



UNIVERSITI TEKNOLOGI MARA (UITM)

**THE ASSOCIATION BETWEEN NON-
ALCOHOLIC FATTY LIVER DISEASE (NAFLD)
AND CAROTID INTIMA-MEDIA THICKNESS
(CIMT) IN TYPE 2 DIABETES MELLITUS AND
PROVEN CORONARY ARTERY DISEASE
PATIENTS**

NURAZAM BIN OMAR

Dissertation submitted in fulfilment of the requirements for the degree
of

Master of Medicine

Faculty of Medicine

May 2016


AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree, qualification or academic award.

I hereby, acknowledge that I have been supplied with the Academic Rules and regulations for Post Graduates, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student : Nurazam Bin Omar
Student I.D No. : 2011180655
Programme : Master of Medicine (Internal Medicine)
Faculty : Medicine
Thesis Title : The association between non-alcoholic fatty liver disease (NAFLD) and carotid-intima media thickness (CIMT) in type 2 diabetes mellitus and proven coronary artery disease patients

Signature of Student :



.....

Nurazam Bin Omar

16th May 2016

ABSTRACT

Background and Aims: NAFLD and metabolic syndrome have been shown to have a synergistic impact on the development of atherosclerosis. Carotid intima-media thickness (CIMT) is widely used as a reliable index of subclinical atherosclerosis. The relationships between glycaemic control and degree of steatosis with CIMT in patients with NAFLD remain vague. Thus, this study aimed to determine the prevalence of NAFLD and the associated factors including CIMT among a high risk population of type 2 diabetes mellitus (T2DM) with established coronary artery disease (CAD).

Materials and Methods. This is a cross-sectional study involving Type 2 DM patients between 18 to 65 years old who had established CAD based on coronary angiogram, dobutamine stress echocardiogram or exercise stress test (n=150). Patients with seropositive Hepatitis B or Hepatitis C, and significant alcohol intake were excluded. Baseline blood investigations were performed. All participants underwent ultrasonography of the abdomen by 2 independent radiologists for diagnosis of fatty liver, and further graded into moderate (NAFLD-2), mild (NAFLD-1) and no steatosis (non-NAFLD). B-mode ultrasonography of both common carotid arteries was also performed, with calculation of the average posterior wall intima media thickness of the right and left common carotid arteries to determine CIMT.

Results. There were 114 (76 %) males and 36 (24 %) females, with median age 57 years (IQR 13) and mean body mass index (BMI) 29.6 ± 15.3 kg/m². The prevalence of NAFLD was 71 % (n=107). There was significantly higher systolic blood pressure, diastolic blood pressure, weight and waist circumference amongst NAFLD group

ACKNOWLEDGEMENT

Alhamdulillah, I thank God for giving me the blessings and opportunity to complete this priceless enriching journey of Master in Medicine (Internal Medicine). My highest and deepest gratitude goes to my supervisor Associate Professor Dr Rohana Abdul Ghani and my co-supervisor Associate Professor Dr. Marymol Koshy, and Associate Professor Dr Sazzli Shahlan Kassim who has inspired me and has provided me endless support, ideas, and assistance at every step of this project.

I would also like to express my gratitude to the professors and lecturers of Internal Medicine department with special thanks to Prof. Dr Mohammed Fauzi Abdul Rani, Dr Nor Hashida @ Juita Hassan , Dr Siti Kamariah Othman, Dr Mohammad Idris Zamhuri, Dr Mohammad Hanafiah, and Dr Bushra Johari. They have been more than willing to provide me the support and knowledge needed for this project.

My humble appreciation also goes to all the nurses in Cardiology and Endocrine Clinic, Medical Imaging Department staff, and medical laboratory technicians of the Universiti Teknologi MARA (UITM) who have provided me the facilities and assistance during my data collection. Without the collaboration from these individuals, the project would not have been a success and finished on time.

I have always believed that striving and working together equates to success. Therefore, my sincerest gratitude goes to all my friends and colleagues of Master in Medicine (Internal Medicine) who have provided me help in every way possible to ensure the success of this project.

TABLE OF CONTENTS

Abstract	iii
Acknowledgement	v
List of Figures.....	xii
List of Tables	xiv
List of Symbols and Abbreviations.....	xvi
CHAPTER 1: INTRODUCTION.....	1
1.1 Research background	1
1.2 Definition of terms.....	1
1.2.1 Non Alcoholic Fatty Liver Disease	1
1.2.2 Significant alcohol intake.....	3
1.2.3 Coronary artery disease.....	3
1.2.4 Carotid Intima-Media Thickness.....	4
1.2.5 Glycemic targets in T2DM with coronary artery disease.	4