Consumption Behavior, Need and Factors Influencing Buying Decision on Soy and Soy Germ Products of Menopausal Women in Thailand

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ABSTRACT

The objectives of this study were to investigate 1) the prevalence of menopausal symptoms and methods for alleviation of menopausal symptoms, 2) the consumption behavior and needs of menopausal women, and 3) the factors influencing a consumer's buying decision on soy and soy germ products. The research was undertaken by collecting data from various sources and interviews with questionnaires of 402 menopausal women aged between 40 and 59 years. The result showed that the five most common symptoms were tiredness (81.1%), forgetfulness (77.6%), dry skin (75.4%), headache (72.9%), and aching in muscles and joints (70.1%). Most respondents alleviated menopausal symptoms by exercising the body and brain (54.5%) and eating phytoestrogen products (30.1%). The top five soy products usually consumed by respondents were 1) pasteurized or UHT soymilk (85.8%), 2) soft/silk tofu (68.4%), 3) tofu milk (57.0%), 4) tofu with ginger syrup (55.7%), and 5) firm tofu (48.0%). The respondents consumed soy and soy germ products 1−2 times per week (37.1%) and normally purchased from markets or open markets (87.1%). The reasons given for consuming soy and soy germ products were nutrition value and medicinal properties. The respondents rated the importance levels of eleven variables influencing a consumer's buying decision. Meanwhile, a factor analysis technique classified these variables into four factors which in total explained a cumulative variance of 67.37 percent. The four factors were 1) a product and price factor, describing product appearance, taste and price; 2) a marketing factor describing brand, convenient buying and advertising; 3) a package factor describing packaging and the size of the package; and 4) a health factor describing nutrition value, medicinal properties and product safety. This exploratory study was conducted to get a better understanding of menopausal women's behavior. For the development of soy germ products, the respondents were interested in soy germ products containing isoflavones (87.6%). They suggested that soy germ products should be developed in a beverage category (57.7%) and a supplementary food category (25.3%).

Keywords: consumption behavior, soy and soy germ product, buying decision, factor analysis, menopausal women

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บทคัดย่อ

การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อสำรวจ 1) อาการวัยทองและวิธีบรรเทาอาการวัยทอง 2) พฤติกรรมการบริโภคและความต้องการของผู้หญิงวัยทองในประเทศไทย และ 3) ปัจจัยที่มีอิทธิพลต่อการตัดสินใจซื้อผลิตภัณฑ์จากถั่วเหลืองและผลิตภัณฑ์จากเจิร์มถั่วเหลืองของผู้หญิงวัยทอง โดยการรวบรวมข้อมูลและการสัมภาษณ์ผู้หญิงวัยทองจำนวน 402 คน ที่มีอายุระหว่าง 40–59 ปี ผลการวิจัยพบว่า อาการวัยทองที่พบมากที่สุด 5 อันดับแรก ได้แก่ เหนื่อยเพลีย (81.1%) หลงลืม (77.6%) ผิวหนังแห้ง (75.4%) ปวดศีรษะ (72.9%) และปวดเมื่อยกล้ามเนื้อ (70.1%) ซึ่งวิธีบรรเทาอาการวัยทองของผู้บริโภคส่วนใหญ่ ได้แก่ การออกกำลังกายและการฝึกสมอง (54.5%) และการรับประทานอาหารที่มีไฟโตเอสโตรเจน (30.1%) โดยผลิตภัณฑ์จากถั่วเหลือง 5 อันดับแรกที่ผู้บริโภครับประทานเป็นประจำ ได้แก่ 1) น้ำนมถั่วเหลืองพาสเจอไรส์หรือสเตอริไลส์ (85.8%) 2) เต้าหู้อ่อน (68.4%) 3) เต้าหู้นมสด (57.0%) 4) เต้าฮวยน้ำขิง (55.7%) และ 5) เต้าหู้แข็ง (48.0%) ผู้บริโภคส่วนใหญ่รับประทานผลิตภัณฑ์จากถั่วเหลืองและเจิร์มถั่วเหลือง 1–2 ครั้งต่อสัปดาห์ (37.1%) และมักจะเลือกซื้อผลิตภัณฑ์จากตลาดสดหรือตลาดนัด (87.1%) ซึ่งเหตุผลที่ผู้บริโภครับประทานผลิตภัณฑ์จากถั่วเหลืองและเจิร์มถั่วเหลืองเนื่องจากต้องการคุณค่าทางโภชนาการ และต้องการสรรพคุณในการป้องกันและรักษาโรค และจากการวิเคราะห์ปัจจัยในการให้ระดับความสำคัญของตัวแปรที่มีอิทธิพลต่อการตัดสินใจซื้อของผู้บริโภค จำนวน 11 ตัวแปร สามารถจัดกลุ่มตัวแปรเหล่านี้ได้เป็น 4 ปัจจัย และอธิบายความแปรปรวนของตัวแปรทั้งหมดได้ ร้อยละ 67.37 โดยปัจจัยทั้ง 4 นี้ ได้แก่ 1) ปัจจัยด้านผลิตภัณฑ์และราคา ประกอบด้วย ลักษณะปรากฏ ราคา และรสชาติ 2) ปัจจัยด้านการตลาด ประกอบด้วย ตราสินค้า ความสะดวกในการซื้อ และการโฆษณา 3) ปัจจัยด้านบรรจุภัณฑ์ ประกอบด้วย รูปแบบของภาชนะบรรจุ และขนาดของภาชนะบรรจุ และ 4) ปัจจัยด้านสุขภาพ ประกอบด้วย สรรพคุณในการป้องกันและรักษาโรค คุณค่าทางโภชนาการและความปลอดภัยของผลิตภัณฑ์ ซึ่งการศึกษานี้นำไปสู่ความเข้าใจในพฤติกรรมของผู้หญิงวัยทองมากขึ้น สำหรับการพัฒนาผลิตภัณฑ์จากเจิร์มถั่วเหลืองนั้น ผู้บริโภคให้ความสนใจในการพัฒนาผลิตภัณฑ์จากเจิร์มถั่วเหลืองที่มีปริมาณไอโซฟลาโวนส์ (87.6%) ซึ่งผู้บริโภคได้เสนอแนะให้พัฒนาผลิตภัณฑ์ในกลุ่มของผลิตภัณฑ์เครื่องดื่ม (57.7%) และผลิตภัณฑ์เสริมอาหาร (25.3%)

คำสำคัญ: พฤติกรรมการบริโภค ผลิตภัณฑ์ถั่วเหลืองและเจิร์มถั่วเหลือง การตัดสินใจซื้อ การวิเคราะห์ปัจจัยผู้หญิงวัยทอง

INTRODUCTION

Menopause, also called change of life or climacteric, is a natural event experienced by every woman. The common denominator is cessation of the menstrual cycle. On the other hand, in relation to the symptoms and risks of osteoporosis, cardiovascular diseases, cancer, and Alzheimer's disease, every woman is unique. Hormonal therapy (HT) is recommended for postmenopausal women showing primarily vasomotor symptoms. However, HT results in side effect such as mastalgia, nausea, migraine, weight gain, and edema besides the fear of breast cancer (Nahas and Nahas-Neto, 2006). These effects have led many women to choose a natural approach.

Soybean is a popular health food that has been consumed in Asian countries for many centuries (Wang and Murphy, 1996). Soybean and soy foods contain numerous phytochemicals including isoflavones, especially the soy germ or hypocotyls that contain about five to six times the amount of isoflavones in the cotyledon (Liu, 1997). Once soy germ has been isolated, ingredients can be manufactured for the food and supplement markets (Schryver, 2002). Thus, soy germ is interesting

because it was the most concentrated source of isoflavones in soy.

Currently, soybean and soy products are consumed worldwide due to their nutritional properties and the beneficial characteristics of the constituent compounds, like isoflavones (Phommalth *et al.*, 2008). Consumption of isoflavones is related to human health benefits in reducing or altering certain risk parameters of cardiovascular disease, relieving menopausal symptoms, contributing to bone growth or stabilization, and reducing the risk of several forms of cancer in women such as breast cancer and colon cancer (Cassidy *et al.*, 1994; Kim *et al.*, 1998).

In Thailand, menopausal women aged 40–59 years constituted 13 percent of the total population in 2005 and this is predicted to increase to 28 percent in 2020 (Prasit *et al.*, 2007; National Statistical Office of Thailand, 2009). Therefore, the objectives of this study were to survey 1) the prevalence of menopausal symptoms and methods for alleviation of menopausal symptoms, 2) the behavior and needs of menopausal women in Thailand, and 3) the factors influencing the buying decision of menopausal women on soy and soy germ products to provide basic information for further product development of soy and soy germ products.

METHODOLOGY

Consumer survey

The study used primary and secondary data. A set of questionnaires was used to collect data. The questionnaire set consisted of three parts: 1) demographic profile, menopausal symptoms and methods of alleviating the menopausal symptoms of the respondents, 2) the behavior and needs of the respondents toward soy and soy germ products, and 3) factors influencing consumer buying decisions on soy and soy germ products. A buying decision score was rated using the five-point Likert scale. The reliability of the questionnaire was tested by Cronbach's Alpha Coefficient method (Robinson *et al.*, 1991) ($\propto = .05$) and questionnaires were adjusted.

The data were collected by means of questionnaires and interviews with 402 menopausal women (both natural and surgical menopause), aged 40–59 years, attending the menopause clinic at Abhaibhubejhr hospital and general respondents in Prachinburi province in Thailand during July 2008 to December 2008. Natural menopause was divided into 2 subgroups—namely, peri-menopausal and post-menopausal groups.

Statistical analysis

The statistical analysis included: frequency, percentage, arithmetic mean, mode, standard deviation, and a Chi-square test. Factor validity was assessed by factor analysis of the buying decision scale items using principal component extraction and oblique rotation by the varimax approach.

RESULTS AND DISCUSSION

Demographic profile and menopausal symptoms of the respondents

The mean age of the 402 menopausal women was 49.3 (SD = 6.11) years. Marital status was reported as 17.9 percent being single, while 64.9 percent were married, 11.0 percent were divorced, 5.2 percent were widowed, and 1.0 percent were separated (Table 1). Of the respondents, 37.6 percent had obtained a bachelor's degree and 34.1 percent had primary school education. The majority of the respondents were government officials (29.1%), and employees or laborers (27.4%). Of the respondents, 16.4 percent had their own business and 14.7 percent were housewives. The respondents' monthly income was between 10,001 and 15,000 baht (34.6%), between 5,001 and 10,000 baht (23.9%), and less than 5,000 baht (15.9%).

The prevalence of each climacteric symptom identified by menopausal status is shown in Table 2. The five most common menopausal symptoms were tiredness (81.1%), forgetfulness (77.6%), dry skin (75.4%), headache (72.9%), and aching in muscles and joints (70.1%). These data were consistent with

Table 1 Demographic profile of menopausal women

(n = 402)

Information	n	%
Marital status		
Married	261	64.9
Single	72	17.9
Divorced	44	11.0
Widowed	21	5.2
Separated	4	1.0
Education		
Primary school	137	34.1
Secondary school	79	19.6
Associate degree	24	6.0
Bachelors degree	151	37.6
Masters degree or higher	11	2.7
Occupation		
Government officials	117	29.1
Employee/laborer	110	27.4
Own business	66	16.4
Housewifeves	59	14.7
Farmer	42	10.4
Government enterprise official	8	2.0
Monthly salary		
≤ 5,000 THB	64	15.9
5,001 – 10,000 THB	96	23.9
10,001 – 15,000 THB	139	34.6
15,001 – 20,000 THB	62	15.4
> 20,000 THB	31	7.7
No response	10	2.5

previous studies conducted by Prasit *et al.* (2007) where the most frequently reported discomforts were forgetfulness, muscle/joint pains, and tiredness. Hot flushes were significantly higher in surgical menopausal woman than natural menopausal group. Respondents with natural menopause presented more moodiness and anxiety in pre/peri menopausal women while vaginal dryness and decreasing sexual desire were mostly presented in the post-menopausal group.

The respondents alleviated menopausal symptoms (Table 3) by exercising the body and brain (54.5%) and by eating phytoestrogen products (30.1%), while only 10.7 percent of severe cases used hormone replacement therapy (HRT). Fu *et al.* (2003) stated that for many generations, women had recognized that eating and digestion of specific foods or plant extracts such as soy foods and isoflavones may lead to a reduction in the symptoms of menopause.

Behavior and needs of the respondents with regard to soy and soy germ products

The results of the behavioral survey (Table 4) showed that the respondents consumed soy and soy germ products that could be classified into four categories: 1) raw material category: they consumed

Table 2 Prevalence of each symptom in various groups of menopausal status

Symptoms	All (n = 402) n (%)	Pre/Peri (n = 134) n (%)	Post (n = 134) n (%)	Surgical (n = 134) n (%)	*p*–value
Tiredness	326 (81.1)	112 (83.6)	109 (81.3)	105 (78.4)	0.077
Forgetfulness	312 (77.6)	102 (76.1)	110 (82.1)	100 (74.6)	0.112
Dry skin	303 (75.4)	100 (74.6)	106 (79.1)	97 (72.9)	0.133
Headache	293 (72.9)	100 (74.6)	94 (70.1)	99 (73.9)	0.672
Aching in muscles and joints	282 (70.1)	95 (70.9)	97 (72.3)	90 (67.1)	0.545
Hot flushes	280 (69.7)	77 (57.5)	86 (64.2)	117 (87.3)	0.015*
Anxiety	275 (68.4)	111 (82.8)	79 (58.9)	85 (63.4)	0.018*
Night sweats	272 (67.7)	87 (64.9)	95 (70.9)	90 (67.1)	0.158
Decreasing sexual desire	269 (66.9)	86 (64.1)	100 (74.6)	83 (61.9)	0.005*
Moody	264 (65.7)	105 (78.3)	82 (61.2)	77 (57.5)	0.033*
Avoid intimacy	261 (64.9)	83 (61.9)	87 (64.9)	90 (67.1)	0.654
Dizziness	251 (62.4)	83 (61.9)	88 (65.7)	80 (59.7)	0.089
Vaginal dryness	217 (54.0)	56 (41.79)	85 (63.4)	75 (55.9)	0.020*
Decrease in physical strength	210 (52.2)	69 (51.5)	75 (56.0)	66 (49.3)	0.337
Difficulty sleeping	196 (48.8)	63 (47.0)	70 (52.2)	63 (47.0)	0.051
Feeling a lack of energy	180 (44.8)	57 (42.5)	63 (47.0)	60 (44.7)	0.290
Involuntary urination	178 (44.3)	59 (44.0)	63 (47.0)	55 (41.0)	0.446
Feeling depressed	173 (43.0)	59 (44.0)	60 (44.7)	54 (40.2)	0.565
Frequent urination	172 (42.8)	62 (46.3)	56 (41.8)	54 (40.2)	0.615
Urinary stress incontinence	163 (40.5)	57 (42.5)	53 (39.6)	53 (39.6)	0.824
Palpitation	143 (35.6)	48 (35.8)	50 (37.3)	45 (33.6)	0.640

* Note that no values are significant at $p < .05$

Table 3 Methods of alleviating menopausal symptoms of the respondents

n=402

Information	n	%
Exercising the body and brain	240	54.5
Eating phytoestrogen product	132	30.1
Having a hobby such as reading, watching TV. etc.	89	21.1
Hormone replacement therapy	43	10.7
Concentration	30	7.5

* Multiple responses were allowed

68.4 percent soft/silk tofu, followed by firm tofu (48.0%), red sufu (25.3%), and tofu skin (24.9%); 2) snack category: of the respondents, 57 percent chose tofu milk followed by tofu with ginger syrup (55.7%), and soy pudding (18.4%); 3) beverage category: of the respondents 85.8 percent consumed pasteurized soy milk or UHT soy milk followed by rejuvenating concoction beverages (6.5%) and green tea with soy protein isolate (3.2%); and 4) supplement food category: this represented less than 6 percent of respondents. Respondents consumed soy and soy germ products 1–2 times per week (37.1%) and less

Table 4 Behavior of consumers with regard to soy and soy germ products

n=402

Information	n	%
(1) Raw material category*		
Soft/Silk tofu (kinugoshi)	275	68.4
Firm tofu (momengoshi)	193	48.0
Red sufu	102	25.3
Tofu skin (yuba)	100	24.9
Textured soy protein	74	18.4
Soy flour	19	4.7
Natto	9	2.2
(2) Snack category*		
Tofu milk	229	57.0
Tofu with ginger syrup	224	55.7
Soy pudding	74	18.4
Roasted soy, baked soy	65	16.2
Bakery items made from soy flour	34	8.5
Soy milk icecream	29	7.2
Breakfast cereal containing soy	22	5.5
Cereal bars containing soy	6	1.5
(3) Beverage category*		
Pasteurized /UHT Soy milk	345	85.8
Rejuvenating concoction beverage	26	6.5
Green tea with soy protein isolate	13	3.2
Instant soy milk	10	2.5
Artificial coffee (roasted soy)	8	2.0
(4) Supplementary food category*		
Soy protein isolate powder	22	5.5
Calcium with soy germ tablet	14	3.5
Isoflavones capsule or tablet	2	0.5
Lecithin capsule	1	0.2
Frequency for consumption of soy and soy germ products		
Every day	9	2.2
3−4 times per week	50	12.4
1−2 times per week	149	37.1
< 1 time per week	116	28.9
Seldom	78	19.4

Table 4 (Cont.).

n=402

Information	n	%
Expense of soy and soy germ products per time		
≤ 50 THB	263	65.4
51 – 100 THB	116	28.9
101 – 200 THB	8	2.0
201 – 300 THB	2	0.5
> 300 THB	13	3.2
Place of purchase of soy and soy germ products*		
Open market	350	87.1
Convenience store	138	34.3
Department store	124	30.8
Supermarket	119	29.6
Health shop	25	6.2
Direct sales	23	5.7
Electronic commerce	2	0.5
Reason for consumption of soy and soy germ products*		
Wanted nutrition value	129	32.1
Medicinal properties in product	115	28.6
Good taste	108	26.9
Inexpensive	81	20.1
Meat replacement	50	12.4
Milk replacement	42	10.4

* Multiple responses were allowed

than once per week (28.9%). The respondents normally purchased soy and soy germ products from the open market (87.1%), convenience store (34.3%), department store (30.8%), supermarket (29.6%), and health shop (6.2%).

The reasons respondents consumed soy and soy germ products were: for the nutrition value (32%) and medicinal properties (28.6%), followed by good taste (26.9%) and inexpensive (20.1%). These results agreed with the study by Wansink and Cheong (2002) that found consumers ate soy for health reasons (69.2%) and taste reasons (30.8%).

Data on the needs of the respondents (Table 5) showed that 87.6 percent were interested in soy germ products containing isoflavones. They suggested that soy germ products should be developed in a beverage category (57.7%), a supplementary food category (25.3%), a snack category (11.9%), and a raw material category (5.1%). The price for developed soy germ products should be less than 50 THB/package (65.1%).

Factors influencing buying decision on soy and soy germ products

The inter-item reliability of the set of questionnaires was 0.806, as tested by Cronbach's

Table 5 Needs of the respondents for soy germ products

Information	n	%
Interest for soy germ products containing isoflavones (n = 402)		
Yes	352	87.6
No	50	12.4
Suggestion for development of soy germ products (n = 352)		
Raw material category	18	5.1
Beverage category	203	57.7
Snack category	42	11.9
Supplementary food category	89	25.3
Price for developed soy germ products (n = 352)		
≤ 50 baht	229	65.1
51 − 100 baht	64	18.2
101 − 200 baht	37	10.5
201 − 300 baht	14	3.9
> 300 baht	12	3.4

Table 6 Important factors influencing consumer's buying decision regarding soy and soy germ products

Buying decision variable	Mean±SD*	Level of importance*
1. Taste	4.11±0.73	very important
2. Appearance	4.08±0.62	very important
3. Price	3.98±0.73	very important
4. Medicinal properties	3.82±0.66	very important
5. Nutrition value	3.73±0.69	very important
6. Cleanliness and safety	3.70±0.70	very important
7. Type of packaging	3.66±0.74	very important
8. Convenient buying	3.56±0.75	very important
9. Brand	3.49±0.65	moderately important
10. Size of packaging	3.47±0.74	moderately important
11. Advertising	3.41±0.65	moderately important

Note: Buying decision score is rated from 1 to 5 (1= less important; 5 = extremely important)

*Mean score 1.00−1.49 = very slightly important
Mean score 1.50−2.49 = slightly important
Mean score 2.50−3.49 = moderately important
Mean score 3.50−4.49 = very important
Mean score 4.50−5.00 = extremely important

Alpha Coefficient method. The respondents were asked to rate the importance levels of eleven variables affecting the consumer's buying decision with regard to soy and soy germ products. The results (Table 6) showed that there were eight variables very important to the consumer's buying decision of this product. These variables were taste, appearance, price, medicinal properties, nutrition value, cleanliness and safety, type of packaging, and convenient buying.

Factor analysis (Table 7) of the eleven variables suggested that four factors could be identified with an Eigen value larger than 1.0 (Lewis-

Table 7 Factor loading of rotated component matrix on consumer buying decision for soy and soy germ products

Factor	Factors and factor loading of variables			
	1	2	3	4
Appearance	.832	.031	.073	.145
Taste	.687	.253	.137	.071
Price	.811	.032	.132	.094
Brand	.076	.833	.123	.211
Convenient buying	.042	.860	.232	.001
Advertising	.206	.455	.010	.319
Type of packaging	.165	.161	.906	.144
Size of packaging	.158	.165	.901	.167
Nutrition value	.083	.141	.120	.743
Medicinal properties	.107	.094	.158	.843
Cleanliness and safety	.153	.415	.066	.451
Eigen value	3.777	1.433	1.176	1.026
Variance explained (%)	34.82	13.03	10.69	9.33
Accumulated variance explained (%)	34.82	47.35	58.04	67.37

Note: Extraction method: Principal Component Analysis
Rotation method: Varimax

Beck, 1994) and they explained 67.37 percent of the variance of the variables. The first factor can be called the product and price factor, as the highest loadings related to three variables pertaining to product appearance, taste, and price. The second factor was named the marketing factor because three of the highest loadings for this factor referred to brand, convenient buying, and advertising. The third factor was defined by two items relating to the type of packaging and the size of packaging and was labeled as the package factor. The final factor, which related to nutrition value, medicinal properties and product safety, was labeled as the health factor. The influence of the first factor (product and price) was the highest, explaining 34.82 percent of the variance of the variable.

CONCLUSION

An exploratory study was conducted to examine the symptoms experienced and methods of alleviating menopausal symptoms by menopausal women in Thailand and also to survey consumption behavior, needs and the influential factors in buying decisions on soy and soy germ products. The main results of the study can be summarized into four parts. Firstly, the five most common symptoms were tiredness, forgetfulness, dry skin, headache, and aching in muscles and joints. The most common methods for alleviation were exercising the body and brain, eating phytoestrogen products, and hormone replacement therapy in severe cases. Secondly, the behavioral survey showed that the top five soy products consumed by respondents usually were 1) pasteurized or UHT soy milk, 2) soft/silk tofu, 3) tofu milk, 4) tofu with ginger syrup, and 5) firm tofu. The respondents consumed soy and soy germ products 1−2 times per week and normally purchased from the open market. They consumed soy and soy germ products because of their nutrition value and medicinal properties. Thirdly, the respondents were interested in soy germ products and suggested that soy germ products should be developed in the beverage category and supplementary food category. The price

of any products should be less than 50 THB/packet. Finally, the factors underlying the buying decision regarding soy and soy germ products were categorized into four groups by factor analysis: 1) product and price factor, describing product appearance, taste and price; 2) marketing factor, describing brand, convenient buying and advertising; 3) package factor, describing packaging and size of package; and 4) health factor, describing nutrition value, medicinal properties and product safety.

The results of the study have contributed to the existing, though scarce, literature on consumption behavior with regard to soy and soy germ products. Consumption behavior is influenced by many factors such as product appearance, taste and price, among others. Thus, the health food or supplementary food manufacturers of soy and soy germ products should use this information to respond to consumers' needs and product developers should apply the findings to develop product concepts using soy and soy germ ingredients in the formulation of health food or supplementary food products for menopausal women in the future.

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