A Comparison of a Healthy Thai Diet and Contemporary Thai Diet on Health Indices in Individuals With Noncommunicable Diseases: A Randomized Controlled Trial

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Abstract

Background: Studies have suggested that dietary patterns emphasizing low-fat, plant-based foods like vegetarian, Mediterranean, and Dietary Approaches to Stop Hypertension (DASH) diets reduce noncommunicable disease risk.

Objectives: To compare the effects of a Healthy Thai Diet (HTD) and a Contemporary Thai Diet (CTD) on body mass index (BMI), blood pressure, cholesterol, and glycemia. The HTD is characterized by low-fat, plant-based Thai food that substitutes animal products with plant-based ingredients while maintaining traditional seasonings (eg, fish sauce, shrimp paste, and coconut milk).

Methods: Individuals exhibiting at least 1 abnormal health index (BMI, blood pressure, low-density lipoprotein cholesterol [LDL-C], fasting blood sugar [FBS]) or undergoing chronic disease treatment were randomly assigned to the HTD (n = 30) or CTD (n = 32) for 12 weeks. Health indices were measured at baseline and at week 12. Statistical analyses included paired *t* tests for within-group comparisons and student's *t* tests for between-group comparisons.

Results: After 12 weeks, the HTD group experienced significant weight loss (-3.03 kg vs 0.43 kg in CTD, $P < .01$), particularly in participants with BMI greater or equal to 23 kg/m^2 (-3.99 kg vs 0.04 kg, $P < .01$). Systolic blood pressure dropped significantly in the HTD (-17.4 mmHg vs -6.3 mmHg in CTD, $P = .05$), especially in those with initial readings greater or equal to 140 mmHg (-32 mmHg vs -12 mmHg, $P = .01$). LDL-C decreased notably in the HTD (-34.1 mg/dL vs -12.9 mg/dL in CTD, $P < .05$). Participants with type 2 diabetes in the HTD were able to reduce or discontinue medications while maintaining stable glycemic control. Significant changes in gut microbial abundance and improvement in estimated glomerular filtration rate (eGFR) ($P < .05$) were observed in the HTD.

Conclusions: These results suggest that the HTD may be a promising dietary intervention for managing obesity, hypertension, dyslipidemia, and type 2 diabetes in Thailand.

Keywords: Noncommunicable diseases, Plant-based diet, Dietary intervention, Lifestyle medicine, Lifestyle modification

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Introduction

Over the past 50 years, the incidence of chronic noncommunicable diseases (NCDs) has risen significantly in Thailand.[1] Despite advances in modern medicine, these conditions remain challenging to cure. Recent research highlights the role of dietary patterns — defined as the habitual consumption of certain foods within populations — in influencing health outcomes. Studies have shown that certain dietary patterns are linked to a reduced risk of chronic diseases.[2-7]

The concept of modifying dietary patterns to prevent and treat chronic diseases was first investigated in 1953 by Keys[8] through the "7 countries study", which linked high fat consumption to cardiovascular disease. Later, the "22 countries study" by Yerushalmy et al[9] suggested that meat consumption, rather than fat alone, was more closely associated with cardiovascular risk. This led to a focus on high-meat and high-fat diets in chronic disease research. The European Prospective Investigation into Cancer and Nutrition (EPIC) Study tracked 448 568 participants over 15 years, finding that high meat intake increased diabetes risk, while diets rich in fruits and vegetables lowered it. An analysis of 26 344 deaths in the cohort showed higher all-cause mortality in individuals consuming red and processed meats.[2, 3] Similarly, a Harvard study with 131 342 participants over 13 years revealed that, for those primarily consuming calories from animal products, substituting just 3% of animal-based calories with plant proteins reduced overall mortality by 33%, cardiovascular death by 48%, and cancer mortality by 28%.[10] Another study in Lyon with 420 heart disease patients found a Mediterranean diet reduced adverse cardiac events by 70% compared to a traditional American diet.[4] In Loma Linda, a 6-year study of 73 308 vegetarians found a 10-year increase in life expectancy compared to the general population.[5] Furthermore, studies by Gould et al[6] and Ornish[7] demonstrated that comprehensive lifestyle changes, including a low-fat vegetarian diet, significantly improved heart health, reduced coronary artery stenosis, chest pain episodes, and the need for invasive procedures. These findings have underscored the benefits of plant-based diets and lifestyle changes in chronic disease prevention and management.

Beyond heart disease and diabetes prevention, plant-based diets have also been associated with reduced blood pressure in hypertensive patients,[11] a 5-fold reduction in mortality among chronic kidney disease patients,[12] lower uric acid levels and joint pain in gout patients,[13] and decreased cancer mortality rates.[14] The Personalised Responses to Dietary Composition Trial (PREDICT) study[15] further indicated that a diverse gut microbiome, supported by prebiotic- and probiotic-rich foods, helps lower chronic disease risk. Additionally, high refined sugar intake has been linked to obesity, diabetes, and cardiovascular disease.[16] Also, excessive fructose consumption can overwhelm the liver's ability to process it into glucose, instead converting it into fat that contributes to insulin resistance, obesity, and diabetes.[17] However, consuming fructose with fiber slows down its absorption and conversion to fat. The processing level of grains also impacts health, as unrefined grains are associated with reduced type 2 diabetes risk, while refined grains increase it.[18] Harvard research on healthcare professionals[19] found that frequent white rice intake raises type 2 diabetes risk, whereas brown rice intake reduces it, and whole grains lower cardiovascular disease risk. High consumption of refined grains may also increase the risk of non-alcoholic fatty liver disease.

Previous research supports several principles for a healthy diet: (i) a focus on plant-based foods (ii) high fiber intake (iii) limited meat and dairy, particularly processed meats like sausages, bacon, and ham (iv) foods that promote gut microbiota diversity through prebiotics and probiotics, and (v) reduced refined sugars, favoring natural fiber-rich sources like fresh fruits.

Analyzing the changes in dietary patterns in Thailand over the past 50 years has revealed a decline in vegetable consumption, an increase in meat consumption, more frequent use of frying and sautéing with oil, increased intake of sugars from sweetened beverages and desserts, and greater consumption of refined grains with the removal of bran. The traditional components of Thai cuisine, such as chili, shrimp paste, fish sauce, curry paste, spices, and coconut milk, have remained unchanged.

Given these dietary shifts and limited existing evidence on Thai dietary patterns in managing NCDs, this study was designed to test the hypothesis that consuming a Healthy Thai Diet (HTD) would lead to significant improvements in key health indices compared to a Contemporary Thai Diet (CTD).

HTD, as defined for this study, retains traditional Thai seasonings such as curry paste, coconut milk, shrimp paste, and fish sauce, but emphasizes a variety of low-fat, plant-based ingredients while deliberately avoiding meat, dairy, butter, and cheese. Importantly, this diet permits unrestricted consumption until satiety, without the need for calorie counting or restriction.

The primary outcomes of interest in this study included body weight, blood pressure, low-density lipoprotein cholesterol (LDL-C) levels, and blood glucose levels. This study aimed to generate evidence on the potential health benefits of the HTD, with the goal of informing future national health food policies.

Methods

Study Design

This study was a randomized controlled trial (RCT) aimed at comparing the effects of the HTD with the CTD over a 12-week period, conducted from January to April 2024.

Participants

The study population consisted of Thai individuals aged 18 and above from all 4 regions of Thailand. A sample size calculation was performed using power analysis with an effect size of 1, a power of 0.95, $\alpha = .05$. and an allocation ratio (N2/N1) of 1. Based on 2-sided hypothesis testing using G*Power version 3.1.9.7, a minimum sample size of 54 participants was determined. To account for a potential dropout rate of 10%, the total sample size was set at 60 participants, who were then randomly assigned to 1 of 2 groups (30 participants each) through blocked randomization to prevent selection bias.

Participants were eligible for the study if they had at least 1 abnormal health index, including a body mass index (BMI) greater than 25 kg/m^2, LDL-C levels over 130 mg/dL, blood pressure exceeding 140/90 mmHg, fasting blood glucose (FBS) levels above 100 mg/dL, or were undergoing treatment for chronic conditions such as cardiovascular disease, stroke, hypertension, dyslipidemia, diabetes, or obesity.

Exclusion criteria included individuals diagnosed with cancer, those with infectious diseases, bedridden patients, individuals dependent on others for care, or those unable to prepare or access the HTD independently.

Interventions

Participants in the study were randomly assigned to 1 of 2 dietary interventions.

HTD: The HTD group followed a diet based on 77 recipes developed by the research team. These recipes adhered to the study's defined criteria for a healthy diet while maintaining traditional Thai flavors. The HTD emphasized low-fat, plant-based ingredients, including whole grains, fruits, vegetables, legumes, nuts, mushrooms, tea, and coffee. Animal products were used sparingly, primarily as flavor enhancers (eg, fish sauce, shrimp paste), and the diet was designed to be low in added sugars, with a preference for natural sources of sugar high in fiber, such as fresh fruits. Participants in this group were encouraged to eat until satiety without counting or restricting calories.

At the start of the study, participants in the HTD group attended a 2-week Healthy Thai cooking workshop organized by the research team. During this workshop, they were trained to prepare the 77 Thai recipes (eg, Phat Kaphrao, Kway Teow, Som Tum, Massaman curry, Nam Prik, Thai pumpkin custard), which they subsequently continued to prepare at home. Participants were allowed to adapt cooking methods and flavors to their personal preferences, provided they adhered to the core principles of the HTD. The quality of the meals consumed by participants was monitored through daily photographic food logs, which were submitted throughout the 12-week intervention period.

CTD: Participants in the CTD group continued their usual dietary practices, representative of the typical foods consumed by the general Thai population during the study period. No specific dietary restrictions or modifications were imposed. As with the HTD group, the quality of the meals consumed was monitored through daily photographic food logs submitted by the participants over the 12-week period.

Sample and Data Collection

Samples and data were collected at 3 distinct time points: (i) baseline - including an initial physical examination (eg, body weight and blood pressure), collection of chronic disease medication history, and collection of blood and stool samples; (ii) after 2 weeks - collection of stool samples; and (iii) final (after 12 weeks) - including a final physical examination (eg, body weight and blood pressure), collection of chronic disease medication history, and collection of blood and stool samples.

Laboratory Analysis

Blood samples were collected from all participants at the above-mentioned time points during the study. These samples were analyzed at Bangkok R.I.A. Lab, a certified laboratory facility that meets the quality standards of ISO 9001:2015, LA, and ISO 15189. This study evaluated the impact of dietary interventions primarily on the following blood biomarkers, FBS (mg/dL) and LDL-C (mg/dL).

The gut microbiome from stool samples was analyzed and profiled at CPF Food Research and Development Center (Thailand) using metataxonomic, specifically 16S rRNA gene sequencing. Raw sequences were processed and profiled using the Greengenes database,[20] which is a chimera-checked 16S rRNA gene reference database, to generate taxonomic classifications. Gut microbiome diversity was reported based on relative abundance at both the phylum and genus levels.

Statistical Analysis

All data were analyzed using IBM SPSS version 19.0 (IBM SPSS Statistics for Windows, Version 19.0. Armonk, NY: IBM Corp; 2010). The analysis was divided into 2 parts; (i) descriptive statistics to detail the characteristics of the sample group, presented in frequency distribution and percentage tables; (ii) comparative characteristics analysis between groups using the student's *t* test, with significance set at ≤ .05, and within-group comparisons before and after the experiment using the paired *t* test, with significance set at ≤ .05. If the normality assumption check indicated that the data were not normally distributed, nonparametric statistics were applied. Specifically, the Mann-Whitney *U* test was used in place of the student's *t* test, and the Wilcoxon signed-rank test was substituted for the paired *t* test.

Results

After the recruitment announcement through social media, a total of 113 individuals applied to participate in the study. Of these, 65 met the inclusion criteria, and 62 confirmed their availability to join the study. Baseline data and characteristics of the sample group were divided by general information and key health indices for NCDs (Table 1).

Following computerized blocked randomization, the participants were divided into 2 groups: 30 participants in the HTD group and 32 in the CTD group. Six participants from the CTD group withdrew before the completion of the study, whereas no withdrawals were recorded in the HTD group.

Body Weight and BMI

Participants in the HTD group experienced an average weight loss of 3.03 kg after switching to this diet for 12 weeks, while participants in the CTD group, who did not alter their eating habits, had an average weight gain of 0.43 kg. The weight change between these 2 groups was statistically significant ($P < .01$). Further analysis of weight changes in participants with overweight or obesity issues, defined as having a BMI of 23 kg/m^2 or higher at the start of the study, revealed that participants from the HTD group managed to reduce their weight by an average of 3.99 kg. In contrast, participants from the CTD group had an average weight increase of 0.04 kg. This difference in weight changes was statistically significant ($P < .01$) (Table 2).

The trend of weight reduction in the HTD group was observable as early as the first 2 weeks of the study when the participants attended the Healthy Thai cooking workshop. Comparing the weights before and after the workshop, participants lost an average of 2 kg (from 61 kg to 59 kg) (Figure 1).

Participants in the HTD group did not change other aspects of their lifestyle beyond adopting the HTD. They were instructed to maintain their usual levels of physical activity and exercise throughout the study, without altering their routines from before joining the study.

Blood Pressure

After 12 weeks, participants in the HTD group experienced an average reduction in systolic blood pressure of 17.4 mmHg. In contrast, participants in the CTD group saw a smaller average reduction of 6.3 mmHg. The difference in systolic blood pressure reduction between the 2 groups was statistically significant ($P = .05$) (Table 2).

When analyzing the changes in blood pressure among participants who had a baseline systolic blood pressure of 140 mmHg or higher, it was found that the HTD group experienced an average reduction of 31.7 mmHg, compared to just 12 mmHg in the CTD group. This difference was also statistically significant ($P = .01$) (Table 2).

The trend of lowering blood pressure in the HTD group was evident as early as the first 2 weeks. During the initial Healthy Thai cooking workshop, a comparison of systolic blood pressure before and after the workshop revealed an average reduction of 10 mmHg (from 134 mmHg to 124 mmHg) (Figure 2).

Throughout the 12-week study, there was no need to adjust the antihypertensive medication dosage for participants in the HTD group who were on blood pressure medication.

Cholesterol

After 12 weeks, the HTD group showed an average reduction in LDL cholesterol of 20.43 mg/dL, whereas the CTD group saw a smaller average decrease of 10 mg/dL. The change in LDL-C levels within the HTD group, comparing pre- and post-intervention, was statistically significant ($P < .01$). However, when comparing the changes between the 2 groups, the difference was not statistically significant ($P = .18$) (Table 2).

Table 1. Demographics and Health Indices

Characteristic	No. (%)		
	HTD Group (n = 30)	CTD Group (n = 32)	All (N = 62)
Sex			
Female	22 (73.33)	25 (78.13)	47 (75.80)
Male	8 (26.67)	7 (21.87)	15 (24.20)
Age, y			
< 51	5 (16.67)	5 (15.62)	10 (16.13)
51 - 60	9 (30.00)	11 (34.38)	20 (32.26)
61 - 70	15 (50.00)	12 (37.50)	27 (43.55)
> 70	1 (3.33)	4 (12.50)	5 (8.06)
BMI, kg/m^2			
< 23	12 (40.00)	14 (43.75)	26 (41.94)
≥ 23	18 (60.00)	18 (56.25)	36 (58.06)
Systolic BP, mmHg			
< 140	17 (56.67)	16 (50.00)	33 (53.23)
≥ 140	13 (43.33)	16 (50.00)	29 (46.77)
LDL-C, mg/dL			
< 130	12 (40.00)	18 (56.25)	30 (48.39)
≥ 130	18 (60.00)	14 (43.75)	32 (51.61)
FBS, mg/dL			
< 100	22 (73.33)	17 (53.12)	39 (62.90)
≥ 100	8 (26.67)	15 (46.88)	23 (37.10)
Individuals on chronic disease medication prior to the study			
Antihypertensive medication	12 (40.00)	14 (43.75)	26 (41.94)
Lipid-lowering medication	18 (60.00)	14 (43.75)	32 (51.61)
Diabetes medication	4 (13.33)	7 (21.88)	11 (17.74)

Abbreviations: BMI, body mass index; BP, blood pressure; FBS, fasting blood sugar; LDL-C, low-density lipoprotein cholesterol.

Table 2. Effect of Different Dietary Patterns on Key Health Indices

Characteristic	Mean (SE)								*P* Value
	HTD Group (n = 30)				CTD Group (n = 32)				
	At Baseline	At Week 12	Change	*P* Value	At Baseline	At Week 12	Change	*P* Value	
Body weight, kg									
All	60.47 (1.95)	57.44 (1.86)	-3.03 (0.42)	< .01	59.74 (0.27)	60.17 (0.27)	0.43 (0.56)	.15	< .01
BMI ≥ 23 kg/m^2	66.06 (2.28)	62.07 (2.31)	-3.99 (0.51)	< .01	67.84 (2.40)	67.88 (2.65)	0.04 (0.65)	.83	< .01
BMI ≥ 25 kg/m^2	71.37 (3.03)	67.17 (3.19)	-4.20 (0.86)	< .01	70.90 (3.29)	70.99 (3.86)	0.09 (0.87)	.74	< .01
BMI, kg/m^2	23.70 (0.59)	22.64 (0.53)	-1.06 (0.18)	< .01	23.44 (0.8)	23.64 (0.77)	0.21 (0.14)	.08	< .01
Systolic BP, mmHg									
All	133.77 (4.65)	116.37 (2.31)	-17.40 (3.45)	< .01	134.48 (2.74)	128.20 (3.87)	-6.28 (4.02)	.10	.05
≥ 140 mmHg	155.31 (5.90)	123.62 (3.21)	-31.69 (3.85)	< .01	145.11 (1.91)	133.11 (6.53)	-12.00 (6.99)	.09	.01
Diastolic BP, mmHg	79.73 (2.58)	71.33 (1.75)	-8.40 (1.88)	< .01	81.24 (2.32)	78.09 (2.41)	-3.14 (2.18)	.16	.08
LDL-C, mg/dL									
All	145.63 (10.63)	125.20 (8.56)	-20.43 (5.7)	< .01	128.08 (7.08)	118.08 (7.47)	-10.00 (5.01)	.06	.18
≥ 130 mg/dL	182.39 (10.42)	148.28 (10.35)	-34.11 (5.53)	< .01	158.08 (6.96)	145.17 (8.42)	-12.92 (8.93)	.18	.04
Total cholesterol, mg/dL	220.07 (10.52)	192.73 (8.27)	-27.33 (6.47)	< .01	198.62 (18.01)	190.35 (18.33)	-8.27 (14.81)	.09	.03
FBS, mg/dL									
All	96.33 (3.18)	92.57 (2.35)	-3.77 (2.36)	.17	102.77 (5.58)	102.62 (4.08)	-0.15 (5.57)	.86	.42
> 100 mg/dL	118.38 (7.47)	107.75 (5.19)	-10.63 (8.23)	.23	120.58 (9.89)	112.67 (5.92)	-7.92 (10.48)	1.00	.48
Use diabetes medication	132.50 (11.09)	113.75 (9.59)	-18.75 (16.11)	.23	124.20 (26.23)	116.60 (10.89)	-7.60 (28.58)	1.00	.47
eGFR, mL/min	84.89 (2.84)	88.32 (2.7)	3.43 (1.51)	.02	91.84 (2.70)	91.53 (2.44)	-0.31 (1.16)	.61	.02
hsCRP, mg/L	4.37 (3.21)	0.93 (0.30)	-3.44 (3.20)	< .01	2.53 (0.74)	1.98 (0.74)	-0.61 (1.15)	.30	.06

Abbreviations: BMI, body mass index; BP, blood pressure; eGFR, estimated glomerular filtration rate; FBS, fasting blood sugar; hsCRP, high-sensitivity C-reactive protein; LDL-C, low-density lipoprotein cholesterol.

Figure 1. Average Daily Body Weight of the Healthy Thai Diet Group During the First 2 Weeks of Dietary Change

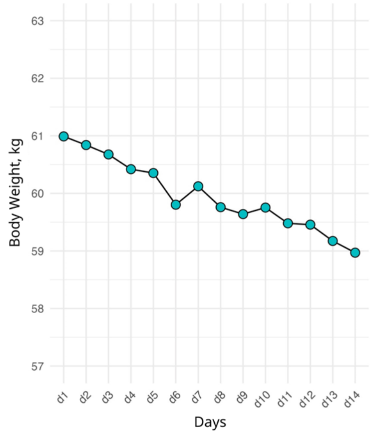
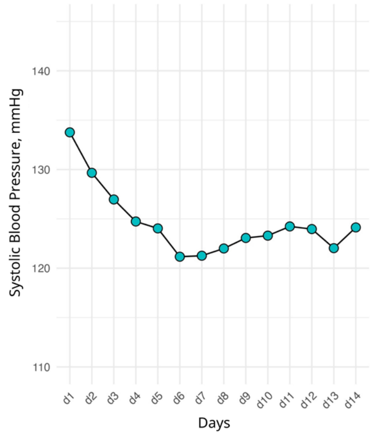


Figure 2. Average Daily Systolic Blood Pressure of the Healthy Thai Diet Group During the First 2 Weeks of Dietary Change



When focusing on participants with initial LDL-C levels of 130 mg/dL or higher, the HTD group exhibited a substantial average reduction of 34.11 mg/dL, compared to a reduction of only 12.92 mg/dL in the CTD group. This difference was statistically significant ($P < .05$) (Table 2).

The trend of decreasing LDL-C levels in the HTD group was evident from the first 2 weeks, similar to the reductions observed in blood pressure and body weight. During the cooking workshop, the average LDL-C level decreased by 18 mg/dL (from 146 mg/dL to 128 mg/dL). Additionally, participants with extremely high LDL-C levels, those exceeding 190 mg/dL at the baseline, managed to reduce their LDL-C by an average of 50 mg/dL (from 229 mg/dL to 179 mg/dL) within the first 2 weeks.

Throughout the 12-week study period, participants in the HTD group who were on lipid-lowering medication prior to the study did not increase their medication dosage.

Blood Glucose Levels

For participants diagnosed with diabetes and receiving medication at the start of the study who were in the HTD group, it was observed that they were able to maintain stable blood glucose levels while reducing their oral medication to just a single type. Additionally, for those who were on insulin injections, the dosage could be reduced by 30% without any increase in blood glucose levels (Table 2).

Gut Microbiota

The characteristics of the gut microbiota in participants from the HTD group showed significant changes at the phylum level after 12 weeks of consuming the HTD. Specifically, there was a decrease in bacteria from the *Bacteroidota* and *Fusobacteriota* phyla, while the number of bacteria from the *Firmicutes* phylum increased (Table 3). These changes in the gut microbiota were also observable in the first 2 weeks of the study. The shift included a decrease in *Bacteroidota* and *Fusobacteriota*, and an increase in *Firmicutes* (Table 4).

When analyzing the genus level of gut microbiota in the HTD group, it was found that several genera capable of producing short-chain fatty acids, such as *Agathobaculum, Butyribacter, Eubacterium, Lachnospiraceae,* and *Gordonibacter,* increased steadily from the beginning to the end of the study. In contrast, some genera, such as *Granulicatella, Lawsonibacter, Ruminococcus, Phocaeicola,* and *Phocea,* showed a continuous decline.

Table 3. The Relative Abundance of the 3 Phyla of Gut Microbiota in Both Groups of Participants Compared at the Start and the End of the Study

Gut Microbiota	Mean (SE)					
	HTD Group (n = 30)			CTD Group (n = 26)		
	At Baseline	At Week 12	*P* Value	At Baseline	At Week 12	*P* Value
Bacteroidota	0.355 (0.015)	0.310 (0.016)	.02	0.342 (0.019)	0.310 (0.017)	.23
Fusobacteriota	0.003 (0.001)	0.001 (0.001)	.03	0.006 (0.004)	0.004 (0.002)	.37
Firmicutes	0.495 (0.017)	0.536 (0.017)	.02	0.514 (0.023)	0.553 (0.021)	.18

Table 4. The Relative Abundance of 3 Bacterial Phyla in the HTD Group Compared at the Start of the Study and After 2 Weeks Following the Dietary Change

Gut Microbiota	Mean (SE)		
	HTD Group (n = 27*)		
	At Baseline	At Week 2	*P* Value
Bacteroidota	0.348 (0.015)	0.29 (0.014)	< .01
Fusobacteriota	0.003 (0.001)	0.002 (0.001)	.02
Firmicutes	0.497 (0.017)	0.575 (0.019)	< .01

* The sample size was reduced (from 30 to 27 samples) because 3 samples collected after the first 2 weeks did not pass the quality control.

Discussion

The demographic characteristics of the participants in both groups revealed that the majority were aged 50 and above and were female. Over 60% were either overweight or obese, and more than 40% were currently taking medication for hypertension. Additionally, over 50% were on lipid-lowering medications, and nearly 20% were using diabetes medications. The use of these medications did not affect the study's outcomes, as the distribution of medication use was evenly spread across both groups. Participants in both groups were advised to maintain their current medication dosages without any adjustments during the study, except for those in the HTD group who were on diabetes medication. These participants were advised to reduce their diabetes medication dosage after starting the HTD to prevent hypoglycemia. Throughout the study, participants in both groups were also advised to maintain their usual level of physical activity, ensuring that it did not increase or decrease from their prestudy routine.

Regarding the dietary pattern, which was the main independent variable in this study, participants in the HTD group were advised to adhere as closely as possible to the principles of the HTD. They were encouraged to prepare meals at home whenever possible and to eat out only when necessary, while strictly following the research study's dietary guidelines. Meanwhile, participants in the control group, who followed the CTD, were instructed to continue consuming their usual diet without altering their cooking methods or ingredients during the study. Before the study concluded, 1 participant in the CTD group requested to withdraw due to a desire to switch to a plant-based diet. Additionally, 5 other participants withdrew due to difficulties in attending the final physical examination and blood tests at the end of the study.

HTD proved to be effective for weight loss in individuals who were overweight or obese. Participants were able to eat until full without needing to restrict food intake, count daily calories, or engage in intermittent fasting. Daily weight tracking during the first 2 weeks showed a gradual and steady reduction in body weight, achieved without increasing physical activity or exercise.

In terms of the effects of the HTD on blood pressure, the diet effectively reduced systolic blood pressure, especially in individuals with baseline readings above 140 mmHg. This reduction became noticeable within the first 2 weeks. The participants did not focus on consuming specific herbs known for lowering blood pressure; rather, they emphasized a diet rich in a wide variety of plant-based foods, with the principle being "the more variety, the better". The results of the HTD on blood pressure were consistent with studies on the Dietary Approaches to Stop Hypertension (DASH) diet,[13] suggesting that a plant-based diet, when combined with traditional Thai seasonings like coconut milk, shrimp paste, fish sauce, and fermented fish, could serve as an effective tool for managing hypertension.

HTD effectively reduced LDL-C, particularly in participants with baseline LDL-C levels above 130 mg/dL. Notably, this reduction was observable in the first 2 weeks. Although the HTD included dishes prepared with coconut milk, which contains a high proportion of saturated fats, the typical Thai diet is varied, with coconut milk used only in certain meals or on certain days. In contrast, plant-based ingredients, which were a staple in the HTD, generally have a naturally low-fat content compared to animal-based foods like meat, dairy, eggs, butter, and cream. For instance, red beans derive only 3% of their calories from fat, while eggs have 60%, minced pork 70%, and chicken thighs 90%. This inherent low-fat characteristic of the HTD meant there was no need for calorie counting.

Regarding the effects on diabetes, the diet allowed diabetic patients to reduce their medication dosage without causing an increase in blood sugar levels. This finding aligned with previous studies that have suggested a high intake of animal products could lead to the accumulation of intramyocellular lipids in muscle cells, ultimately resulting in insulin resistance.[21, 22] When participants reduced their consumption of meat, dairy, and eggs and increased their intake of plant-based foods, these conditions gradually improved, leading to enhanced insulin sensitivity.[23, 24] As a result, the body became more efficient at transporting glucose from the bloodstream into muscle cells.

In terms of the difficulty of transitioning from the CTD to the HTD, retaining the full range of traditional Thai seasonings — whether they come from plants or animals, contain fat or not — while focusing on changing the primary ingredients, such as replacing chicken with mushrooms or eggs with tofu made from beans, made the transition smoother. This approach minimized the need for drastic adjustments to the taste of the food, making the dietary shift easier to adopt.

The metataxonomic analysis of gut microbiota from both groups revealed that switching to the HTD led to significant changes in the gut microbiota composition, observable as early as the first 2 weeks after the dietary change. Notably, the HTD increased the abundance of certain bacterial genera, particularly those involved in the production of short-chain fatty acids through genes and enzymes associated with the acetyl-CoA metabolism pathways.[25, 26] This finding aligned with previous research indicating that short-chain fatty acids production in the gut is influenced by the consumption of prebiotic-rich foods such as vegetables, fruits, whole grains, legumes, nuts, and seeds.

Additionally, this study incidentally found that the HTD was associated with improvements in kidney function, as indicated by significant changes in the estimated glomerular filtration rate (eGFR). Although eGFR was not originally anticipated to be a primary or secondary outcome measure, the findings have suggested potential benefits of the diet on renal health. Furthermore, the study observed a statistically significant decrease in high-sensitivity C-reactive protein (hsCRP) levels in the HTD group ($P < .01$), indicating an additional potential anti-inflammatory effect of the diet.

This study had some limitations that should be acknowledged. The reliance on self-reported dietary data might have introduced bias, as participants might not have accurately report their food intake. Future research should aim to confirm these findings in a larger clinical trial with an extended study period, potentially 5 years or more, to better capture long-term outcomes such as mortality or adverse clinical outcomes associated with NCDs. Expanding the sample size and duration could provide more robust evidence for the potential benefits of the HTD as a dietary intervention.

Conclusions

This study conducted a randomized controlled trial comparing the effects of the CTD, commonly consumed across Thailand, with the HTD, which retains traditional Thai seasonings such as chili, coconut milk, shrimp paste, fish sauce, and fermented fish, but substitutes other ingredients entirely with plant-based foods and avoids animal products. The findings have indicated that the HTD was associated with weight loss in individuals who were overweight, a reduction in blood pressure in those with hypertension, a decrease in cholesterol levels in those with high cholesterol, a reduction in diabetes medication without increasing blood sugar levels in diabetic patients, and an increase in gut microbiota diversity, particularly in genera that produce beneficial short-chain fatty acids. Additionally, the HTD was linked to improved kidney function. These results provide robust evidence to support dietary changes for the prevention and treatment of chronic diseases in the general population and could inform future health promotion and disease prevention policies at the national level.

Additional Information

Acknowledgments: To facilitate the application of these findings, the research team has made all accompanying research materials, including the 77 Healthy Thai Diet recipes, freely available online for public use. The research team would like to express their gratitude to the CPF Food Research and Development Center for their generous funding of this study, which was provided without any attached conditions or obligations.

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