

Nutritional Supplements in Health-Conscious Pre-/Post-Menopausal Thai Women

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Objective: To survey prevalence, knowledge, attitude, and factors affecting the behavior of nutritional supplement consumption in health-conscious pre-/post-menopausal Thai women.

Material and Method: A survey was conducted in 327 women, aged 40-67 years, who were new participants in the health promotion education program of Siriraj Menopause Clinic, Gynecologic Endocrinology Unit, Department of Obstetrics and Gynecology, Faculty of Medicine Siriraj Hospital, Mahidol University, between January and July 2008. The participants completed a self-administering questionnaire inquiring their demographic data, attitude, knowledge, and behavior of supplement consumption. The participants were divided into three groups, i.e. current-, past-, and never-users, and then compared.

Results: The majority (54.7%) of the presented participants consumed at least one kind of supplements, 37.3% and 17.4% were current- and past-users, respectively. The current-, past-, and never-users were not different in age, medical diseases, education levels, reading frequency, and economic status. The majority of participants obtained the information of supplements from newspaper or magazine. The users primarily purchased the supplements from hospitals or clinics. All participants had knowledge on health promotion and supplement products, however, 7.6% and 11.5% of such knowledge, respectively, was inaccurate. All participants had both positive and negative attitudes on supplement consumption, the negative attitude was found in 33.4% of the items tested. The never-users had trivial but statistically significant ($p < 0.001$) more accurate knowledge and more negative attitude than other groups had.

Conclusion: More than 50% of health-conscious pre-/post-menopausal Thai women are ever-users of nutritional supplements. A lot of misunderstanding and misconception do exist even in the health-conscious women, regardless of their consumption behaviors. More education on this issue should be provided in order to reduce unnecessary expenditure and increase the efficiency of supplement consumption expenditure.

Keywords: Attitude, Knowledge, Nutritional supplement, Menopause

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Nowadays pre-/post-menopausal Thai women are more health-conscious. However, practicing a healthy lifestyle varies from individual to individual. Some practices have proven benefits, some may be trade-off, while the others may have no benefit. Despite the overwhelming scientific evidences, some of the public misperception regarding self-practicing of healthy lifestyle is still ubiquitous.

Nutritional supplement is one form of the practice that has become popular all over the world, partly because of advertisement and convenient accessibility without need of prescription. The evidences that nutritional supplements have health benefits are mostly from observational studies. Long-term use of vitamins E, B6, B12, and folic acid may reduce risk of coronary heart disease^(1,2). Magnesium may have benefit on bone and cardiovascular system^(3,4). Among herbal and natural products, Gingo biloba is the herb that has been extensively studied and has solid evidence demonstrating its benefits. Gingo biloba has a neuroprotective effect, promoting memory and emotion⁽⁵⁾. Soy protein, containing phytoestrogen, is effective in reducing menopausal

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symptoms, improving lipid profile, and decreasing bone loss⁽⁶⁻⁹⁾. Black cohosh, a herb widely used in Europe, is effective for the treatment of menopausal symptoms^(10,11). Unfortunately, a considerable number of clinical trials cannot prove the effectiveness of many nutritional supplements⁽¹²⁻¹⁴⁾.

Thai herbs have long been used as either ingredients or seasonings in Thai recipes or as herb-mixtures in Thai traditional medicine. Thai herbs have been used to attenuate many menopause related problems such as hot flushes and may prevent osteoporosis^(15,16). There have been some observed benefits in using Thai herbs. Recently, Thai herbs have been used differently from the traditional way. They are being manufactured in the similar form and administered in the similar mode as modern medicine. Although it is easier to consume herbs in the modern form than in the traditional form, there is no clinical trial to support the potential benefits of such transformed herbs. Moreover, before herbs are utilized in pure or concentrated forms, toxicity test followed by phase I and phase II clinical trials should be performed. Unfortunately, there is limited information regarding the safety of the precious Thai herbs that are manufactured in modern form.

When a product is put on the market as a nutritional supplement, consumers usually perceive that such a product has health benefit and is safe⁽¹⁷⁻¹⁹⁾. In the USA, many people believe that supplements have no side effect and are FDA-approved⁽¹⁷⁾. However, an excessive use of vitamin/mineral supplements is shown to cause health problems⁽²⁰⁾. The public misperception about the efficacy and the safety of taking nutritional supplements may do more harm than good.

Therefore, it is interesting to understand knowledge, attitude, and factors contributing to the behavior of consumers in taking nutritional supplements. The authors focus the present study in the health-conscious pre-/post-menopausal women because this particular group of women is presumed to be the major consumers of these health products. The information from this survey would be beneficial for modifying a health education program for pre-/post-menopausal women in order to achieve the ultimate goal of management for these women, *i.e.* maintaining or improving quality of life.

Material and Method

A cross-sectional study was conducted in the Department of Obstetrics and Gynecology,

Faculty of Medicine Siriraj Hospital, Mahidol University between January and June 2008. The present study was conducted in accordance with the principle stated in the latest version of the Declaration of Helsinki. The present study protocol and questionnaire were approved by the Ethic Committee of the faculty.

The subjects were pre-/post-menopausal women of at least 40 years of age who were new registrants of the health promotion education program at Siriraj Menopause Clinic, which took place every other Thursday. These women were considered health-conscious because they wanted to attend the program by themselves without coercion. The registrants who were willing to join the present study were asked to complete a self-administering questionnaire before beginning of the education program.

Questionnaire

The questionnaire consisted of five sections; (i) demographic data, (ii) behavior of supplement consumption and related factors, (iii) knowledge on health promotion (seven items), (iv) knowledge on supplement products (17 items), and (v) attitude on supplement consumption (15 items). The demographic data section explored the information including age, education, reading frequency, and economic status. The behavior of supplement consumption section inquired the information regarding sorts of supplement consumed, frequency of supplement consumption per week, source of acquiring information, and place for obtaining the supplement. Knowledge on health promotion during pre-/post-menopausal period, or on supplement products was evaluated from the participant's response on each tested item, *i.e.* true, false, or "don't know". Attitude on supplement was evaluated from the participant's response on each tested item, using five-point Likert's scales, *i.e.* strongly disagree, disagree, indifferent, agree, or strongly agree.

The questionnaire was constructed and content validated by three gynecologists and one scientist with experience in menopause medicine. The original questionnaire was modified after face validation in a few pre-/post-menopausal women. The final questionnaire was then validated in 30 pre-/post-menopausal women who attended a community aerobic-exercise group. The present questionnaire had an acceptable property for knowledge testing with discrimination scores ranging from 0.15 to 0.77, and

a high reliability with an average Cronbach alpha of 0.8080. The attitude section had an average Cronbach alpha of 0.5512.

Operational definitions

Nutritional supplements include vitamins, minerals such as calcium and trace elements, herbs, and natural products. Although these products can be found in regular foods, the products that were considered as supplements in the present study were those manufactured in the instant forms such as capsule, tablet, effervescent tablet, powder, or crude extract. These products usually contain higher amount or concentration of the active ingredients than the regular foods do.

Knowledge on supplement products referred to the respondents' understanding of supplements and their usefulness in treating or improving some health problems.

Attitude towards nutritional supplements referred to the degree of positive or negative feelings about taking supplements. It included opinion or belief of the respondents on supplements in terms of their effectiveness, benefit, and risk.

Behavior of nutritional supplement consumption was classified into three groups: (i) never-users, participants who had never taken supplements; (ii) past-users, participants who used to take supplements and stopped taking for more than 6 months; and (iii) current-users, participants who were regularly or occasionally taking supplements at the time of survey. Ever-users referred to the combination of past- and current-users.

Statistical analysis

Sample size was calculated using a formula for prevalence estimation. From the presented data obtained from questionnaire validation process, a prevalence of supplement consumption in the middle-aged Thai women was 54%. When the precision error of estimation (d) = 10% of prevalence ($d = 0.054$), and $\alpha = 0.05$, the sample size was 327 cases. The subjects were divided into three groups according to their behaviors of consumption.

Statistical analysis was performed using SPSS 11.0 (SPSS Inc). Data were presented in mean \pm SD or number (%) as appropriate. One-way analysis of variance (ANOVA) for continuous data or Chi-square test for categorical data was applied to survey the potential association between the behaviors of supplement consumption and demographic data or

variables of interest. A p-value of < 0.05 was considered statistically significant.

Results

The questionnaires were obtained from 327 participants aged 40 to 69 years old. Sixty percents of them were in the postmenopausal period with a median duration of menopause of 3 years (range 1 to 22 years). The most common encountered menopausal related symptoms were hot flushes and myalgia. The majority (54.7%) of the participants had consumed at least one supplement; 37.3% and 17.4% were current- and past-users, respectively. The participants acquired the information of supplement products mainly from newspapers or magazines, whereas medical personnel contributed to 23.5% of sources of the information. The participants primarily bought the supplements from clinics or hospitals (31.6%). It was found that 70.2% of the ever-users' families or friends were also taking at least one kind of supplement. Among the non-users, the main reason for not taking the supplements was being afraid of potential side effects (45%) (Data not shown).

Fig. 1 illustrates the prevalence of 18 commonly used nutritional supplement products in Thailand. The most commonly used vitamin, mineral, and natural product among the ever-users were multi-vitamin (30.0%), calcium (41.1%), and soy protein (35.9%), respectively; similarly, among the current-users were vitamin C (61.2%), calcium (60.4%), and soy protein (57.8%).

Table 1 demonstrates characteristics of the study participants. There was no difference among groups in age, educational levels, reading habits, sources of income, economical status, or medical diseases. Medical diseases were found in (40.4%) all participants. The most common disease reported was allergy (20%, data not shown).

Table 2 reveals knowledge and attitude of the participants. Answers to questions about health promotion had slightly $> 10\%$ of "don't know" and $< 10\%$ of incorrect responses. Answers to questions about supplement products had $> 50\%$ of "don't know" and slightly $> 10\%$ of incorrect responses. Each participant had a positive attitude on some statements about supplement consumption and negative attitude on the others. The overall negative attitude was found in slightly $> 30\%$ of the responses. Comparing with the past- or current-users, the never-users had more accurate knowledge on both health promotion and supplement products, and more negative attitude on

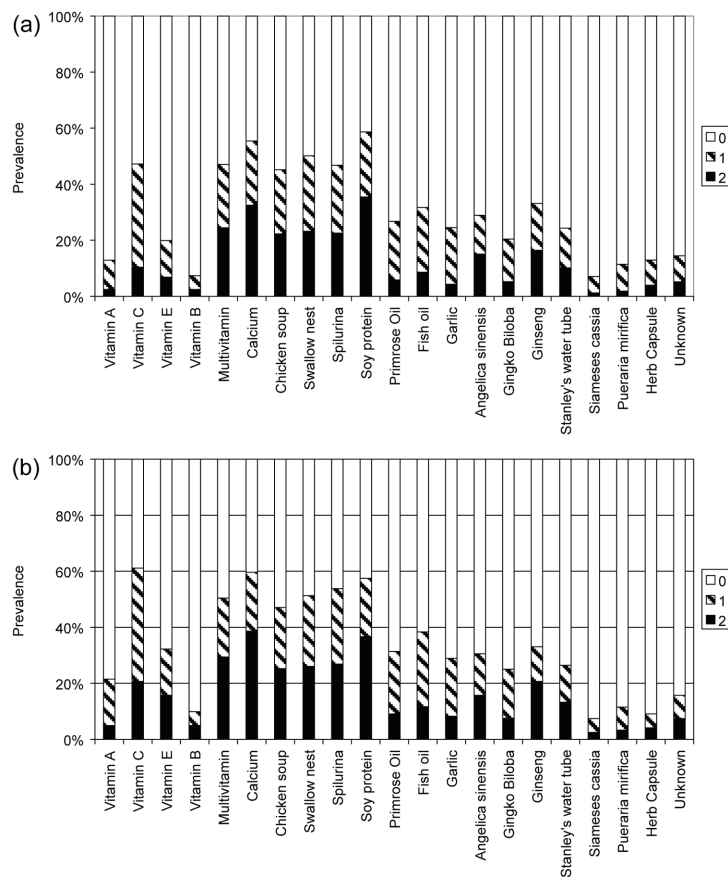


Fig. 1 The 18 commonly used nutritional supplement products in (a) ever-users, (b) current-users
 MTV = multivitamin, Vit = vitamin, 0 = The participant has never been used this product, 1 = The participant used this product but stop using > 6 months, 2 = The participant is currently using this product

supplement consumption. Although the differences were statistically significant ($p < 0.001$ in all variables), the magnitude of differences were trivial.

Discussion

This is one of a few studies targeting on health-conscious pre-/post-menopausal women. Prevalence of supplement consumption in the present study was undoubtedly high (54.7%), and was in line with the prevalence in previous studies (14.5% to 83.9%)^(17,18,21-34). The wide range of prevalence depends on surveying methods and study population. Interviewing method gives higher prevalence than self-administering questionnaire⁽³⁵⁾. A study by Ishihara JTS et al showed that such prevalence in Asian countries was lower than that in the Western ones⁽²⁴⁾. However, the prevalence in the present study was much higher than that found in the Japanese

(10-28%)⁽²⁴⁾ and the Chinese population (14.5%)⁽³⁴⁾. This may be due to the difference in culture and behavior of people in different countries. Thai people may be more influenced by the practice of western people. Moreover, the Japanese study was conducted more than 10 years ago (1997) and may not reflect the current picture of Asian subjects, whereas the study population in the Chinese study was younger than that in the present study.

The supplement products explored in the present study are generally found in Thai drugstores. The authors categorized them into vitamins, minerals, and natural products. The authors found that multivitamin and vitamin C, calcium, and soy protein were the most commonly used supplements in each category. The use of vitamins may be under the influence of commercial advertisement, and the belief that vitamins can promote health in any condition.

Table 1. Characteristics of 327 participants

Characteristics	Overall (n = 327)	User groups			p-value
		Current (n = 121)	Past (n = 57)	Never (n = 149)	
Age (mean ± SD)	50.7 ± 4.9	50.9 ± 5.7	50.9 ± 4.2	50.4 ± 4.5	0.721
Educational levels					0.308
Primary school	94 (28.7)	29 (24.0)	21 (36.8)	44 (29.5)	
Secondary school	48 (14.7)	18 (14.9)	12 (21.1)	18 (12.1)	
College	44 (13.4)	17 (14.0)	4 (7.0)	23 (15.4)	
University	141(43.2)	57 (47.1)	20 (35.1)	64 (43.0)	
Reading habits					0.367
Not at all	20 (6.1)	11 (9.1)	1 (1.8)	8 (5.4)	
Infrequent	50 (15.3)	16 (13.2)	10 (17.5)	24 (16.1)	
Frequent	257(78.6)	94 (77.7)	46 (80.7)	117 (78.5)	
Sources of income					0.178
Stipend	145 (44.4)	55 (45.5)	21 (36.9)	69 (46.3)	
Pension	42 (12.8)	22 (18.2)	8 (14.0)	12 (8.1)	
From offspring or relatives	39 (11.9)	13 (10.7)	9 (15.8)	17 (11.4)	
Others	101(30.9)	31 (25.6)	19 (33.3)	51 (34.2)	
Economical status					0.729
Not enough for living	40 (12.2)	13 (10.7)	5 (8.8)	22 (14.8)	
Enough without saving	168 (51.4)	62 (51.3)	32 (56.1)	74 (49.7)	
Enough with saving	119(36.4)	46 (38.0)	20 (35.1)	53 (35.5)	
Medical diseases	132 (40.4)	51 (38.6)	20 (15.2)	61 (46.2)	0.657

Data are mean ± SD or n (%). Data were analyzed using one way analysis of variances (for continuous data) or Chi-square test (for categorical data)

Table 2. Knowledge and attitude on health promotion and nutritional supplements in 327 participants

Variables	Overall	User groups			p-value
		Current	Past	Never	
Knowledge on health promotion	(n = 2,287)	(n = 847)	(n = 397)	(n = 1,043)	<0.001
- Don't know	256 (11.2)	82 (9.7)	44 (11.1)	130 (12.4)	
- Incorrect answers	174 (7.6)	80 (9.4)	36 (9.1)	58 (5.6)	
- Correct answers	1,857 (81.2)	685 (80.9)	317 (79.8)	855 (82.0)	
Knowledge on supplement products	(n = 5,355)	(n = 2,057)	(n = 965)	(n = 2,333)	<0.001
- Don't know	2,961 (55.3)	1,136 (55.2)	599 (62.1)	1,226 (52.5)	
- Incorrect answers	617 (11.5)	274 (13.3)	98 (10.1)	245 (10.5)	
- Correct answers	1,777 (33.2)	647 (31.5)	268 (27.8)	862 (37.0)	
Attitude on supplement consumption	(n = 4,903)	(n = 1,814)	(n = 854)	(n = 2,235)	<0.001
- Positive	1,320 (26.9)	519 (28.6)	223 (26.1)	578 (25.9)	
- Indifferent	1,945 (39.7)	720 (39.7)	363 (42.5)	862 (38.6)	
- Negative	1,638 (33.4)	575 (31.7)	268 (31.4)	795 (35.5)	

Data are n (%) of n in each user group. Data were analyzed using Chi-square test. n = total number of possible responses from all participants

The result was in accordance with the study by Lyle BJ et al, which showed that vitamin C was the most commonly used vitamin, due to the belief that

vitamin C could delay aging and increase collagen production⁽²⁶⁾. The popularity of calcium was owing to the campaign to prevent osteoporosis in Thailand,

and the highly competitive advertisement of various forms and brands of commercially available calcium. The preference of soy products in the present study population was similar to that found in Americans⁽²⁷⁾. Although recent meta-analysis study cannot demonstrate the effectiveness of soy products⁽³⁶⁾; a considerable number of previous studies prove that soy products contain phytoestrogen which is effective in reducing menopausal related symptoms⁽³⁷⁻⁴⁰⁾. Moreover, tofu, a soy product, is an enrich source of calcium.

With an increasing fear of postmenopausal hormone therapy after the Women's Health Initiative (WHI) study, alternative measures have been using to relief menopausal related symptoms⁽³⁷⁾; phytoestrogen and herb products are among attractive remedies. Ginseng has gained reputation from all over the world for its universal benefits. It is the most prevalent herb in many studies⁽¹⁸⁾, including in the present study. On the contrary, local Thai herbs like Siamese cassia (Keeleg) and Pueraria mirifica (Kwowlkrue) were among the least popular herbs. More scientific studies of Thai local herbs and enhancement of nationalistic attitude should be promoted to increase the confidence in consumption of these herbs.

Consistent with previous studies^(18,23,30), the present study population acquired the information of supplement products mainly from newspapers or magazines. One study showed that health care personnel were the least source of information in this issue⁽¹⁸⁾. That finding was similar to the authors. Regretfully, previous studies showed that more than half of the subjects did not inform their own doctors regarding their supplement use, unless a specific question was introduced during regular visits^(19,23,27,30).

The present study population had good knowledge on health promotion as their responses had approximately 80% of correct answers. Despite this, the knowledge on supplement products were less pronounced. The "don't know" accounted for > 50% of responses; however this number was not important since the participants did not have to know every supplement listed in the present survey. More important was the > 10% incorrect answers which reflected that > 20% of the participants' knowledge were inaccurate. This would lead to inappropriate use of supplements.

Each participant had a positive attitude on some tested items and negative attitude on the others. Even those who were taking supplements still disagreed

in some (30%) of the consumption behaviors. The authors found that the never-users had more accurate knowledge and more negative attitude on supplement consumption than the current- or past-users. Although the differences were statistically significant, the magnitude of differences was trivial. This implied that knowledge and attitude did not have much influence on the decision to use supplements in the presented population.

Various factors associating with the supplement consumption are demonstrated in previous studies. Those factors are sex, (1, 2, 5, 13, 18) age, (4,10,13,18,19) employment status, (18) obesity, (11,18) physical activity (18), stress (18), education, (1,10) baseline health status (4), and income (19). The supplement consumers are usually employed, in high socio-economic status, and have active and stressful lifestyle. However, the authors did not find any significant factors affecting the consumption behaviors. The present study had adequate sample size to demonstrate at least 15 associating factors if they did exist. It was possible that the behavior of specific study participants, *i.e.* middle-class health-conscious pre-/post-menopausal women, would be under the influence of yet unidentified factors.

The limitation of the present study was selection bias. The prevalence of supplements in the present study could not represent the whole picture of Thai women. Moreover, a survey using a self-administering questionnaire may underestimate the prevalence of supplement consumption compared with an interview method⁽³⁵⁾. Apart from that, closed-ended questions would lead to limited scope to assess sorts of supplement consumed and participants' attitude.

In conclusion, supplement consumption is prevailing in pre-/post-menopausal Thai women. A lot of misunderstanding and misconception do exist even in the health-conscious women, regardless of their consumption behaviors. More education on this issue should be provided in order to reduce unnecessary expenditure and increase the efficiency of supplement consumption expenditure.

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การใช้ผลิตภัณฑ์อาหารเสริมในสตรีวัยใกล้หมดระดู หรือวัยหมดระดูที่ใส่ใจในสุขภาพของตนเอง

พิชัย ลิระศิริ, เจนจิต ฉายะจินดา, สุชาดา ต้นพัฒนา, ธันยารัตน์ วงศ์วานนุรักษ์, จงดี แดงรัตน์,
มณีรัตน์ ไชยานนท์

วัตถุประสงค์: เพื่อสำรวจความชุก ความรู้ ทัศนคติ และปัจจัยที่มีผลกระทบต่อการใช้ผลิตภัณฑ์อาหารเสริมในสตรีวัยใกล้หมดระดูหรือวัยหมดระดูที่ใส่ใจในสุขภาพของตนเอง

วัสดุและวิธีการ: ทำการสำรวจในสตรีไทย จำนวน 327 ราย อายุระหว่าง 40-67 ปี ที่เข้าร่วมกิจกรรม การส่งเสริมสุขภาพ ที่คลินิกวัยทอง หน่วยต่อมไร้ท่อทางนรีเวช ภาควิชาสูติศาสตร์-นรีเวชวิทยา คณะแพทยศาสตร์ศิริราชพยาบาล มหาวิทยาลัยมหิดล ระหว่าง เดือนมกราคม ถึง กรกฎาคม พ.ศ. 2551 โดยการใช้แบบสอบถาม แบ่งผู้ร่วมวิจัยออกเป็น 3 กลุ่ม ตามพฤติกรรมการใช้ผลิตภัณฑ์อาหารเสริม คือ กำลังใช้อยู่ในปัจจุบัน เคยใช้ในอดีต และไม่เคยใช้แล้วทำการเปรียบเทียบทางสถิติ

ผลการศึกษา: ร้อยละ 54.7 ของผู้ร่วมวิจัยใช้ผลิตภัณฑ์อาหารเสริมอย่างน้อยหนึ่งผลิตภัณฑ์ โดยร้อยละ 37.3 กำลังใช้อยู่ในปัจจุบัน และร้อยละ 17.4 เคยใช้ในอดีตเมื่อพบว่าผู้ร่วมวิจัยทั้ง 3 กลุ่ม ไม่มีความแตกต่างกันในปัจจัยเหล่านี้ คือ อายุ โรคประจำตัว ระดับการศึกษา ความสม่ำเสมอในการอ่านหนังสือ และระดับเศรษฐฐานะ ผู้ร่วมวิจัยส่วนใหญ่ ได้รับข้อมูลเกี่ยวกับผลิตภัณฑ์อาหารเสริมจากหนังสือพิมพ์หรือนิตยสาร โดยส่วนใหญ่ซื้อผลิตภัณฑ์ดังกล่าวจากคลินิก หรือ โรงพยาบาล พบว่าผู้ร่วมวิจัยมีความรู้พื้นฐานด้านการดูแลสุขภาพ และความรู้เกี่ยวกับผลิตภัณฑ์อาหารเสริม แต่เป็นความรู้ที่ไม่ถูกต้องร้อยละ 7.6 และร้อยละ 10 ตามลำดับ ผู้ร่วมวิจัยมีทัศนคติต่อการใช้อาหารเสริมทั้งในทางบวกและในทางลบ โดยทัศนคติในทางลบพบได้ร้อยละ 33.4 ของข้อคำถามพบว่ากลุ่มที่ไม่เคยใช้มีความรู้ที่ถูกต้องเกี่ยวกับการส่งเสริมสุขภาพและผลิตภัณฑ์อาหารเสริม ตลอดจนมีทัศนคติในทางลบต่อการใช้อาหารผลิตภัณฑ์เสริมมากกว่ากลุ่มอื่นเล็กน้อยอย่างมีนัยสำคัญทางสถิติ ($p < 0.0001$)

สรุป: สตรีไทยวัยใกล้หมดระดูหรือวัยหมดระดูที่มีความใส่ใจในสุขภาพของตนเอง มากกว่าร้อยละ 50 มีการใช้ผลิตภัณฑ์อาหารเสริม สตรีในวัยนี้ไม่ว่าจะเคยใช้ผลิตภัณฑ์อาหารเสริมหรือไม่ก็ตาม ต่างก็มีความรู้ด้านการส่งเสริมสุขภาพอยู่ในเกณฑ์ดี แต่ยังคงมีความเชื่อและความเข้าใจที่ไม่ถูกต้องเกี่ยวกับผลิตภัณฑ์อาหารเสริม ดังนั้นจึงควรเพิ่มเติมการให้ความรู้แก่สตรีที่เข้าร่วมกิจกรรมการดูแลสุขภาพ เพื่อให้สตรีเหล่านั้นมีความรู้ความเข้าใจที่ถูกต้องและใช้ผลิตภัณฑ์อาหารเสริมอย่างเหมาะสมและคุ้มค่า