

Original Article

Characteristics of soy bread users and their beliefs about soy products

Anthony Worsley¹ BSc(Hons), PhD, Mark L Wahlqvist² BMedSc, MD BS (Adelaide), MD (Uppsala), FRACP, Fabien S Dalais² BSc(Hons), PhD and Gayle S Savage² Grad Dip Diet (Deakin), PhD (Monash)

¹*School of Health Sciences, Deakin University, Melbourne, Australia*

²*Asia Pacific Health and Nutrition Centre, Monash Asia Institute, Monash University, Melbourne, Australia*

A two-stage random telephone/mail survey was conducted during the last quarter of 1998 among Adelaide residents to determine consumers' use of soy bread and other soy products and their health expectations of soy products. One in five (21%) of 1477 telephone subscribers usually consumed soy bread and related soy products. Comparisons of soy bread consumers and non-consumers, based on the mail survey sample, showed that more soy bread consumers used dietary supplements and ate low fat and vegetarian diets, though their experiences of ill health were similar. Soy bread consumers held stronger universalism (pro-nature) values than non-consumers. They also held more positive expectations about the benefits of soy consumption, including reductions in menstrual and menopausal symptoms, increased bowel regularity and reductions in the risk of heart disease and cancer. The findings are discussed in relation to the psychology of dietary supplementation, values orientations and physiological plausibility. Further investigations are suggested.

Key words: Australia, dietary supplements, personal values, soy bread, survey, symptoms.

Introduction

Clinical trials suggest that there may be substantial health benefits from consumption of soy. For example, Wilcox *et al.*¹ showed a significant improvement in the vaginal cytology of postmenopausal women following dietary supplementation with soy flour, linseed, and red clover. Epidemiological studies have shown that women in China,² Japan³ and South-east Asia⁴ experience fewer menopausal and menstrual symptoms than women from Western Europe or North America.

Perhaps in response to the publicity given to these studies of soy products, there has been an increase in the number of soy products on the market. These include soy breads, soy drinks and a variety of soy supplements that can be added to diets. In Australia, there has been a sudden rapid expansion in the consumption of breads containing soy and or linseed. However, little is known about the characteristics of the people who consume these products, nor is much known about their reasons for doing so.

Thus, the aims of this study were:

- 1 to determine the likely prevalence of the consumption of soy breads and other soy products;
- 2 to describe some of the demographic, psychographic and dietary characteristics of soy users;
- 3 to compare their expectations of the health benefits associated with soy to those of non-consumers of soy products.

Methods

Instruments

A questionnaire was constructed with the following sections:

Consumption of soy products. These include breads, drinks and supplements. We inspected supermarkets to ascertain the main brands of soy products and related non-soy brands of breads and other products. A list of 20 breads, 17 breakfast cereals and 10 soy drinks was made; respondents were asked to indicate how often they used these products (e.g. never, about monthly, weekly, daily).

Use of soy and other dietary supplements. A short list of common dietary supplements and special dietary habits (e.g. use of diabetic diets) was made. Respondents indicated how often they used these products.

Health experience. Respondents were asked whether they suffered from any of a number of common conditions (e.g. diabetes, heart disease, a disability) and how many times they had visited a doctor or other health practitioner during the past year. Height, weight and smoking status were also requested.

Correspondence address: Professor Anthony Worsley, School of Health Sciences, Deakin University, 221 Burwood Highway, Burwood, Victoria 3125, Australia.

Tel: +61 3 9251 7259; Fax: +61 3 9244 6017

Email: tonyw@deakin.edu.au

Accepted 3 August 2001

Likely reasons for using soy products. We constructed a list of 14 possible benefits based upon anecdotal reports and clinical experience. Respondents indicated whether they thought soy product consumption would improve, worsen or make no change to various functions such as skin condition, sleep quality and menstrual symptoms.

Personal values. Previous work has suggested that specific personal values may be associated with the consumption of particular types of foods or with particular attitudes to foods.^{5,6} We thought it likely that self-orientated values might be associated with soy consumption since it is most likely taken to improve some aspect of self functioning. An abbreviated version of Schwartz's values survey was used to assess personal values.⁷ Respondents indicated whether each of 22 value statements were most, fairly or not important to them.

Demographic information. The information sought included details of age, sex and occupation. Details of employment, education status, ethnicity, household size and income were also recorded.

Procedure

A simple random sample of 1500 names was drawn from the Adelaide *White Pages* telephone directory. Telephone calls were made to potential respondents between 6 pm and 9 pm on week nights, and between 10 am and 6 pm on Saturdays. Non-respondents were called back a maximum of three times. After identification of the female caller as being from the Department of Public Health, University of Adelaide, potential respondents were asked, 'Do you use any soy products, for example, soy bread?' They were then asked if they would like to take part in a survey. If so, a questionnaire (entitled *Bread and your Health*) would be mailed to them the next day. For the first month of the study, questionnaires were sent to both soy and non-soy users. For the next month thereafter, questionnaires were sent only to soy users. This was because the prevalence of soy use was approximately one in five – we wanted approximately equal numbers of soy and non-soy users for our subsequent analyses. People who had agreed to take part in the survey but who did not return a questionnaire after two weeks were reminded by phone at that time.

Results

Prevalence of soy use

In all, 1477 people were contacted by telephone during the last quarter of 1998. They were all asked if they consumed soy products; 303 said that they did. This suggests that the prevalence of soy product use among this random sample of Adelaide adults was approximately 21%.

Response and refusal rates

Seven hundred and ninety five individuals were invited to complete the postal questionnaire; 556 agreed verbally to do so and 474 returned completed questionnaires. Thus, the response rate among those who agreed to participate was 85%, or 60% of those who were invited to participate. Two

hundred and thirty nine people (795 – 556) refused to take part in the postal survey; this represents a refusal rate of 30% (239/795). Reasons for refusal included lack of time and lack of interest in the topic area.

Many respondents did not answer all of the items in the initial section of the questionnaire, which concerned frequencies of use of breads and cereals. Subsequent comparisons of the characteristics of 'completers' and 'non-completers' showed that the latter were older, less educated and more likely to be male than the 'completers'. Their dietary supplementation habits were almost identical to those of the non-users of soy bread. It appears that some of the 'non-completers' may have been confused or put off by the use of brand names to describe many of the food products in this section.

Demographic, health and dieting characteristics of soy bread users and non-users

There were no statistically significant differences in the household incomes, the countries of birth, the educational backgrounds or the mean ages of the users and non-users of soy bread. However, more of the soy bread users were women (Table 1). A similar situation existed in the comparisons of users and non-users of soy products in general.

More of the non-users of soy bread were smokers and fewer of them were consuming low fat or vegetarian diets (Table 1). There were no statistically significant differences in the group's recent health conditions or in their use of health professionals.

Use of soy breads

Vogel's, Burgen and other brands of soy and linseed breads were each consumed several times a week by approximately one in six respondents. About one in 20 respondents consumed either Burgen, another commercial soy bread or home-made soy bread every day (Table 2).

Dietary supplementation and soy bread consumption

Generally, consumers of soy bread used dietary supplements more often than non-users (Table 3). This was particularly so for mineral and vitamin supplements.

Comparison of respondents' expectations of benefits associated with soy use

Generally, substantial proportions of respondents in both groups expected that soy would protect against heart disease and cancer, reduce menstrual and menopausal symptoms, help with weight control, bowel regularity and inter-meal satiety.

Table 1. Comparisons of sex, smoking and dieting status associated with soy bread consumption

Variable	% Non-users	% Users	P
Low fat diet	22.6	41.7	0.001
Vegetarian diet	2.1	12.5	0.001
Smoker status	15.4	8.6	0.091
Sex (men/women)	30.9	17.4	0.011

There were many statistically significant differences between the groups, all of which showed that soy bread users expected greater health benefits. However, the biggest differences between the groups were in their expectations about menopausal and premenstrual symptoms, heart disease, cancer

and increased bowel regularity. Two expectations showed greater scepticism among the soy bread users; more of them disagreed with the proposed benefits associated with skin and sleep. Table 4 also clearly shows that soy bread users were more certain of their opinions than non-users.

Table 2. Reported frequencies of consumption of types of soy bread

Type of bread	Never	1–3 times/week	Daily	<i>n</i>
Burgen SoyLin Bread	78.2	17.8	4.0	327
Vogel's Soy & Linseed Bread	83.8	14.5	1.7	345
Helga's Soy & Linseed Bread	98.5	0.9	0.6	328
Other bread with soy/linseed	79.2	15.0	5.8	327
Homemade bread with soy/linseed	89.9	5.5	4.6	327
Ryvita biscuits with soy/linseed	84.1	15.1	0.9	345

Table 3. Comparisons of soy bread users' and non-users' self-medication and dietary supplementation during the previous month

Dietary supplement	Non-users (<i>n</i> = 166)			Users (<i>n</i> = 116)			<i>P</i>
	Not used	Several times a week	About daily	Not used	Several times a week	About daily	
Headache tablets/capsules	50.0	46.3	3.8	44.0	54.1	1.8	NS
Oatmeal or wheatbran	92.7	3.3	4.0	82.1	7.5	10.4	0.032
Fish oils	92.7	3.3	4.0	78.5	14.0	7.5	0.002
Herbal medicines	93.4	3.3	4.0	79.2	11.3	9.4	0.003
Antihistamines (not prescribed)	86.3	10.5	3.3	78.3	16.0	5.7	NS
Homeopathic medicines	98.0	0.0	2.0	90.5	7.6	1.9	0.003
Mineral supplements (e.g. calcium tablets)	83.7	4.6	11.8	69.7	11.0	19.3	0.022
Multivitamins	75.8	8.5	15.7	61.8	22.7	15.5	0.005
Phytoestrogen extract	97.3	0.0	2.7	95.3	3.8	0.9	0.036
Evening primrose oil	93.4	0.0	6.6	83.8	6.7	9.5	0.003
Specific vitamins (e.g. E, B, C)	77.8	3.9	18.3	56.6	20.4	23.0	0.0001
Brewer's yeast	98.0	0.7	1.3	95.2	2.9	1.9	NS
Soy products of any sort	89.5	5.3	5.3	61.5	23.9	14.7	0.0001

NS, not significant.

Table 4. Comparison of soy bread users' and non-users' expectations of soy benefits

Expectation	Non-users (<i>n</i> = 166)			Users (<i>n</i> = 116)			<i>P</i>
	Disagree	Not sure	Agree	Disagree	Not sure	Agree	
To lessen bloating	16.5	70.7	12.8	31.5	48.6	19.8	0.002
To make bowels more regular	8.9	53.3	37.8	12.4	37.2	50.4	0.039
To reduce risk of cancer	14.0	61.0	25.0	16.8	39.8	43.4	0.003
To protect against heart disease	10.1	58.0	31.9	10.5	37.7	51.8	0.004
To lessen depression/anxiety	28.8	63.6	7.6	33.0	58.0	8.9	NS
To relieve or prevent headaches	28.6	65.4	6.0	34.8	58.9	6.3	NS
To stop feeling hungry	22.4	60.4	17.2	21.4	46.4	32.1	0.019
To relieve muscle or joint pain	23.3	72.9	3.8	27.7	61.6	10.7	0.054
To reduce menopause symptoms	9.2	67.1	23.7	15.7	25.7	58.6	0.0001
To reduce premenstrual symptoms	13.0	71.4	15.6	10.3	45.6	44.1	0.001
To make skin look or feel better	17.9	67.2	14.9	30.4	56.3	13.4	0.071
To get a good night's sleep	29.1	66.4	4.5	38.7	57.7	3.6	NS
To aid clear thinking and concentration	28.4	64.9	6.7	29.7	61.3	9.0	NS
Weight control	17.3	58.6	24.1	27.4	42.5	30.1	0.033

NS, not significant.

Psychographic associates of soy bread consumption

Cross-tabulation analyses confirmed the view that soy bread use was associated with universalism values such as protection of the environment, harmony with nature and living in a world of beauty. Factor analysis of the values items revealed several identifiable values segments similar to those observed by Schwartz and Bilsky.⁷ An ANCOVA analysis of the respondents' universalism values scores by categories of soy bread consumption and controlling for likely confounders such as age, education and sex, showed that soy bread consumption was significantly related to universalism values independently of these variables. That is, soy bread users held stronger universalism values than non-consumers (mean factor scores after adjustment for influence of the demographic variables: users = 0.15, SD 0.25; non-users = -0.27, SD -0.18).

Discussion

The findings suggest that soy bread consumption is now prevalent across the Australian population, particularly among women and those people who hold strong universalism values. Indeed, soy products were consumed by approximately one in six of the initial random sample of South Australian telephone subscribers. Soy bread consumption was associated with low fat and vegetarian dietary practices and with a range of dietary supplementation practices. More soy bread consumers believed that soy products had a number of health benefits, especially amelioration of menstrual and menopausal symptoms and lowering of the risk of heart disease and cancer.

Use of dietary supplements and special diets

The findings clearly suggest that consumers of soy bread (and other soy products) use a wide range of dietary supplements and some avoid meat and high fat foods. Previous research has shown that dietary supplementers tend to experience more stress than others and also have less confidence in the quality of the food supply,⁸ despite having generally more nutritious diets.^{9,10} Further studies are required to examine the extent to which soy consumers share these characteristics. Research is also required to examine the nutritional quality of the soy consumers diets; dietary supplementers in general appear to have more nutrient-dense diets than non-supplementers. The greater prevalence of low fat and vegetarian diets among the soy bread consumers suggest that this may be the case.

Expected benefits of soy

At first glance, the greater expectations of the soy bread consumers might be put down to a combination of targeted advertising of soy products to women suffering from menstrual and menopausal symptoms and to a general placebo effect. This may indeed be the case. However, there were no statistically significant differences between the two groups on four of the symptoms (depression, headaches, sleep and clear thinking) and on sleep and clear thinking, the soy bread

users reported less agreement with the proposed benefits. This suggests any placebo effects are not simple 'across the board' effects. The expectations about heart disease and cancer are unlikely to reflect personal experience. The ways in which soy has become linked to these diseases in the consumers' minds require further investigation. In contrast, the supposed benefits of soy for bowel regularity and menstrual and menopausal symptoms are grounded in personal experience and perhaps deserve more serious consideration from a physiological point of view. Several clinical studies have found that soy may be of benefit in reducing menopausal symptoms.¹¹

Demographic and psychographic predictors of soy bread consumption

In this relatively small sample, the only demographic predictor of soy bread consumption that achieved statistical significance was sex. The relationship between soy bread consumption and universalism was independent of any demographic associations. This finding is in agreement with the supplement and special diet findings above. It suggests that soy users belong to a segment of consumers who are suspicious of the conventional food supply and who take action to rectify its perceived defects through supplementation and 'healthy' dietary patterns. Values akin to universalism, which centres on harmony with nature, have been linked to vegetarianism and pro-environmental views^{5,12,13} and concerns about the food system.¹⁴ These consumers are especially likely to be disturbed by activities such as the genetic modification of soybeans. Further work is required to confirm these findings and to examine more closely consumers' perceptions of the properties of soy breads and other soy products, since the holding of a particular set of values is likely to be associated with specific perceptions of soy and other foods (e.g. that they are 'natural' or 'healthy'). Finally, possible additional benefits of soy consumption (such as improved bowel function, skin condition and cognition) require investigation.

Conclusions

- 1 Soy bread consumption is now widespread across the Australian population, particularly among women of all ages and socio-economic backgrounds.
- 2 Soy bread users hold a number of expectations about the health benefits of soy, which require further social psychological and physiological examination.
- 3 Soy bread consumers appear to have similar health experiences to those of non-consumers but more of them use dietary supplements and consume low fat and vegetarian diets.
- 4 Universalism values appear to be independent and stronger predictors of soy bread consumption than demographic variables.

Acknowledgements. The authors thank Peta Guy and Darina Hoffman for their technical assistance during the conduct of this survey.

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