# การสูบบุหรี่กับการเกิดโรคหลอดเลือดหัวใจ: บทบาทของพยาบาลในการช่วยเลิกบุหรี่

# Cigarettes Smoking and Coronary Artery Disease: Nurses' Role in Smoking Cessation

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**บทคัดย่อ**

การสูบบุหรี่เป็นหนึ่งในปัจจัยสำคัญของการเกิดโรคหลอดเลือดหัวใจซึ่งเป็นโรคไม่ติดต่อเรื้อรังที่สำคัญโรคหนึ่งที่กำลังคร่าชีวิตคนไทยอยู่ในปัจจุบัน การทราบถึงพิษภัยและผลกระทบที่เกิดจากการสูบบุหรี่ต่อหลอดเลือดหัวใจจะช่วยให้ประชาชนตระหนักถึงอันตรายของบุหรี่ที่มีต่อสุขภาพและเห็นความสำคัญของการไม่สูบบุหรี่หรือเลิกสูบบุหรี่เพื่อลดความรุนแรงที่เกิดจากการสูบบุหรี่ต่อโรคหลอดเลือดหัวใจในอนาคต บทความนี้มีวัตถุประสงค์เพื่ออธิบายความสัมพันธ์ระหว่างการสูบบุหรี่และการเกิดโรคหลอดเลือดหัวใจรวมถึงบทบาทของพยาบาลในการช่วยเลิกบุหรี่ อันจะนำไปสู่การตระหนักรู้ในเรื่องการเกิดโรคหลอดเลือดหัวใจซึ่งเป็นผลมาจากการสูบบุหรี่และเพื่อใช้เป็นแนวทางสำหรับบุคลากรทางสุขภาพในการช่วยเลิกบุหรี่ในผู้ป่วยโรคหลอดเลือดหัวใจต่อไป

**คำสำคัญ :** บุหรี่ โรคหลอดเลือดหัวใจ บทบาทของพยาบาล

**Abstract**

Cigarette smoking is one of the leading causes of coronary artery disease (CAD), which is one of the important of non-communicable diseases (NCDs) and currently kills Thai people. In order to promoted health and prevented CAD, knowledge about harmful effect of cigarette smoking on coronary artery disease can encourage people to realize on non-smoking or quit smoking. Therefore, this article aimed to describe about relationship between cigarette smoking and coronary artery disease involving nurses' role in smoking cessation. It can lead to awareness about the development of CAD affect from smoking and it can use as a guideline for health care professionals in order to help patients with CAD stop smoking.

**Keywords :** Smoking, Coronary artery disease, Nurses' role

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## Overview of cigarette smoking and coronary artery disease in Thailand

Cigarette smoking is a major public health concern worldwide, including in Thailand. According to the World Health Organization (WHO) documented that cigarette smoking is the single largest preventable cause of disease and premature death. Cigarette smoking continues to kill nearly 6 million people each year and causes hundreds of billions of dollars of economic damage worldwide each year[1]. In Thailand, the Ministry of Public Health reported that the number of in-patients diagnosed with ACS was 197, 576[2]. In addition, the Thai ACS registry (TRACS), which is a multi-center prospective project of nation wide registration in Thailand, invited 17 hospitals, both government public and private from every region in Thailand to participate in this project. The Thai ACS registry project documented information from 9,373 ACS patients. About 32.0% of participants had a history of smoking[3]. Moreover, the second TRACS review documented that 32.1% of participants in 39 participating medical centers were smokers. Therefore, the prevalence of smoking in ACS patients did not change in the two surveys[4]. Furthermore, the National Statistical Office reported that 42,000-52,000 Thai people die annually from cigarette smoking. Of this number, more than 7,900 smoker's deaths are from CAD[5]. Additionally, a recent study analyzed the economic burden of smoking-related health care, and showed that the number of cases attributable to smoking in 2006 was 52,605 for CAD. The out-of-pocket expenditures for treatment were 1773.7 million baht for CAD[6].

## Substances in cigarette

Cigarette smoke is a complex mixture of chemical components that are bound to aerosol particles or are free in the gas phase. Chemical components in cigarette smoke can be distilled into smoke or can react to form other constituents that are then distilled to smoke[7]. Researchers have estimated that cigarette smoke has more than 7,000 chemical components from many different classes[8]. An example of cigarette smoke components following these;

Nicotine is the major chemical compound of cigarette that causes and sustains cigarette addiction[9, 10]. Nicotine is a dangerous and highly addictive chemical. It can cause an increase in blood pressure, heart rate, flow of blood to the heart and a narrowing of the arteries (vessels that carry blood). Nicotine may also contribute to the hardening of the arterial walls, which in turn, may lead to a heart attack. This chemical can stay in body for six to eight hours depending on how often cigarette smoke. Also, as with most addictive substances, there are some side effects of withdrawal. Nicotine is the addictive substance in tobacco, keeping the smoker dependent on smoking. Nicotine is not life-threatening, but it has the addictive effect and can cause the health risks[11]. Nicotine causes sympathetic stimulation with hemodynamic effects that include an increase of heart rate and blood pressure, and increased myocardial contractility. Catecholamine release also results in constriction of coronary arteries. These effects increase myocardial work, which is of obvious concern to patients with compromised myocardial function[12]. Cigarette smoking increases blood coagulation and platelet aggregation, reduces oxygen delivery, causes coronary vasoconstriction and increases myocardial work via the hemodynamic effects of nicotine[13].

Carbon monoxide is a colorless, tasteless, that is also found in car exhaust. It's transferred to bloodstream. Carbon monoxide decreases the amount of oxygen that is carried in the red blood cells. It also increases the amount of cholesterol that is deposited into the inner lining of the arteries which, over time, can cause the arteries to harden. This leads to heart

disease, artery disease and possibly heart attack.

Tar is a mixture of the compounds in cigarette smoke. Tar is the part of cigarette smoke which causes the yellow-brown stains on teeth and fingers. Arsenic is used to preserve wood. Some arsenic compounds have been linked to cancer of the lung, skin, liver, and bladder.

Benzene is a colorless chemical derived from petroleum. In cigarettes, benzene is used as an adhesive to seal the paper holding the tobacco. It can cause cancer, particularly leukemia in humans.

Cadmium is a metal used to make batteries. Cadmium and cadmium compounds can cause lung cancer and have been associated with kidney and prostate cancer. Chromium compounds cause lung cancer and have been associated with cancer of the nose and nasal sinuses.

Formaldehyde is used to make other chemicals and resins. It is also used as a preservative. Formaldehyde is also highly poisonous and often used to preserve dead bodies because no forms of life can grow in it. Formaldehyde is known to cause cancer, and also irritates the skin as well as the respiratory and gastrointestinal systems.

Effect of cigarette smoking on coronary artery disease

Cigarette smoking is one of the major risk factors for the development of CAD. Coronary artery disease is a non-communicable disease in which a waxy substance called plaque builds up inside the coronary artery. Coronary artery disease occurs when arteries that carry blood to the heart muscle are narrowed by plaque or blocked by clots. Chemicals in cigarette smoke cause the blood to thicken and form clots inside veins and arteries. Blockage from a clot can lead to a heart attack and sudden death. The four principal mechanisms of cardiovascular damage caused by cigarette smoking are induction of a hypercoagulable state, reduction of oxygen delivery because of carbon monoxide, coronary vasoconstriction, and nicotine-induced hemodynamic effects[13]. The risk of developing CAD among smoker is two to four times that of non-smokers because of smoking's contribution to increased atherosclerosis. Development of atherosclerosis, progressive artery hardening, which forms from the deposition of fatty plaques in association with scarring and thickening of the artery walls, is tied to toxins in the blood that come directly from cigarette smoking. These arterial wall changes lead to inflammation and formation of blood clots which can progress to CAD. Cigarette smoking is also linked to sudden cardiac death (SCD) in both genders. Cigarette smoking is also a powerful independent risk factor for sudden cardiac death in patients with CAD; smokers have about twice the risk of non-smokers[14, 15].

## Nurses' role in smoking cessation

In Thailand, the government became a signatory to the World Health Organization's (WHO) Framework Convention on Tobacco Control (FCTC) recognizing that tobacco use is a serious problem on February 27, 2005[16]. By ratifying the WHO FCTC WHO, Thailand has an obligation to implement tobacco control policies enacted under this treaty to implement the National Strategy Tobacco Control Policy 2010-2014[17]. The ultimate goals are to reduce the prevalence of tobacco consumption among Thais and protect the health of Thais for exposure to tobacco consumption. This plans included eight strate¬gies, in which the second strategy stated that consumer promotion to tobacco use reduction and quit, have been adopted from FCTC article 14[17]. The Ministry of Public Health enforced setting up smoking cessation service in the hospitals, implementing the 5A5R protocols[19]. The 5 A's for treating tobacco use and dependence including:

- Ask about tobacco use: identify and

document tobacco use status for every patient at every visit.

- Advice to quit: a clear, strong, and personalized manner, urge every smoker to quit.

- Assess willingness to make a quit attempt: Is the tobacco user willing to make a quit attempt at this time.

- Assist in quit attempt: for patient who willing to make a quit attempt, offer medication and provide or refer for counseling or additional treatment to help the patient quit. For patients who unwilling to quit at the time, provide interventions designed to increase future quit attempts.

- Arrange follow up: For the patient willing to make a quit attempt, arrange for follow up contacts, beginning within the first week after the quit date. For patients unwilling to make a quit attempt at the time, address tobacco dependence and willingness to quit at next clinic visit.

For smoker who shows an unwillingness to quit, nurses should use the 5 R's including:

- Relevance: encourage smoker to indicate why quitting is personally relevant,

- Risks: identify potential negative consequences of tobacco use,

- Rewards: Identify potential benefits of stopping tobacco use, such as improved health, saving money, and better food taste.

- Roadblocks: ask the patient to identify barriers or impediments to quitting and provide treatment (problem solving counseling, medication) that could address barrier.

- Repetition: Repeat these steps at every visit.

According to AHA/ ACC secondary prevention guidelines for patients with coronary and other vascular diseases, the goal in taking care of patients who are smokers is that, cardiac patients should complete cessation and have no exposure to environmental tobacco smoke. The recommendations for cardiac nurses include asking about tobacco use status at every visit, advising every tobacco user to quit, assessing the tobacco user's willingness to quit, assisting by counseling and developing a plan for quitting, arranging follow-up, referral to special programs, or pharmacotherapy (including nicotine replacement and bupropion), and urging avoidance of exposure to environmental tobacco smoke at work and home. Therefore, Nurses represent the largest group of health care professionals and greatest contact with patients. Nurses are well positioned to play a significant role and work with clinicians involved in smoking cessation and disease management among patients with CAD, and to support implementation of smoking cessation intervention for smoke-free environments.[20, 21]

## Summary

Cigarette smoking is related to CAD, and it is most modifiable risk factors for CAD. Cigarette smoke consists of more than 7,000 chemical components and hundreds of them are harmful to human health, especially nicotine and carbon monoxide. Nicotine may also contribute to the hardening of the arterial walls, which in turn, may lead to a heart attack. Cigarette smoking increases the risk of getting CAD and dying early from CAD. Carbon monoxide decreases the amount of oxygen that is carried in the red blood cells and also increases the amount of cholesterol which can cause the arteries to harden. Smoking cessation has been accepted as a crucial strategy in tobacco control because it can reduces the incidence and impact of a range of costly chronic diseases improve quality of life and yield savings in health care cost. Smoking cessation is the most important step that can decrease the chance of CAD and heart attack. The risk of sudden cardiac death in smokers decreases significantly as soon as they can

quit smoking. Smoking-related cardiac events are significantly reduced within one year after smoking cessation. Therefore, nurses represent the largest group of health care professionals and greatest contact with patients. They should use this opportunities to expand their roles to promote smoking cessation.

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