

## Review

### **Role of Nutrition and Dietetics in the Prevention of the Risk of Non-communicable Diseases in Thailand**

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**ABSTRACT** *Background and Purpose.* Non-communicable diseases (NCDs) are increasing globally and have become the leading cause of health-related economic problems and death in Thailand and Asian countries, mostly under the age of 70, as reported by the World Health Organization (WHO). The risk factors that rapidly raise the burden of NCDs are alcohol, unhealthy diets, physical inactivity, and air pollution. The most effective way to solve these problems may be through public education, especially in healthy nutrition and diet. *Purpose.* This review highlights how plant-based nutrition and dietetics play a significant and potential role in preventing and reducing NCDs in Thailand. *Methods.* We conducted a systematic search of the PubMed database by combining the terms "dietary intake, nutritional status, phytonutrients, dietetics, plant-based, NCDs, nutrition, prevention, WHO" with the term "NCDs." and a question: "How much nutrition and dietetics involve and affect NCD risk?" was studied and summarized. *Results.* Nutrition and dietetics strongly impact NCD risk in Thailand and other countries. The Thai government is urged to develop the 5-Year National Prevention and Control Plan to enhance awareness of prevention in communities. The national plan must focus on the change in food behaviour and lifestyle. The country would benefit from investing in four policy interventions to reduce the risk of behavioural risk factors such as tobacco consumption, alcohol consumption, an unhealthy diet, and physical inactivity. The 6<sup>th</sup> Country Cooperation Strategy (CCS) was devoted to 2022–2026, as well as WHO consultants and their nutrition plans. The objectives are sustainable development to control and continually prevent NCDs by improving the systems to implement national health policies and plans. *Conclusions.* Plant-based nutrition interventions are of the highest importance and essential in preventing NCDs. This review focuses on NCDs in Thailand and their risk factors, highlighting several prevention strategies through healthy nutrition and dietetics. The positive outcomes of the goals remain to be observed and challenged. If the control and prevention plan for NCDs in Thailand was effective and successful, this strategy could also be implemented in other countries.

**Keywords:** Nutrition, dietetics, plant-based diets, PBDs, prevention, risk of NCDs, non-communicable diseases, Thailand

#### **INTRODUCTION**

As of 2025, the population of Thailand is projected at 71.62 million, compared to 71.67 million in 2024. It ranks 20th in the world by population and 11th in Asia. The population growth rate in 2025 is projected at -0.07 percent (1). Their average lifespan is 71.4 years. NCDs are the most prevalent killer disease among all deaths, and stroke is the most common cause in both sexes (2-3). NCDs can cause the population to suffer a significant economic burden, resulting in Thailand's estimated 1.6 trillion baht in 2019. NCDs not only have a human and health cost but also an economical cost. The loss is about 9.7% of its gross domestic product (GDP). These costs include 139 billion baht to treat NCDs (9%) and 1.5 trillion baht (91%) in decreased productivity due to capacity reduction. Some other Asian countries have also taken up their NCDs burden as an essential public health agenda (4).

NCDs are often associated with degenerative and aging periods. However, since NCDs can affect people across the lifespan without discriminating by age and sex, unfortunately, 86% of premature NCD deaths occurred in low- and middle-income households, with half of the deaths occurring in the age group 30–69 years. Premature deaths and reduced productivity occur when employees cannot fully function and must leave their workplace, resulting in a financial burden. Therefore, the detection, screening, treatment, and health care for all ages and populations by the government's preventive and control measures will be crucial in preventing NCDs and reducing their financial burden (5-7).

According to WHO, Thailand and other nations observed these increased NCDs during the industrialization and development of the country (6). The Royal Thai Government authorities have raised awareness of NCD prevention by starting the 5-Year National NCDs Prevention and Control Plan (2017-2021) followed by the 6<sup>th</sup> Country Cooperation Strategy (CCS) during 2022–2026 along with WHO's strategic vision and consultants. The 6<sup>th</sup> CCS strives to enhance the systems necessary to implement

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national health policies, strategies, and plans and achieve national objectives under the Sustainable Development Goals (SDGs). The CCS must be informed by a country-driven approach and based on a review of the health situation in Thailand (8).

Globally, preventive nutrition and dietetics have an important role in the prevention of NCDs, however, they should be introduced at the appropriate time and with the appropriate methods. Nutrition and diets would have a positive impact on the reduction of public health spending. WHO is well-positioned to provide global nutrition education for NCD prevention and management. Nutrition education and the health workforce must be increasingly focused on and be the key to enhancing population health and wellbeing. A balanced diet, rich in essential nutrients, is essential to maintaining health and preventing nutritional diseases. One of the most effective ways to solve these issues is by utilizing public education, particularly in healthy nutrition and diets. This article will examine and focus on NCDs and their risk factors in Thailand and outline various common prevention strategies through healthy nutrition and dietetics (9-10).

### METHODS

We systematically searched the PubMed database using a search term that included “plant-based diets” in combination with terms on “dietary intake, nutritional status, phytonutrients, control plan, dietetics, plant-based, NCDs, lifestyles, nutrition, prevention, Thailand, vegetarian, vegan, WHO”. Questions to be answered: What are the risks associated with NCDs? What measures can be taken to prevent NCDs and control them? We aimed to demonstrate how nutrition and dietetics could contribute to preventing and reducing the risk of NCDs in the Thai population through WHO policy, government management, and health-related organizations.

### RESULTS

From our systematic literature search, we found a significant link between food, nutrition, diet, and NCDs. The World Cancer Research Fund International and the NCD Alliance highlight the importance of addressing NCDs through dietary patterns and nutritional status (11).

#### The Link between Food, Diets, Nutrition and NCDs

Foods, diets, and nutritional status are important factors contributing to the development of NCD. Unhealthy diets are detrimental to pathological conditions such as obesity, hypertension, CVDs, certain types of cancer, and type-2 diabetes.

Overweight is a dietary condition that is associated with excessive body fat. It increases the risk of heart disease, diabetes, and other health problems. Overweight and obesity, as well as dietary factors such as elevated blood pressure and blood cholesterol, are risk factors for NCDs and major causes of multiple illnesses (12). Approximately 80% of these individuals with NCDs were in low- and middle-income countries, with 29% affecting individuals under 60 years old (13-14).

Modern nutrition transition from traditional foods has dramatically altered the dietary patterns and nutrient intake, such as fiber-rich foods (whole grains, pulses, and roots) that have decreased, while higher caloric consumption from refined grains, sugars, animal meat, and fats has increased (15).

Many Thai modern dishes originate from traditional foreign dishes. Some examples of the Thai top dishes are “Pork grilled on pan” (Moo Kata, หมูกระทะ) which derives from Korean meat BBQ (Gogigoo-ui, Korean), and “Khao Man Gai” (ข้าวมันไก่) from Hainanese chicken rice, a dish that’s extremely popular among Thai youths and their families. Both cooked meats contain higher saturated fats and cholesterol. Over-grilled red meat and steak based on epidemiologic reports supporting the link between red and processed meats and increased colorectal cancer risk. Subsequently and socially, such regular and overeating behaviours become food addiction, probably causing obesity and gastric cancer in Thai adults. These habitual changes in foods and lifestyles in different populations with higher incomes contribute to NCDs by influencing the nutritional quality and imbalance of available foods (16).

WHO has implemented a worldwide response to NCDs, including recommendations for population-based strategies and monitoring frameworks with targets and indicators. The need for greater coordination between NCD prevention efforts and actions addressing unhealthy nutrition and food system challenges is essential. Nutritionists and dietitians contribute significantly to NCD prevention by promoting balanced nutrition, addressing risk factors, and advocating for healthier food systems. Their expertise is crucial for the fight against NCDs. The beneficial and possible outcomes of the strategies should be interesting to be challenged and explored (13-14).

#### What are the effects of NCDs and health issues in Thailand?

Today, NCDs, primarily heart disease, stroke, cancers, diabetes, and chronic lung diseases, account for 74% of deaths in Thailand, or 400,000 people each year. In Thailand, NCDs, such as heart disease, stroke, cancer, diabetes, and chronic lung disease, have five major risks: tobacco smoking, less physical activity, alcohol drinking, unhealthy diets, and air pollution. The risk factors of NCDs from cigarette smoking and alcohol consumption are significantly higher in the young population (24-54 years). Metabolic factors, such as hypertension, hypercholesterolemia, overweight and obesity, and type-2 diabetes, are found to increase in older adults (55–65 years) (17-19).

From the study of NCD prevalence and Social Determinants of Health (SDHs) in Thailand during 2013-2021, it was found that the prevalence rates of CVD and COPD were remarkably higher. The SDHs data included household income, expenses, loans, education, smokers, alcohol consumers, and air-polluted PM2.5 levels. Policy implications should include the need for interventions to raise awareness of risk factors and their consequences. Healthy lifestyles have to be improved. More effective policies are set to improve health equity. Preventive healthcare can be accessible to the public, regional disparities in healthcare infrastructure must be addressed, and investment in research was suggested that future research should be focused on interventions to reduce NCD prevalence and explore the cost-effectiveness of the strategies (20).

Nutrition-related diseases are caused by nutrient imbalances in the diet, either insufficient vitamins, minerals, and the optimal ratio of fatty acids (omega-3/omega-6 = 1/2) or high intake of calories and fats, as well as other nutritional issues. The primary cause of

NCDs is the excessive consumption of certain nutrients, saturated fats, high sodium, high calories, concentrated sugar, and sweet drinks, which are related to overweight, obesity, and type-2 diabetes. It revealed that a high intake of trans fats and cholesterol but low in essential unsaturated fats and natural antioxidants (polyphenols, flavonoids, carotenoids, and vitamins C and E, contributed to the increased incidence of atherosclerosis, cardiovascular heart disease (CVDs), Alzheimer's disease, and stroke. Excessive salt diets can increase the risk of hypertension and disorders of kidney function. The NCD's risk factors among the Thai population mostly involve increasing unhealthy or imbalanced nutrition and lifestyles. The behavioral changes rapidly raise CVDs, type-2 DM, cancers, COPD, obesity, hypertension, and kidney failure. Therefore, effective diet management by CCS and special nutritionists and dietitians is necessary for NCD prevention and control (20).

### **Roles of Nutritionists and Dietitians in NCD Prevention**

Nutritionists and dietitians are food specialists who may present medical nutrition counselling and therapy. A nutritionist is an expert in food science and health. A dietitian specializes in promoting optimal health and preventing and regulating diseases through nutrition science. Dietitians are the only nutrition professionals who become legally regulated by law to be licensed as "Registered Dietitian Nutritionists" (RDN or RD) who help people understand the significance of healthy nutrition and how to improve their eating habits. Therefore, nutritionists and dietitians are essential in managing and preventing nutritional diseases by helping individuals create personalized meal plans for optimal and balanced diets. Dietitians also help physicians with conditions like kidney disease, diabetes, and heart disease. They should actively educate and encourage people of all ages to choose food properly to maintain their best weight and body mass index (BMI), medical situations, and good health. Dietitians work in various settings, including hospitals, clinics, public health care, nursing homes, academic and research laboratories, wellness centers, and spas (10, 21).

### **Urgent Need for Investment in NCDs**

The WHO with the Ministry of Public Health of Thailand showed that the need to invest in NCDs is urgent. This will provide substantial social and economic expenses in the next decade. The analysis annually showed that. The Thai economy had a significant impact on NCDs, which cost 1.6 trillion THB or 9.7% of its 2019 gross domestic product (GDP) (4). A costing analysis provides an estimate of the cost required to implement a set of policy interventions for prevention and selected clinical interventions. A cost-benefit analysis compares these implementation costs to determine which intervention packages would provide the most advantageous returns on investment. The proposed evidence-based policy and clinical interventions would save 310,000 lives and generate THB 430 billion in benefits for the nation in the next 15 years (22-24).

The official documents also discuss other nutritional issues that may contribute to health and sustainable development. The policies and clinical interventions should be put together to represent critical and initial actions that can resolve the NCD

incidence in Thailand. The responsibility for these actions and the benefits that resulted is beyond the health sector to directly and indirectly impact the achievement of all the SDGs and impact the entire society. Dietitians are the only nutrition professionals to be regulated by law, and they are governed by an ethical code to ensure that they always adhere to the highest standards (22-23).

Thailand would benefit from investing in four policy intervention packages that reduce the risk of behavioral risk, including tobacco smoking, alcohol toxicity, improper diet and lifestyle, and physical inactivity. The primary clinical interventions for the most prevalent NCDs developed metabolic disorders utilizing a combination of prevention, early detection, and management strategies. Prevention strategies by implementing lifestyle changes to better health can significantly reduce the risk of NCDs. We urgently require early detection by regular health check-ups and screenings. These can help identify NCDs such as diabetes, CVDs, and cancers at an early stage making them easier to manage (22-23).

WHO has recently confirmed the appointment of Dr. Piroj Saonuan, M.D., Deputy CEO, Thai Health Promotion Foundation (ThaiHealth), as one of the 20 global experts in the control and prevention of NCDs in the Strategic and Technical Advisory Group on NCDs (STAG NCD), which provides academic expertise in essentially medicine. The Health Promotion Foundation Act established ThaiHealth as a government agency in 2001. "Everyone in Thailand has the capacity and lives in a society and environment conducive to good health," is their vision (25).

### **Roles of the Thai Ministry of Public Health in Reducing the Risk of NCDs**

With the coordination with CCS and WHO Plan, Mr. Somsak Thepsutin, Minister of Health, chaired the first meeting of the National Salt and Sodium Consumption Reduction Policy Committee to Reduce NCDs. The Thai Ministry of Public Health is giving importance to solving the problem of NCDs, which are mainly caused by inappropriate eating behaviors, such as consuming too much salt and sodium. From the survey on salt consumption in Thailand in 2009, it was found that Thais consumed as much as 4.35 grams of sodium per person per day from their diet, which is twice as high as the WHO's limit of no more than 2 grams per day. Meanwhile, about 22 million Thais suffer from diseases related to sodium consumption, such as high blood pressure, kidney disease, heart disease, and CVDs.

Mr. Somsak already has a policy to reduce and prevent NCDs by assigning the Department of Disease Control to set up the working committee. The progress of the strategy to reduce salt and sodium consumption in Thailand from 2016-2025 has been reported, and policy issues have been pushed forward, with the goal of Thais having better health and staying away from NCDs. The committee should encourage Thais to reduce their salt consumption by at least 30%. The community health volunteers can use a tool called "Salt Mete" to raise awareness and control the amount of sodium in the cooking of responsible households, set a ceiling for salt and sodium in ready-to-eat food products, and push for financial measures such as a sodium tax law.

The Department of Disease Control is the main agency to strengthen the implementation of the strategy and action plan in formulating the strategy to

reduce salt and sodium consumption in Thailand (SALTS) to achieve the goals. The strategy for fiscal years 2017-2024 consists of two measures.

1. Creating, developing, and expanding a collaborative network by working with 2 network partners to expand the area of monitoring measures and reduce salt and sodium consumption nationwide.

2. Increasing knowledge, awareness, and enhancing skills of people, communities, producers/entrepreneurs, related professional personnel, and policymakers by publicizing health policies such as the policy to procure healthy food, the sodium tax policy, and setting a ceiling for sodium, and creating a social trend to reduce salt and sodium consumption through various channels (26).

### **Role of Thai Dietetics Association on NCDs Prevention**

TDA was born in 1974, officially established in 1991, and joined the Federation of Dietetic Associations (AFDA). Since its establishment, TDA has been devoted to advancing the dietetics profession, promoting health through nutrition, and addressing key health issues such as NCDs. TDA has a significant role in preventing NCDs through various initiatives, journals, and programs, as well as educational programs and workshops to raise awareness about healthy eating habits and lifestyle choices that can prevent NCDs.

TDA has the authority to qualify and certify Thai dietitians and provide their Certificate of Dietetics of Thailand (CDT). Dietitians affiliated with TDA provide personalized nutrition counselling to assist individuals in managing their diet and reducing the risk of NCDs. TDA supports research on nutrition and NCDs and advocates for policies that promote healthy eating and reduce the prevalence of NCDs (27).

TDA organizes community outreach programs and annual nutrition and dietetic conferences to reach a wider audience and provide resources for healthy living. In these areas, overall TDA exemplifies to reduce the risks and burden of NCDs in Thailand and improve public health (22).

### **CONCLUSION**

Like other developing countries in Asia, NCDs are the most prevalent deadly illness in Thailand and cause a deteriorating economic burden, resulting in a few trillion baht annually. The behaviour of unhealthy food consumption and lifestyle in the Thai population has played a significant role in deteriorating health outcomes for many for a few decades. Therefore, behaviour modification and lifestyle improvement should be priority strategies for healthcare organizations. The interventions should have a better

impact, resulting in valuable outcomes, if nutritionists and dieticians work collaborating with other professionals with different backgrounds and scopes of practice (28-29).

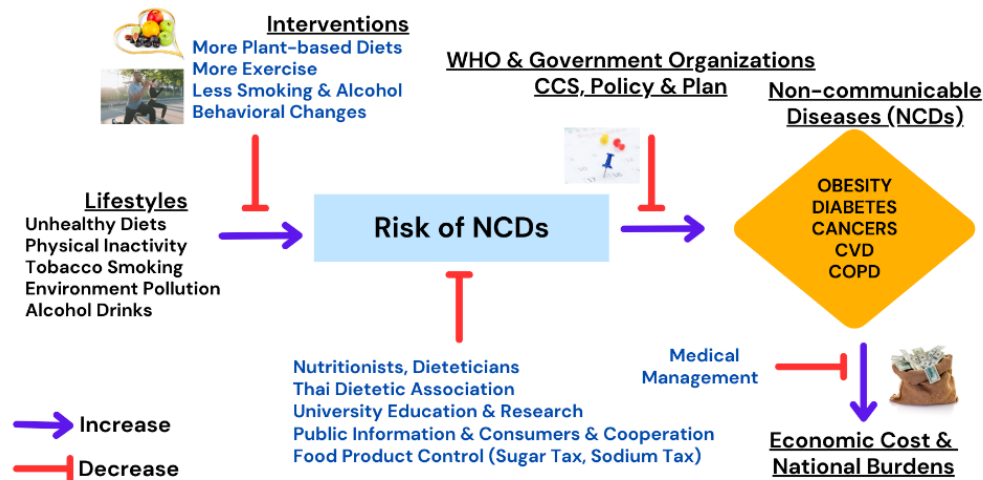
This review article on nutrition and dietetics for the prevention of NCDs would likely emphasize the critical role of dietary management in reducing the risk of NCDs. It would highlight the importance of a plant-based balanced diet rich in fruits, vegetables, whole grains, and lean proteins while minimizing the intake of meat-based diets, added sugars, unhealthy fats, and excessive salt. We would also stress the need for public awareness and education on healthy eating habits, as well as the role of healthcare professionals in guiding individuals towards better dietary choices. Additionally, it would call for comprehensive policies and programs to support healthy eating and physical activity at the community and national levels.

The interventions by lifestyle and behavioral changes in nutrition and dietetics through Thai governmental CCS policy and WHO guidelines and plan are urgently required in the reduction of the risk of NCDs to save the economic cost and national burdens (**Figure 1**). There are many problems and obstacles depending on the food business and consumers. They have to be regularly educated and behave with righteousness. If it were so done, these interventions should be able to effectively prevent or reduce NCDs in Thailand. How to do healthcare policy efficiency is a big question to be challenged.

### **Thoughts to be concerned about eating practice with mindfulness**

A popular original phrase, “*Tell me what you eat, and I will tell you what you are,*” was said by Anthelme Brillat-Savarin in 1826 and by Ludwig Andreas Feuerbach in 1863-64 (30). The saying implies that the food we eat has a bearing on our mental and physical conditions. Our food choices can reduce NCD risks and profoundly impact our health and well-being. Some right thoughts may like these. Foods rich in omega-3 fatty acids help keep our brain memory. Whole grains, fruits, and vegetables help maintain good cardiovascular health. Prebiotics and probiotics in our food help promote beneficial bacteria and a healthy gut. Vitamin C-rich fruits can bolster our immune system. Dietary fiber helps bowel movements, regulates blood sugar and cholesterol, and supports weight management.

Before choosing and eating regular foods, we must think of, “*You are what and how you eat*”. After those foods were consumed, we must be more aware of our daily diets and which foods are influencing our health and wellness. Our thought must also be switched to “*You eat what and how you are*”.



**Figure 1.** A model showing how interventions by lifestyle and behavioral changes of nutrition and dietetics reduce the risk of NCDs and save the economic cost and national burdens

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