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The Impacts of Vegetables and Fruits Smoothies on Reducing Risk of Hypertension

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ABSTRACT: Since 2019, the majority of people in Thailand have been at risk of hypertension. This appears to be due to the low daily consumption of vegetables and fruits in Thai people. However, the impact of food processing, such as blending (smoothies), on vegetables and fruits is somewhat obscure. Thus, we do this survey research to investigate whether consuming vegetables and fruit as a fresh and blended form has any impact on reducing the risk of hypertension in Thailand. We conducted a survey research and collected data from 567 participants using an online survey questionnaire through Google Forms. Unfortunately, some participants have to be excluded due to answering errors, so only 418 participants were included in the final analysis. Statistics Products and Service Solutions (SPSS) was used for data analysis, so we can divide the questionnaire into 3 parts that are related to the topic, including general information by using multiple choices, daily vegetable and fruit consumption, and lifestyle behaviors that reduce the risks of hypertension. Descriptive statistics were used to illustrate the mean and standard deviation of daily vegetable and fruit consumption and lifestyle behaviors that reduce the risks of hypertension. From our results, the independent samples t-test revealed a significant difference in the lifestyle that reduces the risk of hypertension between participants who use and do not use pain relievers. One-way ANOVA (F-test) also showed a significant difference in the lifestyle that reduces the risk of hypertension between different age groups. Pearson's correlation was used to investigate the correlation between hypertension risk and consumption of vegetables and fruits. We discovered that the consumption of vegetables and fruit does have a significant positive correlation to hypertension risk for both eaten fresh and as smoothies. However, the Pearson correlation obtained for smoothie consumption ($r = 0.331$) is less than that of fresh vegetable and fruit consumption ($r = 0.42$). Subsequently, we can conclude that fresh vegetable and fruit consumption can reduce the risk of hypertension more than vegetable and fruit smoothie consumption. Nevertheless, it is related to the specific participants who usually consume vegetable and fruit smoothies. Moreover, we believe that the reader will obtain numerous benefits from this research, including ways to reduce the risk of hypertension and alternative ways to consume vegetables and fruits.

KEYWORDS: hypertension, vegetable and fruit smoothies, vegetable and fruit consumption

INTRODUCTION

Nowadays, there are a lot of people who are at risk of hypertension. According to the Thai population who have hypertension, the statistical percentage of the hypertension rate in Thai people has been dramatically increasing since 2019 (Wichai Aekplakorn et al., 2024). The percentage of hypertension rate in the Thai population has been approximately 25.7%, which contains 24.6% from males and 26.8% from females. Subsequently, the risk of hypertension is on the upward trend, so everyone should be aware of this disease. Hypertension is a disease when your body contains high blood pressure (140/90 mmHg or higher for people who are below 70 years old) for a long time. Hypertension exhibits several symptoms, including severe chest pain, heart palpitations, dramatic headaches, and nausea (Kowalski et al., 2023). One can make a fundamental diagnosis from these simple symptoms that if someone is experiencing these symptoms for a long time, they are likely to be at risk of hypertension. Furthermore, hypertension can lead to various impacts on health. For instance, hypertension manipulates the important risk of various types of stroke, including ischemic stroke, intracerebral hemorrhage, and aneurysmal subarachnoid hemorrhage. Stroke is a disease that is caused by a blockage of arteries in the brain, which obstructs the blood transportation to the brain. Consequently, the stroke can lead to mortality. According to Benjamin Maïer, approximately 10.4 million people worldwide died from hypertension (Dubow & Fink, 2011). Moreover, hypertension can accelerate dementia. However, this relation is not only complicative but also slightly ambiguous. Several empirical studies have discovered that there is an association between hypertension and worse cognitive function, including

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older people who have had a history of the vascular-related disease (Sierra, 2020). In spite of the severe damage of hypertension, there are a lot of treatments that you can follow to recover from the worsened damage of hypertension, be it medication or lifestyle change.

Treating hypertension by changing people's lifestyles includes adjusting sleep hours, doing exercise, doing activities that help to relieve stress, quitting smoking, and consuming a healthy diet. A healthy dietary pattern that one could change includes eating low amounts of sodium, fat, and sugar, manipulating your alcohol consumption, and often consuming vegetables and/or fruits (Carey et al., 2022). According to the global statistics of vegetable consumption, the trend is absolutely increasing due to the upward trend of the economy of vegetable products since the growth of the vegetable products industry during the forecast period of 2024-2023 (Data, 2023). According to vegetables and/or fruit puree, people worldwide often consume puree made from numerous materials (approximately 10 materials). Moreover, this paper illustrates the impact of various factors of materials in vegetables and/or fruits, including temperatures, moistures, and blending (smoothie). Subsequently, people in the present really prefer to consume vegetables caused by inquiring about a better life. In addition, there are a lot of advantages of vegetable consumption, including gaining good health and reducing the risk of chronic disease such as cardiovascular disease (Dhandevi PEM & Rajesh JEEWON, 2015). As a result, the majority of people in the world actually require consuming vegetables and/or fruits to avoid the risk of chronic disease. Additionally, there are tremendous people who usually consume vegetables and/or fruits for good health. Eventually, they actually consume smoothies which are made from the fruits and/or vegetables of their daily life. Consequently, consumption of vegetables and/or fruits can increase. Among the various species of vegetables, the vegetables that can avoid the risk of hypertension disease are green-leafed vegetables and berries (Wang et al., 2012). Support on which vegetable or fruit lowers hypertension (Madsen et al., 2023). According to the mechanism of the materials in vegetables, the association between high intake of vegetables and fruits and low risk of chronic disease. There are biologic procedures that are the reasons why vegetables and/or fruits can prevent chronic disease risk, including the vitamin mechanism and the releasing of the hormones that control our health (Lampe, 1999b). Eventually, the population of people who consume vegetables to avoid the risk of chronic disease is more well known and increasing immediately since scientists have discovered the benefits of the vegetables from 2007 until the present (Boeing et al., 2012).

Most research evidence shows the link between green leafy vegetable consumption and hypertension. According to the mechanisms to decrease the risk of hypertension, the vegetables and fruits contain various materials that are beneficial to your health. However, there are no reports whether consuming vegetables and/or fruit in different processing methods can particularly avoid the risk of hypertension. Thus, we conducted a survey to investigate the effect of consuming vegetables and fruits by different processing methods on reducing hypertension risk in Thailand. Consequently, there are a lot of benefits of consuming vegetables to decrease the risk of hypertension, which is the vascular-related disease that is a deadly and chronic disease causing mortality in society. This research funding aims to improve the health of the social population in Bangkok, and hopefully this study will motivate people not just to consume but also to consume them in the correct way.

INSTRUMENT

Part 1: General information

1. Gender
2. Age
3. Health check-up
4. History of vascular-related disease
5. History of stress
6. Consumption vegetables and/or fruits
7. Smoking
8. Pain relievers

Part 2 : Daily vegetables and fruits consumption

1. You often consume vegetables.
2. You often consume green-leafy vegetables.
3. You often consume berries.
4. You often consume tomatoes.

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5. You often consume potatoes.
6. How often do you consume nuts?
7. How often do you consume vegetable and fruit smoothies?
8. You often consume fresh fruits and/or vegetables.
9. You often consume cooked fruits and/or vegetables. 10. You often consume cooked fruits and/or vegetables.

Part 3 : Lifestyle behaviors that reduce the risks of hypertension

1. You often sleep 7- 8 hours.
2. You often eat a balanced diet.
3. You often exercise.
4. You often consume foods high in sodium.
5. You often consume food that contains a high level of sugar.
6. You often have a headache.
7. You often have chest pain.
8. You often feel short of breath or experience wheezing.
9. You often feel dizzy.
10. You often experience palpitations.

METHODOLOGY

The survey research was directed to divulge the association between daily fruit and vegetable consumption and reducing risks of hypertension in the Bangkok population. The questionnaires were divided into 3 parts: 1) General information by using the multiple choice. 2) Daily vegetable and fruit consumption 3) Lifestyle behaviors that reduce the risks of hypertension which were used on the 5-point Likert scales including never, occasionally, sometimes, usually, and always. Moreover, because of the sampling procedure, the survey used a convenience sampling method to declare the correlation. Each question was adapted by three specialists and acquired the Item-Objective Congruence (IOC) index scores higher than or equal to 0.5. Furthermore, Cronbach's alpha was applied for determining the reliability of questionnaires; there was an allowable value of 0.894, which mentioned high internal consistency (Taber, 2018). Regarding conduction, the survey was started by Google Forms, Line, and Instagram applications throughout January-February 2025. We derived a total of 418 participants. Exactly, in this study, we manipulated the Statistical Package for the Social Scientist (SPSS) version 30.0.0.0 release to assign the data. Pearson's correlation (r-value) was utilized to discover the correlation between variables, and a t-test was used to observe the difference between the 2 groups. Meanwhile, an F-test (ANOVA) was acquired to notice the difference between over 2 groups.

RESULT

Table 1: General information (N = 418)

	Frequency	Valid percent
Gender		
Male	131	31.3
Female	278	66.5
Other	9	2.2
Age		
Below 20 years old	98	23.4

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20-39 years old	81	19.4
40-65 years old	232	55.5
Above 65 years old	7	1.7
Health check-up		
Yes	290	69.4
No	128	30.6
History of vascular related disease		
Yes	27	6.5
No	391	93.5
History of stress		
Yes	127	30.4
No	291	69.6
Consumption of vegetables and/or fruits		
Yes	360	86.1
No	58	13.9
Smoking		
Yes	55	13.2
No	363	86.8
Pain relievers		
Yes	174	41.6
No	244	58.4

Table 1 shows general information of 567 participants. The majority of participants was female, consisting of 278 participants (66.5%). The most participants are 40-65 years old, consisting of 232 participants (55.5%). Many participants go for health check-ups every year 290 people (69.4%). Most of them do not have a history of vascular-related disease: 391 people (93.5%) and do not

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have a history of stress: 291 people (69.6%). 360 people (86.1%) usually consume vegetables and/or fruits. Most participants do not have a history of smoking, consisting of 363 participants (86.8%). 58.4% (244 participants) do not often take pain relievers.

Table 2: Descriptive statistics (mean and standard deviation)

	N	Mean	Std. Deviation
Daily vegetables and fruits consumption	418	3.14	0.795
Lifestyle behaviors that reduce the risks of hypertension	418	2.55	0.605

Table 2 illustrates mean and standard deviation of daily vegetables and fruits consumption and lifestyle behaviors that reduce the risks of hypertension. Mean of daily vegetables and fruits consumption is 3.14 and standard deviation was 0.795. Mean of lifestyle behaviors that reduce the risks of hypertension is 2.55 and standard deviation was 0.605.

Table 3: Independent samples t-test: lifestyle behaviors that reduce the risks of hypertension and pain relievers

	Pain relievers	N	Mean	Std. deviation	t	p
Lifestyle behaviors that reduce the risks of hypertension	Yes	174	2.70	0.656	4.402**	<0.01
	No	244	2.44	0.540		

**. Causation is significant at the 0.01 level (2-tailed)

Table 3 shows results of an independent sample t-test of lifestyle behaviors that reduce the risks of hypertension and pain relievers. 174 participants often take pain relievers and 244 participants do not often take pain relievers. Mean of people that often take pain relievers was 2.70 and standard deviation was 0.656. While the mean of people that do not often take pain relievers was 0.540. The table shows that t-value is 4.402 and p-value < 0.001, which is <0.05, so there is a significant causation between pain relievers and lifestyle behaviors that reduce the risks of hypertension.

Table 4: One-way ANOVA (F-test); age and lifestyle behaviors that reduce the risks of hypertension

	SS	df	MS	F	P
Between Groups	14.360	3	4.787	14.335**	<0.01
Within Groups	138.242	414	0.334		
Total	152.603	417			

**. Causation is significant at the 0.01 level (2-tailed)

Table 4 illustrates one-way ANOVA (F-test) of age and lifestyle behaviors that reduce the risks of hypertension, obtaining a p-value of <0.001, which this value is less than 0.05. Meanwhile, the table shows a significant difference in hypertension risk between different age groups. According to the result, it shows that people who have higher ages contain the more risk of hypertension. Meanwhile, there is various research that encourages the results. Consequently, the result below shows that there are various correlations between ages and hypertension (Wang et al., 2020).

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Table 5: Pearson's correlation between daily vegetable and fruit consumption and lifestyle behaviors that reduce the risks of hypertension

		Daily vegetables and fruits consumption	Lifestyle behaviors that reduce the risks of hypertension
Daily vegetables and fruits consumption	Pearson Correlation	1	0.420**
	Sig. (2-tailed)		<0.01
	N	418	418
Lifestyle behaviors that reduce the risks of hypertension	Pearson Correlation	0.420**	1
	Sig. (2-tailed)	<0.01	
	N	418	418465

**. Causation is significant at the 0.01 level (2-tailed)

Table 5 illustrates Pearson's correlation coefficient between the daily vegetable and fruit consumption and lifestyle behaviors that reduce the risks of hypertension. The results show that two factors have a significant correlation (r = 0.42), supporting our hypothesis that there is a positive correlation. Consequently, we can assume that daily lifestyle behaviors have correlation with daily vegetable and fruits consumption.

Table 6: Pearson's correlation between processed (smoothie) vegetable and fruit consumption and lifestyle behaviors that reduce the risk of hypertension

		Vegetables and fruits processed consumption	Lifestyle behaviors that reduce the risks of hypertension
Vegetables and fruits processed consumption	Pearson Correlation	1	0.331**
	Sig. (2-tailed)		<0.01
	N	418	418
Lifestyle behaviors that reduce the risk of hypertension	Pearson Correlation	0.331**	1
	Sig. (2-tailed)	<0.01	
	N	418	418465

**. Correlation is significant at the 0.01 level (2-tailed)

Table 6 illustrates a positive correlation between vegetable and fruit consumption and lifestyle behaviors that reduce the risk of hypertension (r = 0.331). According to the results, processed (smoothie) vegetables and fruits consumption can reduce the risk of hypertension. However, it is not higher than fresh vegetables and fruits consumption. Despite that, it is one of the ways which encourages people who hardly consume vegetables and fruits.

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DISCUSSION

Nowadays, the majority of people usually have a risk of hypertension caused by the worsening lifestyles that can lead to hypertension. Therefore, people' do not usually consume vegetables. Eventually, people's preconceived notions about whether you consume vegetables and/or fruits with smoothies might decline the beneficial nutrients. However, vegetable and/or fruit smoothies can increase the advantages of vegetables and/or fruits because smoothies contain tremendous surface areas, so the intestine in your body can easily absorb the materials. Accordingly, we decided to do this research to solve the problems about chronic disease called hypertension. We anticipate that if people increasingly intend to consume vegetables and/or fruits, they will avoid the risk of the chronic disorder from hypertension. Furthermore, fruits and/or vegetables contain numerous vitamins, which have a lot of beneficial assistance to your health. Consequently, we encourage people to consume vegetables and/or fruit smoothies for better health and avoid some chronic diseases.

According to Table 2, the descriptive statistics of 418 participants illustrate the mean (3.14) and standard deviation (0.795) of daily vegetable and fruit consumption and the mean (2.55) and standard variable (0.605) of lifestyle behaviours that reduce the risks of hypertension. As reported by the means, it is the average of a set number. It is calculated by summarizing all the numbers together and then dividing by total count of numbers. Meanwhile, the midpoint of this statistic is 3, higher point is 5, and lower point is 1. According to the vegetable and fruit consumption's means, it illustrates that the majority of participants usually consume vegetables and fruits in a moderate amount. Moreover, the lifestyle behaviors that reduce the risks of hypertension mean demonstrate that the majority of participants do not have hypertension.

From Table 3, the result shows the impact of lifestyle behaviors that reduce the risks of hypertension does have a significant difference between participants who consume pain relievers and participants who do not often take pain relievers. Moreover, the majority of people believe that consuming pain relievers can reduce the risks of hypertension. According to the results, it demonstrates that consuming pain relievers has correlations with reducing the risk of hypertension. Subsequently, we can summarize that consuming pain relievers can decrease the risks of hypertension. Furthermore, when you consume an enormous value of pain relievers, it can destroy your physical and mental health since they overstimulate your organ system, so it accelerates to reduce the risk of hypertension (Rivasi et al., 2022). Providing evidence supporting our hypothesis that there is a causation between lifestyle behaviors that reduce the risks of hypertension and pain relievers.

As reported by Table 4, it illustrates that there are the impacts of age in lifestyle behaviors that reduce the risk of hypertension. Concurrently, the majority of participants are between the ages of 40-65, so they have the risk of hypertension. When your age is too much, your body health will deteriorate. Subsequently, it can lead to hypertension. Consequently, people in this range have adequate health care services, so it is one of the reasons that can accelerate hypertension based on global health care services (World Health Organization, 2017). As stated in Table 5, there is a moderate positive correlation between the daily vegetable and fruit consumption and lifestyle behavior that reduces the risk of hypertension ($r = 0.420$). Eventually, some categories of fruits and vegetables, including green-leafed vegetables and berries, contain numerous vitamin K, which is the substance that can make the blood flow easily. Focusing on the vitamin K accelering blood flow easily, vitamin K may help keep blood pressure lower by preventing mineralization, where minerals build up in the arteries (Mladěnka et al., 2021). This enables the heart to pump blood freely through the body and so reduces the risk of hypertension. Despite that, hypertension also relates to one's lifestyle behavior as this has been demonstrated by Li et al., where they displayed many correlations between lifestyle behavior and hypertension across many countries (Li et al., 2016).

Similarly, Table 6 also displays a positive correlation between processed vegetable and fruit consumption and lifestyle behavior that reduces the risk of hypertension ($r = 0.331$). Even though the processed vegetable and fruit consumption, including smoothies and purees, makes the food consumed to have more surface area. This allows food to be easily digested and absorbed in the intestine. The results from Tables 5 and 6 reveal that the correlation of vegetable and fruit consumption is lower in processed (smoothie) than in fresh form. This could likely be due to fewer people consuming vegetables and fruit smoothies in general because of the complicated procedures that they have. Similarly, the maintenance of hypertension patients by consuming banana smoothies in Europe depicts that the chronic disease in the patients is plummeted easily by the procedures of vitamin K in bananas and the enormous surfaces in smoothies (Eni Puji Lestari et al., 2011).

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CONCLUSION

In conclusion, we discover that vegetable and fruit smoothie consumption is related to reducing the risk of hypertension. However, the results illustrate that the Pearson correlation between vegetable and fruit smoothie consumption and hypertension is less than the Pearson correlation between fresh vegetable and fruit consumption and hypertension. Consequently, we can anticipate that the participants usually consume fresh vegetables and fruits more than they consume vegetable and fruit smoothies. Furthermore, the results demonstrate that people who consume fresh vegetables and fruits can greatly reduce the risk of hypertension more than those who consume vegetable and fruit smoothies. On the contrary, the consumption of smoothies has numerous advantages, such as increasing the surface area so more nutrients can be easily absorbed. Nevertheless, we hope this study brings more awareness to people on the risk of hypertension and promotes more consumption of vegetables and fruits.

REFERENCES

1. Boeing, H., Bechthold, A., Bub, A., Ellinger, S., Haller, D., Kroke, A., Leschik-Bonnet, E., Müller, M. J., Oberritter, H., Schulze, M., Stehle, P., & Watzl, B. (2012). Critical review: vegetables and fruit in the prevention of chronic diseases. *European Journal of Nutrition*, *51*(6), 637–663. https://doi.org/10.1007/s00394-012-0380-y
2. Borgi, L., Muraki, I., Satija, A., Willett, W. C., Rimm, E. B., & Forman, J. P. (2016). Fruit and Vegetable Consumption and the Incidence of Hypertension in Three Prospective Cohort Studies. *Hypertension*, *67*(2), 288–293. https://doi.org/10.1161/hypertensionaha.115.06497
3. Carey, R. M., Moran, A. E., & Whelton, P. K. (2022). Treatment of Hypertension: A Review. *JAMA*, *328*(18), 1849–1861. https://doi.org/10.1001/jama.2022.19590
4. Cheng, W., Du, Y., Zhang, Q., Wang, X., He, C., He, J., Jing, F., Ren, H., Guo, M., Tian Jian-guo, & Xu, Z. (2022). Age-related changes in the risk of high blood pressure. *Frontiers in Cardiovascular Medicine*, https://doi.org/10.3389/fcvm.2022.939103
5. Data. (2023). *Global Vegetables and Fruits Market – Industry Trends and Forecast to 2031*. Databridgemarketresearch.com. https://www.databridgemarketresearch.com/reports/global-vegetables-and-fruits-market?srsltid=AfmBOooFt2MIrtBmVzH0YN_Tb5Nk0p8WYCdIWi_s_crS0Tj5JgZHCZVe
6. Dhandevi PEM, & Rajesh JEEWON. (2015). Fruit and Vegetable Intake: Benefits and Progress of Nutrition Education Interventions- Narrative Review Article. *Iranian Journal of Public Health*, *44*(10), 1309. https://pmc.ncbi.nlm.nih.gov/articles/PMC4644575/
7. Eni Puji Lestari, Bakar, A., & Laily Hidayati. (2011). Regulation of Blood Pressure in Patients with Primary Hypertension with Smoothie Banana (Musa Paradisiaca). *Jurnal Ners*, *6*(2), 141–146. https://media.neliti.com/media/publications/119031-ID-regulation-of-blood-pressure-in-patients.pdf
8. Iadecola, C., Yaffe, K., Biller, J., Bratzke, L. C., Faraci, F. M., Gorelick, P. B., Gulati, M., Kamel, H., Knopman, D. S., Launer, L. J., Saczynski, J. S., Seshadri, S., & Zeki Al Hazzouri, A. (2016). Impact of Hypertension on Cognitive Function: A Scientific Statement From the American Heart Association. *Hypertension*, *68*(6). https://doi.org/10.1161/hyp.0000000000000053
9. Kowalski, S., Goniewicz, K., Moskal, A., Al-Wathinani, A. M., & Goniewicz, M. (2023). Symptoms in hypertensive patients presented to the emergency medical service: A comprehensive retrospective analysis in clinical settings. *Journal of Clinical Medicine*, *12*(17), 5495–5495. https://doi.org/10.3390/jcm12175495
10. Krokida, M. K., Maroulis, Z. B., & Saravacos, G. D. (2001). RHEOLOGICAL PROPERTIES OF FLUID FRUIT AND VEGETABLE PUREE PRODUCTS: COMPILATION OF LITERATURE DATA. *International Journal of Food Properties*, *4*(2), 179–200. https://doi.org/10.1081/jfp-100105186
11. Lampe, J. W. (1999a). Health effects of vegetables and fruit: assessing mechanisms of action in human experimental studies. *The American Journal of Clinical Nutrition*, *70*(3), 475s490s. https://doi.org/10.1093/ajcn/70.3.475s
12. Lampe, J. W. (1999b). Health effects of vegetables and fruit: assessing mechanisms of action in human experimental studies. *The American Journal of Clinical Nutrition*, *70*(3), 475s490s. https://doi.org/10.1093/ajcn/70.3.475s
13. Li, B., Li, F., Wang, L., & Zhang, D. (2016). Fruit and Vegetables Consumption and Risk of Hypertension: A Meta-Analysis. *The Journal of Clinical Hypertension*, *18*(5), 468–476. https://doi.org/10.1111/jch.12777

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14. Madsen, H., Sen, A., & Aune, D. (2023). Fruit and vegetable consumption and the risk of hypertension: a systematic review and meta-analysis of prospective studies. *European Journal of Nutrition*, *62*(5). https://doi.org/10.1007/s00394-023-03145-5
15. Mladěnka, P., Macáková, K., Kujovská Krčmová, L., Javorská, L., Mrštná, K., Carazo, A., Protti, M., Remião, F., & Nováková, L. (2021). Vitamin K – sources, physiological role, kinetics, deficiency, detection, therapeutic use, and toxicity. *Nutrition Reviews*, *80*(4). https://doi.org/10.1093/nutrit/nuab061
16. Perzia, B., Ying, G.-S., Dunaief, J. L., & Dunaief, D. M. (2020). Once-Daily Low Inflammatory Foods Everyday (LIFE) Smoothie or the Full LIFE Diet Lowers C-Reactive Protein and Raises Plasma Beta-Carotene in 7 Days. *American Journal of Lifestyle Medicine*, *16*(6), 753–764. https://doi.org/10.1177/1559827620962458
17. Rivasi, G., Menale, S., Turrin, G., Coscarelli, A., Giordano, A., & Ungar, A. (2022). The Effects of Pain and Analgesic Medications on Blood Pressure. *Current Hypertension Reports*, *24*(10). https://doi.org/10.1007/s11906-022-01205-5
18. Sierra, C. (2020). Hypertension and the Risk of Dementia. *Frontiers in Cardiovascular Medicine*, *7*(5). https://doi.org/10.3389/fcvm.2020.00005
19. Staessen, J. A., Wang, J., Bianchi, G., & Birkenhäger, W. H. (2003). Essential hypertension. *The Lancet*, *361*(9369), 1629–1641. https://doi.org/10.1016/s0140-6736(03)13302-8
20. Taber, K. S. (2018). The Use of Cronbach's Alpha When Developing and Reporting Research Instruments in Science Education. *Research in Science Education*, *48*(6), 1273–1296. https://doi.org/10.1007/s11165-016-9602-2
21. Wang, C., Yuan, Y., Zheng, M., Pan, A., Wang, M., Zhao, M., Li, Y., Yao, S., Chen, S., Wu, S., & Xue, H. (2020). Association of Age of Onset of Hypertension With Cardiovascular Diseases and Mortality. *Journal of the American College of Cardiology*, *75*(23), 2921–2930. https://doi.org/10.1016/j.jacc.2020.04.038
22. Wang, L., Manson, J. E., Gaziano, J. M., Buring, J. E., & Sesso, H. D. (2012). Fruit and Vegetable Intake and the Risk of Hypertension in Middle-Aged and Older Women. *American Journal of Hypertension*, *25*(2), 180–189. https://doi.org/10.1038/ajh.2011.186
23. Wichai Aekplakorn, Suwat Chariyalertsak, Pattapong Kessomboon, Sawitri Assanangkornchai, Surasak Taneepanichskul, Goldstein, A., Cazabon, D., Nareemarn Neelapaichit, & Obehioye Aimiosior. (2024).
24. Trends in hypertension prevalence, awareness, treatment, and control in the Thai population, 2004 to 2020. *BMC Public Health*, *24*(1). https://doi.org/10.1186/s12889-024-20643-1
25. World Health Organization. (2017, December 13). *World bank and WHO: Half the world lacks access to essential health services, 100 million still pushed into extreme poverty because of health expenses*.
26. World Health Organization; World Health Organization. https://www.who.int/news/item/13-12-2017-world-bank-and-who-half-the-world-lacks-access-to-essent ial-health-services-100-million-still-pushed-into-extreme-poverty-because-of-health-expenses

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