم تحليل بيانات من دراسة مستعرضة مقطعيه شملت عينة من 251 مريض من مرضى الفصام العقلي الذين يحضرون الى العيادات النفسية الحكومية في شمال الضفة الغربية من فلسطين وهي جنين ,طولكرم ,نابلس وقلقيليه. من عمر 16 سنة وما فوق .وفقا لمعايير البرنامج الوطني لثقافة الكلسترول و معاير اللجنة الثالثة لعلاج البالغين NCEP ATP III، تم تعريف الكوليسترول العالي (TC) على انه اكثر من 200 ملغ / ديسيلتر. وفرط ثلاثي غليسيريد الدم (مستوى الدهون الثلاثية في الدم)(TG) عرف على انه اكثر من 150 ملغ / ديسيلتر .وقد تم تعريف الكوليسترول البروتين الدهني عالي الكثافة (HDL-C)، على انه أقل

من 40ملغ / ديسيلتر .وقد تم تعريف إرتفاع نسبة الكولسترول البروتين الدهني المنخفض الكثافة (LDL–C)، على أنه أكثر من 130ملغ / ديسيلتر.

النتائج: النتائج أظهرت أنه من كل العينة التي تم تطبيق الدراسه عليها وهي 251 مريض, 43.4% يعانون من إرتفاع من نسبة الكوليستيرول الكلي بالدم(TC), 33.8% من المرضى يعانون من إرتفاع نسبة الكوليستيرول الدهني المنخفض الكثافة(LDL–C)، 41.4% من المرضى يعانون من إنخفاض نسبة الكوليستيرول الدهني العالي الكثافة (HDL–C), و 48.2% من المرضى يعانون من إرتفاع نسبه مستوى الدهون الثلاثية في الدم(TG), و66.5% على الأقل من المرضى لديهم خلل في إحدى دهنيات الدم. معدل إنتشار الدهنيات في مرضى الفصام العقلي كانت أكثر بكثير من عامة الناس في الدول الاخرى, معدل إنتشار الدهنيات في هذه الدراسه كانت بشكل ملاحظ على أنها في الرجال أكثر من النساء في كل أنواع الدهنيات في الدم, مع علاقه كبيرة في إنخفاض مستوى الكلسترول الدهني العالي الكثافة بمعدل(p/0.02). نسبة انتشار إرتفاع الكلسترول الكلي, وارتفاع مستوى الدهون الثلاثية في الدم و ارتفاع نسبة الكلسترول الدهني المنخفض التركيز كانت أعلى في جميع الفئات العمرية. مؤشر كتلة الجسم (BMI) كان مصاحب مع ارتفاع نسبة الدهون الثلاثيه بالدم بشكل ملاحظ, وكان هناك علاقه بين ارتفاع نسبة الكلسترول الكلي والمدخنين بشكل ملاحظ .

الاستنتاج والتوصية: هذه الدراسة تؤكد إرتفاع معدل انتشار الدهنيات في الدم بين مرضى الفصام العقلي، وهو ما يتطلب العمل المناسب للمؤسسة المجتمعية الإستراتيجية في الوقاية والكشف والعلاج من هذا المرض.