Original article

Factors Associated with the Consumption of Food Supplements among Working-Age Group in Phrathatbangphuan Sub-District, Muang District, Nong Khai Province, Thailand

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Abstract

This study aimed to identify the factors associated with food supplement consumption among the working-age group in Phra That Bang Phuan sub-district, Muang district, Nong Khai province, Thailand. A cross- sectional analytical study was completed by 528 participants by a systematic random sampling. Questionnaires were administered for data collection (Reliability=0.77). Both bivariate and multiple logistic regression were fitted to identify associated factors. An adjusted odds ratio with a 95% confidence interval was conducted to determine the level of significance. Results showed that 56.06% of participants were female, aged between 18-59 years old (Mean=37.52 S.D. =12.39) and consumed food supplements around 35.04% of total food supplements for all age groups. Overall opinions on the marketing mix of food supplements were presented at a moderate level (50.95%). The opinions on the product, price, place, and promotion were moderate (48.48%, 57.95%, 59.28%, and 73.67%, respectively). Factors associated with the consumption of food supplements. First, age group 41-50 years old and 51-59 years old ($OR_{adjusted}$= 1. 72; 95% CI: 1. 04 to 2. 83; p- value= 0. 031and $OR_{adjusted}$=2.15; 95%CI: 1.28 to 3.62; p-value=0.002, respectively). and health literacy (access dimesion) presented at a high level ($OR_{adjusted}$=2.09; 95%CI: 1.43 to 3.05; p-value <0.001). It was recommended that the firm need to focus on quality, along with maintaining the quality standards of the brand.

Keywords: The marketing mix, food supplement, working age

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Introduction

In an age where people pay more attention to health care due to widespread consumer trends that encourage people to believe that "healthy can buy with money", combined with the living conditions of modern lifestyles unfavorable to the creation of natural health (Khamoad, 2010, and Nambuddee, 2015). Especially for working-age consumers living in a hurry running against time, stay up late, not getting enough rest. Therefore, causing these people to become more conscious about their health by taking food supplements to help replenish nutrients that are missing enough to the amount that the body should receive per day (Barnes, Ball, Desbrow, Alsharairi, & Ahmed, 2016) . For this reason, food supplements are trendy in the market and are of interest. Despite the economic slowdown, consumers still have more purchasing power (Kasikorn research center, 2017). In 2015, the value of vitamin and food supplements in the market was 49,274 million baht, with an average growth rate of 11 percent (Euromonitor International, 2016). From the growth trend, it expected that the total market value of food supplements in 2015 is at a leap in the period 2016-2017. and a survey of the National Statistical Office found that people consume food supplements increased from 19.1 percent in 2013 to 21.6 percent in 2017 (National Statistical Office, 2017).

The Lao People's Democratic Republic borders Nong Khai Province. There were six trade contacts with the Mekong River border through trade channels, with a total border trade value of 5,236.05 million baht in September 2018 (Nong Khai Provincial Commercial Office, 2018). In this regard, 36 items of health product imports and 17 items of smuggling of health products were examined. Nong Khai Province has 88. 95% of health products consumption behavior (Nong Khai Provincial Commercial Office, 2018).

Currently, there are many brands of food supplements. Each time buys a supplement depends on many factors. One of those factors is the marketing mix, which consists of products, prices, place, and promotion that affects the decision to buy supplements (Kaosumpuns and Anek, 2017). The consumption of food supplements is typical in Thailand and other countries. However, few studies have been conducted in Nong Khai on their consumption, especially in the working-age group. This study aims was to conduct the situation and factors associated with the consumption of food supplements among the working-age group in Phra That Bang Phuan sub-district, Muang district, Nong Khai province, Thailand.

Research Methodology

Study Population and Sample

The population was the working-age group. Both males and females aged between 18-59 years living in Phra That Bang Phuan sub-district, Mueang district, Nong Khai province,Thailand were selected by a systematic random sampling method. To calculate the sample size, the target number of participants was estimated at 269. However, in order to prevent the estimation from being exceeded (Overfitting) therefore adjusting the sample size for Multiple logistic regression (Hsieh, et al, 1998) and adjust the influence of relationships between independent variables with Variance Inflation Factor (VIF). By using VIF at 0.7, the final participant was 528.

Study Design and Data Collection

A cross- sectional study was conducted. Questionnaires were administrated for data collection. Collecting information on sociodemographic

characteristics, consumption of food supplements, and opinion on the marketing mix reported.

Data Analysis

This study analyzed using a packaged program as the followings;

1. Descriptive statistics were used to describe the characteristics and socioeconomic and the consumption of food supplements.

2. Both bivariate and multiple logistic regression were fitted to identify associated factors.

3. An adjusted odds ratio with a 95% confidence interval was computed to determine the level of significance.

Ethical Approval

This study was approved by the Human Research Ethics committee, Sirindhorn College of Public Health Khon Kaen, Thailand. (Ref. No. HE 612051).

Results

1. Characteristics and Socioeconomic

56.06% of participants were female aged between 18-59 years old (Mean=37.52 S.D.=12.39). The average body mass index is 21.76 kilograms per square meter (S.D.=3.25); normal weight, overweight, underweight and overweight level 1 and overweight level 2 (57.95%, 20.08%, 9.85%, 9.66%, and 2.46%, respectively). 37.50% were single. Education level was at the elementary level (24.24%), Contractor (21.02%) with the average monthly income of less than 10,000 baht (Mean = 10896.65, S.D. = 4773.71), and the lowest income 5,000 Baht up to 35,000 Baht. (Table 1).

Table 1 The percentage of characteristics and socioeconomic among the working-age population in Phra That Subdistrict, Muang District, Nong Khai Province, Thailand (n = 528)

Variables	Frequency	Percentage
Gender		
Male	232	43.94
Female	296	56.06
Age (year)		
< 30	184	34.85
31 - 40	114	21.59
41 - 50	126	23.86
51 - 59	104	19.70
Mean (S.D.), Min : Max 37.52(12.39), 18 : 59		
Body Mass Index (BMI)		
Underweight	52	9.85
Normal	306	57.95
Overweight	106	20.08
Level of obesity		
level 1	51	9.66

Variables	Frequency	Percentage
level 2	13	2.46
Mean (S.D.), Min : Max 21.76(3.25), 17.90 : 36.68		
Marital status		
Single	198	37.50
Marriage	182	34.47
Widowed / Divorced / Separated	148	28.03

Table 1 The percentage of characteristics and socioeconomic among the working-age population in Phra That Subdistrict, Muang District, Nong Khai Province , Thailand (n = 528) (cont.)

Variables	Frequency	Percentage
Education level		
No education	73	13.83
Elementary	128	24.24
Junior high school	92	17.42
High school / vocational certificate	115	21.78
Diploma / High Vocational	94	17.80
Bachelor's Degree and Higher	26	4.93
Occupation		
Contractor	111	21.02
Employee	110	20.83
Owner/Self-employed	104	19.70
Agriculturist	87	16.48
Housewife	60	11.36
Civil officer	34	6.44
Student	20	3.79
Others	2	0.38
Monthly income (Baht)		
□ 10,000	303	57.39
> 10,000	225	42.61
Mean (S.D.), Min : Max 10,896.65 (4,773.71), 5,000 : 35,000		

2. The Consumption of Food Supplement

Participants consumed food supplements around 35.04% and 16.10% had consumed more than 3 times a week (Mean = 3.82, S.D. = 1.89). Most of the forms of food supplement consumption were tablets/capsules (81.62%). 18.37% were paying for food supplements between 1,000- 2,000 baht per month (Mean = 999.94, S.D. = 427.36).

Table 2 The percentage of food supplement consumption of the working-age population in Phra That Subdistrict, Muang District, Nong Khai Province, Thailand (n = 528)

Variables	Frequency	Percentage
Food supplement consumption		
Not consumed	343	64.96
Consumed	185	35.04
Frequency (time/week) (n=185)		
1	20	3.79
2-3	80	15.15
> 3	85	16.10

Variables	Frequency	Percentage
Mean(S.D.), Min : Max 3.82(1.89), 1 : 7		
Form of food supplement		
Tablets/capsules	151	81.62
Powder	85	45.94
Liquid	67	36.21
Expenses for food supplement (baht/month) (n=185)		
< 1,000	86	16.29
1,000 – 2,000	97	18.37
> 2,000	2	0.38
Mean(S.D.), Min : Max 999.94(427.36), 500 : 2,200		

3. The opinion on marketing mix

Overall opinions on the marketing mix of food supplements were at a moderate level (50.95%). (Table 3) The opinions on the product, price, place, and promotion were moderate (48. 48% , 57. 95% , 59. 28% , and 73.67%, respectively). (Table 3)

Table 3 The percentage of overall opinions on marketing mix of food supplements (n=528)

Variables	frequency	percentage
Low	39	7.39
Moderate	408	77.27
High	81	15.34

Table 4 The percentage of opinions on marketing mix of food supplements (n=528)

Variables	frequency	percentage
Product		
Low	96	18.18
Moderate	256	48.48
High	176	33.33
Price		
Low	125	23.67
Moderate	306	57.95
High	97	18.37
Place		
Low	58	10.98
Moderate	313	59.28
High	157	29.73
Promotion		
Low	75	14.20
Moderate	389	73.67
High	64	12.12

4. The level of health literacy (each dimension)

The result showed that the level of health literacy; access dimension were at a moderate level (48.11 %), the level of health literacy; understand dimension were at a high level (38.45%), the level of health literacy; appraise dimension were at a moderate level (52.46 %), and the level of health literacy; apply information were at a moderate level (54.17 %), (Table 5)

Table 5 The level of health literacy (each dimension) n=528)

The level of health literacy	frequency	percentage
Access		
Low	153	28.98
Medium	254	48.11
High	121	22.92
Understand		
Low	158	29.92
Medium	167	31.63
High	203	38.45
Appraise		
Low	180	34.09
Medium	277	52.46
High	71	13.45
Apply		
Low	143	27.08
Medium	286	54.17
High	99	18.75

Factors Associated with The Consumption of Food Supplements

The study showed that two significant factors were associated with the consumption of food supplements. First, age group 41-50 years old and 51-59 years old ($OR_{adjusted}$= 1.84; 95% CI: 1.02 to 3.30; p-value=0.04 and $OR_{adjusted}$=2.66; 95%CI: 1.25 to 5.62; p-value=0.01, respectively) ans second, health literacy (access dimension) presented at a high level ($OR_{adjusted}$= 2.04; 95%CI: 1.39 to 2.98; p-value <0.001) (Table 6).

Table 6 Factors associated with the consumption of food supplements

Factors	n	%Consumption		OR	$OR_{adjusted}$	95%CI	P-value
		Not consumed	Consumed				
Age(years)							0.026
□ 30	184	70.11	29.89	1	1		
31 – 40	114	68.42	31.58	1.06	1.15	0.65 to 2.05	
41 – 50	126	61.90	38.10	1.48	1.84	1.02 to 3.30	
51 – 59	104	55.77	44.23	2.51	2.66	1.25 to 5.62	
Level of health literacy (access dimension)							<0.001
Low to medium	407	66.83	33.17	1	1		
High	121	58.68	41.32	1.96	2.04	1.39 to 2.98	

*$OR_{adjusted}$ when controlled the effect of age, health literacy, and marketing mix

Discussion and Conclusions

This research aimed to identify factors associated with food supplement consumption among the working-age group in Phra That Bang Phuan sub-district, Muang district, Nong Khai province, Thailand. The results indicate that consumed food supplements around 35. 04% of total food supplements for all age groups. These results are more closely aligned with the prevalence estimated from other countries. Their findings were the study conducted by Lee HY, Son H, and Short SD. (2016) , They assessed the consumption of vitamins and associated factors by age group and reported that 41.2% of all respondents used vitamins, 38.1% for 20-44 years, 46.5% for 45-64 years, and 38.8% for 65 older. (Lee HY, Son H, and Short SD. (2016). According to with the study conducted by Aditya, R., Wiedyaningsih, C., & Kristina, S. (2017) . which they assessed the demographics and factor associated with food supplements use among Yogyakarta population and showed that a food supplement daily use reported by 63% of participants. Moreover, this result is consistent with the previous study they found that the participants' dietary supplement (mean ± standard error) was reported to be 45.8 ± 1.2%.(Blumberg JB, Zeisel SH, 2017). There are many dietary supplements used in the working group because this age group can buy. As they can earn money by themselves, it was easy to decide what products they are attracted to. Together with the individual who thinks the supplement was useful, used to nourish the body and replace the energy that is lost to work. Participants' opinions on the marketing mix of food supplements, product, price, place, and promotion were moderate levels (48.48%, 57.95%, 59.28%, and 73.67%, respectively). This study's results can explain that most of the participants think that promotion was the most important for deciding to use supplements. The result was similar to the study conducted by Dyah R, Aditya U, Wiedyaningsih C, and Kristina SARI. (2020) , who found that the advertisement which is part of the promotion was commonly the source of information about food supplement used Aditya, R. , Wiedyaningsih, C., & Kristina, S. (2017). On the other hand, different from a study by Németh N. (2016), in which they assessed the Consumer behavior of food supplements from the perspective of food safety and reported that among factors that influence customer decision making, experience in

earlier food supplement consumption received the highest value, followed by quality and price (Németh N, 2016). As same as the study conducted by Auechotpanich S. (2008), The findings of the study revealed that all customers (100%) considered the product, promotion, and physical evidence the most critical factors when making a buying decision (Auechotpanich S, 2008) . Furthermore, the study of Németh N.,(2016).

In terms of factors associated with food supplement consumption. This study found that First, age group 41-50 years and 51- 59 years and health literacy (access dimension) presented at a high level. The result of age besides, the studied by Dyah R, Aditya U, Wiedyaningsih C and Kristina S. (2020) (Dyah R, Aditya U, Wiedyaningsih C, Kristina SARI, 2017). However, there are slight differences among age groups. Also, likely the study by Foote JA et al. (2009) found that supplement use tended to increase with age, although levels and length of regular use varied (Foote JA, Murphy SP, 2009). The difference in food supplements use by age may be influenced by the recognition that there are different nutritional requirements for different life stages.

Alternatively, these differences could be due to targeted marketing of specific dietary supplements. In terms of the Level of health literacy (access dimension). Closely aligned with the study by Azam, N., Mohammad Mehdi, N., Ali, M., & Marziyeh, Z. (2021), they found that differences in health literacy and its components can affect fast food consumption. Similar to the studied by Luís LS, Luís H. (2016). The results suggest that the most critical factors significant determinants of the acceptance of novel food products include: educational level, health literacy level and age.

In conclusion, the use of food supplements in these participants were was relatively high. However, the consideration in making purchase decisions is still not complete health professionals, beyond, providing knowledge and advice on how to buy supplements. There should be regulations of the manufacturer producing safe food supplements.

References

Azam, N., Mohammad Mehdi, N., Ali, M., & Marziyeh, Z. (2021). *BMC Public Health*. doi: 10.21203/rs.3.rs-37135/v1.

Aditya, R., Wiedyaningsih, C., & Kristina, S. (2017). Demographics and factor associated with food supplements use among Yogyakata population. *International Journal of Pharmacy and Pharmaceutical Sciences, 9*, 53. doi: 10.22159/ijpps.2017v9i12.21737

Barnes, K., Ball, L., Desbrow, B., Alsharairi, N., & Ahmed, F. (2016). Consumption and reasons for use of dietary supplements in an Australian university population. *Nutrition, 32*(5), 524–530.

Blumberg JB, Zeisel SH. Contribution of dietary supplements to nutritional adequacy in various adult age froups. *Nutrients*. 2017;9(1325):1–10.

Euromonitor International. (2016). Dietary Supplements in Thailand. Retrieved September 10, 2018, from Euromonitor Passport database.

Foote, J. A., Murphy, S. P., Wilkens, L. R., Hankin, J. H., Henderson, B. E., & Kolonel, L. N. (2003). Factors associated with dietary supplement use among healthy adults of five ethnicities: the Multiethnic Cohort Study. *American journal of epidemiology*, 157(10) , 888– 897. https://doi.org/10.1093/aje/kwg072

Kasikorn research center. (2017). Behaviors and Demands of Elderly Diatary Supplement in Thailand. Retrieved December 12, 2020, from Journal of Humanities and Social Scinces Naknom University.

Hyo Young Lee, Hyunmi Son and Stephanie D. Short. (2017). Consumption of Vitamins and Associated Factors by Age Group. *Asian Journal of Epidemiology*, 10: 10-18.

Hsieh, F.Y., Bloch, D.A. and Larsen, M.D. (1998). A Simple Method of Sample Size Calculation for Linear and Logistic Regression. *Statistics in Medicine*, 17, 1623-1634.

Kaosumpuns K., and Anek P. (2017). The effective of marketing mix to decision making on nutrition food product of consumer in muang district, chiangmai province. *Journal of Graduate Research*, 8(2), 183–198.

Khamoad N. (2010). Important consumer competences in decision making for dietary supplement consumption. Master of Science, Consumer Protection and Health Management Program College Khonkaen University.

Luís LS, Luís H. (2016). New food product consumer's behaviour: health literacy and neofobia. *Global journal of medicine and public health*; 5(3):1-6.

Nambuddee N. (2015). The future of dietary supplements and adjustment of marketing strategy in Thai. *Journal of Social Sciences Srinakharinwirot*, (18), 353–372.

National Statistical Office. (2017). Food consumption behavior of Thai population. National statistical office.

Németh N. Consumer habits of food supplements from the perspective of food safety. *J Econ Lit*. 2016;.

Nong Khai Provincial Public Health Office. (2017). Annual Report Nong Khai Provincial Health Office. Nong Khai Provincial Public Health Office.