

CHAPTER I

INTRODUCTION

Rationale for study

Cardiovascular disease (CVD) is the disease of heart and blood vessels. CVD is the number one cause of death globally in non-communicable diseases that remains the leading cause of death in the future (World Health Organization, 2013).

Atherosclerosis is the potentially cause of CVD that process in which deposits of plaques including fatty substances, LDL-cholesterol, cellular waste products, calcium, and others build up in the inner lining endothelial cells of an artery. Plaques can grow large enough to significantly reduce the blood flow through an artery (James, J. Maciejko, 2004) Plaques rupture potentially causes blood clot formation that can block blood flow to another part of the body, these can cause a heart attack or stroke.

C-reactive protein (CRP) is plasma acute phase proteins that respond to any inflammatory process in the body. It's commonly called high sensitivity C-reactive protein (hs-CRP) because of its increasing sensitivity of methodology used in clinical laboratory to detect at the very low concentration (Nader Rifai, 1999). High sensitivity CRP concentration higher than 3 mg/L indicates high risk of cardiovascular disease (CVDs) (Thomas, A. Pearson, 2004). Several evidences show that hs-CRP can be used to predict CVDs, including peripheral artery disease (PAD). Furthermore, decreasing hs-CRP and low density lipoprotein cholesterol (LDL) levels have more clinical useful in CVDs treatment (Paul, M. Ridker, 2003; Abdellaoui, A., 2007; Mora, S., 2009).

PAD is the disease of blood vessels outside the heart and brain that caused by the narrowing of vessels that carry blood to the legs, arms, stomach, or kidneys. Vascular stiffness and occlusion are risk indicators for peripheral vascular blockage that can cause PAD (Newman, A.B., 2000) People with PAD often have fatty build up in the arteries of the heart and brain. The severity of PAD correlated to serum hs-CRP which showed relation to future CVDs in PAV patients (Yasojima, K., 2001). Ankle-Brachial Index (ABI) is an index for evaluating occlusion at the extremities that are

from the ankle to the center. ABI lower than 0.9 shows the association with occlusion in peripheral arteries (Colin Medical Technology Corporation). Brachial-ankle pulse wave velocity (PWV) is an index for evaluating stiffness. PWV was increased in atherosclerosis (Wada, T., 1994).

There is little information that exist the associations among hs-CRP, WC, BMI, and vascular atherosclerosis in healthy Thai adults. There are several changes in high technologies, convenience, and food in rural Thailand that impact people lifestyles include the less knowledge about risk factors in CVDs in rural Thai people. This study aims to assess the level of hs-CRP, risk of peripheral vascular atherosclerosis, and to determine the relationship among hs-CRP, peripheral vascular indexes, waist circumference, body mass index, blood pressure and blood biochemical analytes in healthy Thai adults in rural Thailand.

Objectives of the study

1. To assess the level of high sensitivity C-reactive protein (hs-CRP) and risk of peripheral vascular atherosclerosis in healthy adults.
2. To determine the associations among hs-CRP, vascular indexes, blood chemistry analyses, blood pressure, and waist circumference in healthy adults.

Scopes of the study

This study involves the measurements of plasma glucose, serum total cholesterol (TC), triglyceride (TG), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C) and high sensitivity C-reactive protein (hs-CRP), resting blood pressure, and vascular indexes e.g. ankle-brachial index (ABI), and brachial-ankle pulse wave velocity (PWV) by using non-invasive technology in participants including central obesity adults and normal waist circumference adults at Ban Krang District and Naresuan University staff.

This study was conducted at Faculty of Allied Health Sciences, Naresuan University and at Ban Krang Hospital for Health Promotion (former name is Ban Krang Primary Care Unit), Muang Phitsanulok, Thailand from June 24, 2008 to 2010. All plasma and serum samples were kept at -20 °C until analysis. The OLYMPUS

AU-640 Automated Analyzer was used to measure biochemical tests at Police Hospital and the VP-1000 Analyzer was used to measure non-invasive ABI and PWV.

Technical term definition

Healthy adults are men and women that were non-smoking, age ≥ 40 years, BMI ≤ 30 , no recent illness and conditions such as tissue injury, infection, autoimmune disease, cancer, general inflammation or chronic inflammation, and taken any medication.

Non-invasive vascular indexes are parameters that indicate vascular condition, using non-invasive technology from V-1000 analyzer, PWV indicate the stiffness condition of vascular and ABI indicate the occlusion condition of vascular.

Peripheral vascular type I is a normal type of peripheral vascular defined by normal PWV and normal ABI. The feature of this type is normal without harder and occlusion vascular.

Peripheral vascular type II is an abnormal type of peripheral vascular defined by slightly increase PWV and slightly decrease ABI. The feature of this type is slightly harder, possible occlusion vascular or slightly harder, slightly occlusion vascular.

Peripheral vascular type III is an abnormal type of peripheral vascular defined by increase PWV and normal ABI. The feature of this type is stiffness vascular.

Peripheral vascular type IV is an abnormal type of peripheral vascular defined by increase PWV and slightly or moderate decrease ABI. The feature of this type is stiffness, possible occlusion vascular or stiffness, moderate occlusion.