Research Article

Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile

Norhayati Hussain,[1,2] Aida Athirah Salim,[1] Siti Fatimah Mohamad,[1] Nursabrina Munawar[1,3]

[1]Faculty of Food Science and Technology, Universiti Putra Malaysia, Selangor, Malaysia
[2]Halal Products Research Institute, Putra Infoport, Selangor, Malaysia
[3]Alliance of Research and Innovation for Food (ARIF), Universiti Teknologi MARA, Kuala Pilah, Negeri Sembilan, Malaysia

Correspondence: Norhayati Hussain, Department of Food Technology, Faculty of Food Science and Technology, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia, Email aryatihussain@upm.edu.my

Received: May 27, 2023 | **Published:** July 24, 2023

Abstract

Consumer herbal drinks consumption should be monitored since limited knowledge of possible herbal drinks harmful effects may put the consumer in danger. It is necessary to assess whether the demographic profile shifts the awareness and practice of consumers towards the consumption of herbal tea. This study compares the relationship between demographic profile with knowledge, attitude, and practices of herbal tea. Next, the association between demographic profile with knowledge, attitude and practices of herbal tea was studied. A cross sectional study was conducted using survey questionnaire, distributed using online platform and validated with reliability of Cronbach alpha with value >0.7. Data were analyzed using descriptive statistic, t-test, one-way ANOVA and chi square test. Result showed that from a total of 168 respondents, majority (72.6%) respondents have a moderate knowledge toward herbal tea and about 44.6% respondents have moderate attitude level toward herbal tea. Knowledge and attitude level relationship was insignificant (p>0.05). Moreover, comparison between knowledge level and higher educational level show significant difference (p<0.05) while the association between attitude level with age, occupation, ethnic and highest educational level show significance different at 0.043, 0.003, 0.023 and 0.020 respectively. The significance different shows that, there is measurable different between two group. Consumer consumption practices also varies among the demographic as examples: consumers prefer herbal tea in tea bag compared with other form and consumer with age range 18-26 years old prefer to buy herbal products from hypermarket/minimarket while older consumers prefer to buy from agent/ stockist. The Malaysian consumers are relatively knowledgeable on herbal tea products and believe that herbal teas were safe for consumption. The consumption practices association is used to determine consumer behavior toward herbal tea consumption and their buying decision.

Keywords: herbal drink, educational level, demographic, consumption, ethnic

Abbreviations: ANOVA, analysis of variance; SPSS, statistical package for social sciences

Introduction

Tea is made of processed leaf of Camellia sinensis and classified as fully fermented (black), not fermented (green) and half fermented (oolong). Drying processes and fermentation distinguish the tea type and its chemical composition.[1] Tea is considered major component of the world beverage market as it is the most popular and lowest cost of beverages. China is considered the biggest producer of tea with production of 1,939,457 tonnes, followed by India (1,208,780 tonnes) and Kenya (432,400 tonnes).[2] Tanui et al.[3] claimed that black and green tea are the most important types globally with green tea produced and consumed in China while black tea production is over 70%. According to Kasim Mansur, Malaysia is ranked 18th in Asia as the largest tea producer by the Food and Agriculture Organization of the United Nations (FAO) as it contributes to almost half (0.45%) of total tea production in the world. Despite 23 million kilograms consumption annually, Malaysia only manufactures 3.8 million kilograms of black tea. There is a notable rise in the number of Malaysian tea intake with an annual consumption of about 29 million kilograms in 2017 compared to 18 million kilograms in 2007, as reported by the Tea Trade Association of Malaysia. Herbal tea consumption also gains recognition over time, along with black tea consumption.[4] Herbal tea is technically not considered as tea. It is a mixture of ingredients not originated from Camelia sinensis like a typical tea.[5] The combination of seed, barks, dried leaves, grasses, fruits, nuts, flowers or other botanical elements is called 'tisanes' herbal tea.[6] Most country has its renown herbal tea for example Rooibos tea is popular in South Africa, Yerba Mate tea in South America (Argentina, Paraguay and Brazil) and Centella asiatica herbal tea by most Asian people.[7,8]

Similarly, tisanes referred as infusions of herbal plants are prepared by steeping in using warm or freshly boiled water with a mixture of botanical ingredients.[9] It can be flavored by adding mint or vanilla.[10] From 2011 to 2017, Malaysia shows a significant rise in commercial herbal crops cultivated annually, which is about 14% growth from 1,198 hectares to 2,317 hectares. It is an increase in the herbal production from 8,911 tons to 11,674 tons.[11] In addition, research on the quality of active ingredients, synergistic effects, vital dosage, side effects, herbal and other medicinal contraindications, and animal and human analysis should be improved to boost the appeal of domestic herbal goods.[12] Herbal teas are widely consumed because of their claim on health improvement and power of herbal that comes from specific active substances present in their tissues.[13] However, over consumption of medicines could lead to several health issues. There is a research stated that active compound of some herbs may disturb drug metabolism. Teh et al.[14] published on knowledge, attitude, and practice of Chinese herbal tea by M40 group at selected town in Kedah. They found that half of the respondent have a moderate level of knowledge and a nearly positive attitude to Chinese herbal tea. Yao

Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile

Copyright:
©2023 Norhayati et al.

85

pointed out that, despite the high consumption of herbal teas in China and elsewhere, the claimed-on healthcare benefit is poorly understood by the consumers, which led to difficulty in developing herbal teas health-promoting products. In another study, Rocha et al.[15] reported the herbal tea preparation affect the sensorial properties of herbal tea. The preparation includes temperature and time duration of brewing, water types and ratio of tea to water. There are limited reports on herbal tea consumption practice and preparation of Malaysia consumers.

Chandarasekara and Shahidi[8] reported that a natural bioactive compound like carotenoids, phenolic acids and flavonoids are abundant in herbal teas. These bioactive compounds exhibit countless biological benefits such as neuroprotective, cardioprotective, chemoprotective, anti-carcinogenic, hepatoprotective and anti-inflammatory. However, despite the beneficial effect, the consumption of untested and unregulated herbal tea may have a disadvantage to health as well.[16] It was reported that herbal drink's quality and safety should be monitored since limited knowledge of possible herbal drinks harmful effects may put the consumer in danger for overconsumption of herbal drinks.[17] Thereby, any product used in an indigenous medicinal practice in which the medicinal product contains exclusively of one or more natural plants, animals or minerals substances were classified under Control of Drugs and Cosmetics Regulations 1984 to guarantee security, consistency and effectiveness of the pharmaceutical, medical, conventional and cosmetic products marketed in Malaysia.[18] Apart from that, demand for health-promoting beverages is increasing with emerging interest of a healthy lifestyle.[19] A lot of work and time are required to gather consumer behavior information in a specific market.[20] Manufacturers with a consumer-oriented approach are more successful to sell their product like functional beverages and food.[21] According to Jia Xinn,[22] the progress of local herbal tea products has risen by 30% annually since the 1990's but, the industry lacks systematic marketing and proper scientific research.

It is important to determine whether demographic profile influence consumer knowledge and practice towards herbal tea consumption. Demographic profiles such as age, gender, occupation and education have an effect on the purchasing purpose and use of certain products.[23] Consumers' perception of healthy eating has risen worldwide because of the growth in understanding of the health benefits of herbal products. Consumers recognize consuming food that promotes wellbeing will enhance and sustain their current health status and prevent diseases.[24] Review by Jibril et al.[23] claimed that young people with age between 15-30 years old are interested in herbal tea, but recent survey on knowledge and characteristics of herbal supplement usage among community pharmacy customers in a Malaysian population shows that herbal tea consumers were older than average age. It is also reported that women are more conscious and friendly towards herbal products such herbal beverages and supplements usage compared with men. Consumer's education level and employment status shows positive correlation with herbal tea usage. It is believed that the input of herbal tea consumption pattern will assist in expanding the demand of local herbal teas industry to be well recognized globally. However, none has assessed public consumers' knowledge, attitude, and practice towards herbal tea consumption and preparation in Malaysia. Therefore, the objectives of this study are:

To evaluate the knowledge, attitude, and practice of public consumers towards herbal tea consumption.

To compare the demographic profile among consumers on knowledge, attitude, and practice of herbal tea consumption.

To identify the association between knowledge, attitude, practice, and demographic profile towards herbal tea consumption.

Conceptual framework

Figure 1 is a conceptual framework which shows the variables in this study. The rectangle shape indicates the independent variables which are gender, age, occupation, household income and educational level whereas oval shape refers to knowledge, attitude, and practice as the dependent variable in the study. There are significant association between demographic profile and knowledge level of consumers and between demographic profile and herbal tea consumption practices of consumers. Whereas there is a significant difference between demographic profile and attitude level of consumers towards herbal tea consumption.
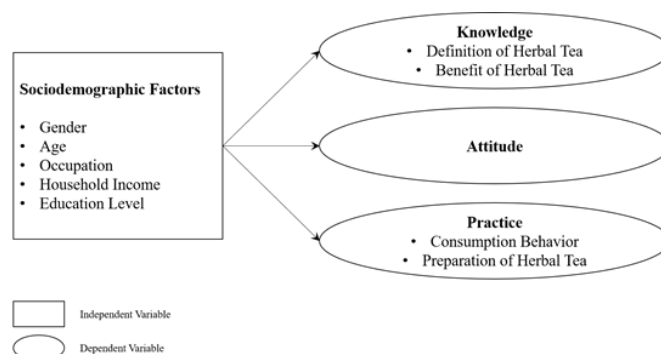

Figure 1 Conceptual framework of demographic factors and knowledge, attitude, and practice of herbal tea.

Methodology

Study design

This survey's study design was a cross-sectional study to investigate the knowledge, attitude, and practice towards herbal tea consumption and their association with demographic profile among Malaysians. Cross-sectional study is an observational study that examines data from one population at one point in time. Generally, the cross-sectional study respondents were often chosen from the available population.[25] It is used since it is inexpensive and requires shorter time to collect data from a large population. Besides that, the data were collected only once without the respondents' need for follow-up.[26] For example, this survey used the total number of Malaysian populations in the country to identify public knowledge on herbal tea.

Sample size

Based on Department Statistic of Malaysia data, Malaysia had a total population of 32.7 million in 2020 and about 25.11 million are aged 15 years old and above.[27] Since this age range is suitable for drinking herbal tea, the sample size will be based on these populations. Besides that, only herbal tea drinkers were required to answer this questionnaire to determine their consumption practices. Based on calculation method by Krejcie & Morgan[28] a maximum of 384 respondents were needed for this research and p-value = 0.50 is recommended to estimate the population proportion. Therefore, at 95% confidence level, P = 0.5, (1−) ≈1. However, after a few filtering processes, only 168 respondents' data with complete and relevant answers were analyzed. Calculation was made using the following formula:

Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile

Copyright:
©2023 Norhayati et al.

86

$$s = \frac{X^2 \text{NP}(1-\text{P})}{d^2(N-1) + X^2 P(1-P)}$$

s = required sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841)

N = the population size.

P = the population proportion (assumed to be .50 since this will provide the maximum sample size) d

d = the degree of accuracy expressed as a proportion (.05)

Questionnaire design

Questionnaire is an appropriate way to collect large number of data and information from public respondent at a limited time and researchers commonly use questionnaire to gather information from the respondents.[29] This questionnaire was built to collect data from the respondent for survey-based research and was developed in dual language (Appendix 1). The self-administered online questionnaire was prepared in Bahasa Malaysia and English language in relevant to research objectives which access the awareness of public on herbal tea, consumption pattern and preparation, safety issue of herbal tea. Close ended question is prepared to ease the answer extracted from the respondent where they need to select the provided answers. Generally, the questions consist of five sections where the first section is a brief explanation about the survey structure, estimation time to answer the survey and confidentiality information of this survey to the respondents. Section A records respondent's demographic profile such as gender, age, occupation, household income, number of children, race and educational level. In Section B, we determine respondent's knowledge on herbal tea/botanic drinks. There are 20 general questions of herbal teas in this section. As an example, with optional answer of "yes", "no" or "not sure", respondents were asked about the definition of herbal tea and whether they know the differences between regular tea and herbal tea. One mark will be given for answer "yes" and zero otherwise. The list of questions in this section were adapted from Teh et al.[14]

Section C with a total of 15 questions were asked to investigate respondent's attitude towards herbal tea/ botanic drink consumption. Respondents need to give their opinion on the statement using the Likert Scale where, 1- Strongly disagree, 2- Disagree, 3- Neutral, 4- Agree and 5- Strongly agree. Respondent may choose scale 3- Neutral as a response for uncertain opinion which indicates free answer without the need to agree or disagree. There is only one question in Section D which ask about the consumption of herbal tea by respondents. If yes, the Section E which consists of nine questions was prepared to determine their consumption practice of herbal tea/botanic drinks. Questions such as types of herbal drinks consumed, place to purchase and reason to drinks herbal tea were asked in this section.

Data collection

This study was conducted over a 5-months period of time among Malaysians. The questionnaire is randomly distributed using online platforms such as WhatsApp and Facebook since it is the most efficient method, in addition to time and cost saving.[30] Besides that, it facilitates the transfer of data for analysis and protects against loss of response as is often experienced through physical paper distribution.

Validity and reliability

A pilot test with 30 respondents was conducted to check the validity and reliability of the survey questionnaire. Validity is used to determine whether the questionnaire covers all the actual topics of investigation for this research. Face validity shows the judgement of non-experts or test takers on their understandings on each of the questions given. It also evaluates the practicability, understandability and simplicity of language used.[31] Since all the respondents had no issues with questionnaire, nothing has been changed. Reliability was measured using the data collected from the pilot test. Reliability was used to ensure all questions were measuring the same thing. Reliability test is important as it shows the consistency of measuring instrument. The data was analyzed using Cronbach's alpha coefficient in Statistical Package for Social Sciences (SPSS) by IBM incorporated software.[32] According to Bolarinwa,[33] reliability coefficient (alpha) will range from 0 to 1 with 0 shows a questionnaire that is not reliable while 1 shows a questionnaire that is very reliable and, value of 0.7 or higher is considered acceptable in SPSS. In this study, after analyzing the data from this questionnaire the reliability coefficient (alpha) score is 0.8, thus make the questionnaire reliable.

Data analysis

A total of 168 respondent's data were analyzed using descriptive statistic, Chi-square test, independent t-test and analysis of variances (ANOVA) were performed using SPSS version 25.0. This software is widely used to analyze data and focuses exclusively on variable-based statistical analysis. It is an integrated and systematic set of processes which is important to ensure the concluded analysis is valid and relevant to the research objectives.[34] Descriptive statistic was used to determine the frequency and percentage for the demographic profiles of the respondents and herbal tea consumer. In contrast, consumer's knowledge level and attitude on herbal tea was presented in mean and standard deviation. The comparison between demographic profile with knowledge and attitude were analyzed using t-test and one-way ANOVA. Chi-square was used to find the correlation between demographic profile and consumer's herbal tea consumption.

Result and discussion

Socio-demographic profile of respondents

Data from a total of 168 respondents who responded to the online survey were analyzed. The response rate of this survey was 13.44%. Despite using several practices to raise the response rate, online surveys are often less likely to achieve response rates as high as surveys conducted using face to face question (on average: 33% vs 56%, 23% lower).[35] Among possible reason are the questionnaire is too lengthy, no reminder given to the respondent and lack of reward for answering the questionnaire . These reasons are supported by Saleh and Bista[36] whose recommended a gentle reminder to male participants to respond promptly to the survey and reward the older participant with a valid token of appreciation. The analysis conducted in this study was descriptive statistics (mean, standard deviation) and inferential statistics consisted of t-test, one-way ANOVA, Chi-square, and Pearson correlation. The demographic profile of respondents participated in the survey is shown in Table 1. All of 168 respondents are herbal tea consumers which consist of 62 male (36.9%) and 106 females (63.1%). It is reported that female is more willing to participate in an online survey than men. Majority of the respondents were Malay with 156 respondents (92.9%), followed by Indian 5 respondents (3.0%), Chinese 4 respondents (2.4%), and 3 respondents

Citation: Norhayati H, Salim AA, Mohamad SF, et al. Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile. *MOJ Food Process Technols*. 2023;11(2):84–96. DOI: 10.15406/mojfpt.2023.11.00285

Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile

Copyright:
©2023 Norhayati et al.

87

(1.8%) from other races such as Bidayuh, Melanau and Dusun. The Department of Statistics reported in 2019; the Malaysian population was dominated by Bumiputra (69.3%), followed by Chinese (22.8%) and Indian (6.9%). Ethnics such a Bidayuh, Melanau and Dusun are considered as a Bumiputra.

For the age range distributions, 90 respondents (53.6%) were 18-26 years old, 10 respondents (6.0%) were 27-35 years old, 16 respondents (9.5%) were 36-45 years old and 52 respondents (31.0%) were 46 years old and above. Majority of the respondents are young people who are engaged well with distribution channels such as WhatsApp and social media (Facebook, Twitter, and Instagram) that were used to distribute the questionnaire survey. Based on Malaysian Communications and Multimedia Commission (MCMC), in 2018, total active social media user in Malaysia is 25 million. 30% of it are the user from the age range of 20-29-years old and 25.9% are user from the age range 30-39 years old. 43.5% of the respondents are student (73 respondents) followed by government workers with 61 respondents (36.3%). Park et al.[37] reported that 97% of college students used the internet and generally technology-skilled, that implies the online technology and environment are familiar to them. While findings by Saleh and Bista[36] found that, students may be interested in taking part in online survey as they may consider using the online survey methodology in their research paper or thesis. The result showed that 75 respondents (44.6%) have household income more than RM5000 either from working respondents, spouse or family income. A total of 95 respondents (56.5%) were single, and 73 respondents (43.5%) were married. Lastly, 114 respondents (67.9%) studied until bachelor's degree, 13 respondents (7.7%) until secondary school, 19 respondents (11.3%) until Certificate/Diploma, 18 respondents (10.7%) until master's degree and 4 respondents (2.4%) until Doctor of Philosophy level.

Respondent's knowledge and attitude toward herbal tea

There is a total of 20 questions to determine the knowledge level of the respondents toward herbal tea. We categorized the knowledge level based on the correct score of the questions: low (0 - 6), moderate (7 - 13) and strong (14 - 20). The attitude towards herbal tea consumption was also categorized into three-level based on the score: low (15-35), moderate (36-55) and high (56-75).[38] Table 2 shows the total knowledge level of the respondents about herbal tea with majority of 122 respondents (72.6%) have a moderate level of knowledge about herbal tea. The mass and social media promotion and advertisement promoting herbal beverages helps in disseminate the information about a certain herbal tea and its benefits to the public.[39] Based on the items shown in Table 3 majority consumers know the definitions and fundamental characteristic of herbal tea. They also know common types of herbal tea mentioned in the item and aware that herbal tea contains antioxidant beneficial to health. However, most consumers did not know that herbal tea is originated from Camellia sinensis and at the same time they believed that green tea as part of herbal tea.

Table 4 shows that 78 respondents (46.4%) have moderate attitude level and 75 respondents (44.6%) have high attitude level toward herbal tea. The mean scores of respondents' overall knowledge and attitude level based on this study were 11.12±3.03, and 55.92±6.50, respectively. This result shows that respondents have moderate knowledge and moderate to high attitude toward herbal tea. It may be due to several types of herbal tea available on the market, and each of them is claimed to have a particular therapeutic or medicinal benefit to health. However, there is little empirical evidence for consumers of that argument. Typically, respondents had very positive views on herbal medicines; most had greater faith in herbals, believed they had a place in modern medicine, more reliable and saw no problems in taking them simultaneously with Western medicine.[40] Based on the items in Table 5 it shows that consumers have positive attitudes toward herbal tea and health benefits. For example, consumers either strongly agree or agree that herbal tea is safe since it is from natural ingredients. Apart from that, consumers also agree and strongly agree that herbal tea are low in calories, helps in losing body weight, helps in removing toxin from body and increase body's metabolism rate. In contrast from that, they disagree that herbal tea can lead to kidney damage. The knowledge and attitude have a moderate positive relationship with value 0.051, as shown in Table 6 with no a significant difference. Jibril et al.[23] claimed that studies concerning consumer education had shown a positive association with consumer attitude.

Table 1 Demographic profile of the respondents (n=168)

Demographic factors		Frequency	Percentage (%)
Gender	Male	62	36.9
	Female	106	63.1
Age	18-26 years old	90	53.6
	27-35 years old	10	6.0
	36-45 years old	16	9.5
	46 years old and above	52	31.0
Occupation	Student	73	43.5
	Government worker	61	36.3
	Private sector employee	26	15.5
	Self-employed	0	12
	Unemployed	8	4.8
Household income	<RM1000	31	18.5
	RM1000 – RM3000	39	23.2
	RM3000 – RM5000	23	13.7
	>RM5000	75	44.6
Marital status	Single	95	56.5
	Married	73	43.5
No. of children	One child	11	6.5

Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile

Copyright:
©2023 Norhayati et al.

88

Table 1 Continued...

Demographic factors		Frequency	Percentage (%)
	2-3 children	28	16.7
	4-5 children	27	16.1
	More than 5 children	7	4.2
	Unrelated	95	56.5
Ethnic	Malay	156	92.9
	Chinese	4	2.4
	Indian	5	3.0
	Other	3	1.8
Highest education	Primary school	0	0
level	Secondary school	13	7.7
	Certificate/Diploma	19	11.3
	Bachelor's Degree	114	67.9
	Master's Degree	18	10.7
	Doctor of philosophy	4	2.4

Table 2 Knowledge level of the respondents about herbal tea

Level	Frequency (n=168)	Percentage (%)
Low (0-6)	12	7.10
Moderate (7-13)	122	72.6
High (14-20)	34	20.2

Table 3 Respondent's answer according to the items in the questionnaire

Items	Frequency (n=168)	
	Correct	Wrong/ Not sure
Understand true definitions of herbal tea/botanic drinks	100	68
Herbal tea is a made from the leaves or shoots of *Camellia sinensis* using hot and cold water, through immersion or mixing the dried leaves	10	**158**
Herbal tea is the name for a mixture of flowers, leaves, seeds, roots, or dried fruits from herbal plants to make drinks.	**145**	23
Herbal teas are also called "tisanes"	21	**147**
Green tea is herbal tea	24	**144**
Most herbal teas are caffeine-free	94	74
Examples of herbal tea are misai kucing tea, pegaga tea, chrysanthemum, and rooibos tea.	**154**	14
Herbal tea consumption does not have bad side effects.	95	73
Herbal teas are generally safe to consume, however, unsupervised mixture of 2 or more herbal plants may cause health risks.	103	65
Herbal tea taken in higher than the recommended consumption is hazardous to the health.	92	76
The consumption timing, frequency and dosage instruction of herbal tea is not necessary for herbal tea.	87	81
Herbal teas are commonly consumed for its therapeutic and energizing properties.	144	24
Herbal tea is consumed only for specific medicinal purposes.	116	52
Herbal tea is a safer choice to use instead of pharmaceutical drugs.	36	132
Pregnant women, elderly and children are groups of people who are suitable to drink herbal tea.	43	125
Mishandling of herbal plant during harvesting (unhygienic storage) and processing (temperature abuse) of herbal tea may give harmful impacts on the herbal tea quality.	119	49
The antioxidant in herbal tea is beneficial to health.	**147**	21
The antioxidant compound in herbal tea help to prevent oxidative damage in the human body.	118	50
Antioxidant found in most herbal tea can avert several non-communicable diseases (ncds) such as cardiovascular diseases, arthritis, type 2 diabetes.	105	63
The contamination of heavy metal from the soil may affect the quality of herbal tea.	115	53

Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile

Copyright:
©2023 Norhayati et al.

89

Table 4 Attitude level of respondents toward herbal tea

Level	Frequency (n=168)	Percentage (%)
Low (15-35)	0	0
Moderate (36-55)	78	46.4
High (56-75)	75	44.6

Table 5 Respondent's attitude according to the items

Items	Frequency (n=168)					
	5	4	3	2	1	Mean±sd
Herbal tea is safe to use since it is from natural ingredients.	79	74	12	3	0	**4.36±0.696**
Herbal tea/botanic drinks help to reduce body's cholesterol level.	60	65	39	4	0	**4.08±0.826**
Herbal tea/ botanic drinks can lead to kidney damage.	4	12	49	59	34	2.36±0.963
Herbal tea/botanic drinks are low in calories.	67	65	32	3	1	**4.15±0.833**
Herbal tea/botanic drinks help in losing body weight.	57	69	37	4	1	**4.05±0.842**
Herbal tea/botanic drinks help to remove toxin from the body.	69	69	27	2	1	**4.21±0.796**
Herbal tea/botanic drinks increase body's metabolism rate.	57	74	36	1	0	**4.11±0.754**
Herbal tea/botanic drinks help with cancer prevention.	29	56	68	14	1	3.58±0.892
Herbal tea/botanic drinks help with digestive system.	67	79	21	1	0	**4.26±0.694**
Herbal tea/botanic drinks prevent iron absorption in the body.	14	36	82	22	14	3.08±1.005
Herbal tea/botanic drinks are not suitable for older people since might affect their bones.	11	26	73	34	24	2.80±1.075
Herbal tea needs to have an aromatic flavor.	27	37	49	36	19	3.00±1.236
The thicker the color of the herbal tea, the higher its effectiveness when consumed.	22	26	71	33	16	3.03±1.124
The more bitter and bitter the flavor of the herbal tea, the higher its effectiveness when practiced.	19	44	61	26	18	3.12±1.136
The scientific evidence that supports the health claimed of herbal tea are poorly disseminate to the public's eye.	64	66	33	1	4	**4.10±0.900**

Note: 5- Strongly agree 4-Agree 3- Neutral 2- Disagree 1- Strongly disagree

Table 6 Correlation between knowledge and attitude

	Attitude	
	r	P-value
Knowledge	0.051	0.515

r: correlation coefficient

p-value: significance difference (p < 0.05)

Comparison of respondent's knowledge level among demographic profiles

Independent t-test was used to compare respondent's knowledge level between gender and marital status. In contrast, one-way ANOVA was used to compare respondent's knowledge level between age, ethnic, occupation, household income, number of children and education level. Table 7 shows the comparison of respondents' knowledge level about herbal tea between demographic profiles. The result shows a significant difference (p<0.05) between knowledge and highest educational level while other demographic profiles show no significant difference. Respondents with higher educational level has higher knowledge level. This statement supported by Sani et al. that conducted a survey Influence of Educational Level on Knowledge and Practice of Breast Self-examination (BSE) Among Women in Sokoto, Nigeria.[41] This survey indicated that a big correlation between the level of education and BSE expertise and practice. Women with a higher level of education have more BSE experience, improved results and are more likely to regularly practice BSE. This contrast with Kim Sooi and Lean Keng[42] study who stated that a significant difference was found between the information score and income (p< 0.05) and no significant difference between other demographic profiles such as age, occupation and education.[42]

Comparison of respondent's attitude with demographic profiles

The comparison between the respondent's attitude level and demographic profile used independent t-test and one-way ANOVA. Independent t-test were used for gender and marital status while ANOVA was used for age, ethnic, occupation, household income, number of children and education level. As shown in Table 8, comparison between attitude level and age, occupation, ethnic and highest educational level with significant difference (p<0.05) at 0.043, 0.003, 0.023 and 0.020 accordingly. Table 9 shows the post hoc test that determines a specific group with significant difference. Teh et al.[14] reported a significant difference (p<0.05) between age and consumer attitude toward Chinese herbal tea and no significant difference between attitudes and other demographic profiles which refers to consumers various education and employment status levels do not influence customer attitudes towards Chinese herbal tea.

Generally, this study shows that consumers with age range 27-35 years old shows highest attitude level toward herbal tea compared with other age group. This may due to respondents in this age groups were more aware and concerned about their health, Then, post hoc test shows that, there is 0.024 significance difference between private sector employee and students while 0.001 significance difference between

Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile

Copyright:
©2023 Norhayati et al.   90

private sector employee and government workers. Respondent's attitude level was affected by the respondent's occupation as they might encounter different working environment that could affect their attitude toward herbal tea. Next, post hoc test between attitude level and respondent's ethnic shows that, there is 0.019 significance difference between Malay and Chinese group. Different ethnic groups might have different culture and habits on herbal tea thus lead to different attitude level. Herbal tea was usually consumed by Chinese and the knowledge was passed down from generation to generations, thus non-Chinese had lower chances to expose to the herbal tea. Lastly, there is a significant difference (p<0.05) between attitude level and respondent's highest education level. Post hoc test shows that, there is 0.019 significance difference between Certificate/Diploma and Doctor of Philosophy (PhD) while 0.03 significance difference between master's degree and Doctor of Philosophy. Respondents with PhD have the lowest attitude level toward herbal tea than respondents with other education level.

Consumers' herbal tea consumption practices

Different consumers have different practices for herbal tea consumption. Table 10 shows the result in consumer practices toward herbal tea. Firstly, 94 consumers (56%) consumed a type of herbs only (example: only mas cotek), 60 consumers (35.7%) consumed two or more types of herbal tea (example: mixture of misai kucing, mas cotek and stevia) and 14 consumers (8.3%) consumed other types of herbal tea which are not stated. A study by Nworu et al.[43] found that, 11.9% of participants used one type of herbal medicine such as ginseng, followed by 5.7% participants used two different types of herbal medicine, 2% used three different types of herbal medicine and 5.7% participants used more than three different types of herbs, like Ayurveda treatment that use various type of herbs. Most participants (74.6%) did not use any type of herbal medicine. The result showed that most herbal tea consumers (120 consumers, i.e. 71.4%) used tea bags instead of other herbal tea forms. Considering the form of raw material used for preparation of the infusion, participants prefer bags (77.7%) than loose-leaf (22.3%).[15,44] Claimed that, although lower volume of green tea was used in bags, they are finely chopped so that they have a greater surface area and could be more effective in releasing flavor constituents than green teas in the leaf form. Green teas in tea bags had similar flavor profile and intensities to leaf form.

Table 7 Comparison of respondent's knowledge level about herbal tea betweendemographic profiles

Demographic profile		n	Mean±sd	p-value
Gender	Male	62	10.48±3.43	0.051
	Female	106	11.49±2.72	
Age	18-26 years old	90	10.94±2.70	0.775
	27-35 years old	10	11.60±3.95	
	36-45 years old	16	11.68±2.89	
	46 years old and above	52	11.15±3.45	
Occupation	Student	73	10.93±2.79	0.154
	Government worker	61	11.74±3.23	
	Private sector employee	26	10.19±3.36	
	Self employed	0	0	
	Unemployed	8	11.13±1.64	
Household Income	<RM1000	31	10.77±2.85	0.697
	RM1000 – RM3000	39	10.79±2.94	
	RM3000 – RM5000	23	11.35±2.90	
	>RM5000	75	11.36±3.21	
Marital status	Single	95	10.97±2.80	0.464
	Married	73	11.32±3.31	
No. of children	One child	11	11.18±3.97	0.097
	2-3 children	28	12.07±3.01	
	4-5 children	27	11.11±2.79	
	More than 5 children	7	8.57±4.29	
	Unrelated	95	11.02±2.81	
Ethnic	Malay	156	11.05±3.05	0.746
	Chinese	4	12.25±3.86	
	Indian	5	11.60±2.07	
	Other	3	12.33±3.21	
Highest education level	Primary school	0	0	**0.049**
	Secondary school	13	10.77±3.59	
	Certificate/Diploma	19	9.95±3.09	
	Bachelor's Degree	114	11.43±2.88	
	Master's Degree	18	10.06±2.99	
	Doctor of philosophy	4	13.75±3.10	

Note: Independent t-test used for gender and marital status.

One way ANOVA used for ethnic, age, occupation, household income, no. of children and highest educational level.Significant difference (p<0.05)

F/t value = F value

Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile

Copyright:
©2023 Norhayati et al.

91

Table 8 Comparison between respondent's attitude level and demographic profiles onherbal tea Independent t-test used for gender and marital status.

Demographic profile		n	Mean±SD	p value
Gender	Male	62	55.89±6.65	0.957
	Female	106	55.94±6.44	
Age	18-26 years old	90	56.63±6.15	
	27-35 years	10	59.70±8.45	
	36-45 years old	16	54.38±8.41	**0.043**
	46 years old and above	52	54.44±5.69	
Occupation	Student	73	55.78±6.20	
	Government worker	61	54.26±6.21	
	Private sector employee	26	59.88±6.38	**0.003**
	Self employed	0	0	
	Unemployed	8	57.00±7.31	
Household Income	<RM1000	31	57.16±5.63	
	RM1000-RM3000	39	57.38±6.45	
	RM3000 – RM5000	23	54.09±7.04	0.120
	>RM5000	75	55.21±6.56	
Marital Status	Single	95	56.69±6.32	
	Married	73	54.92±6.63	0.079
No. of Children	One child	11	52.27±9.89	
	2-3 children	28	54.68±6.98	
	4-5 children	27	535.07±5.42	0.119
	More than 5 children	7	56.00±5.20	
	Unrelated	95	56.95±6.13	
Ethnic	Malay	156	56.28±6.28	
	Chinese	4	46.75±5.68	
	Indian	5	53.40±9.45	**0.023**
	Other	3	54.00±6.93	
Highest Education Level	Primary school	0	0	
	Secondary school	13	55.92±7.40	
	Certificate/Diploma	19	58.37±6.59	
	Bachelor's Degree	114	55.51±5.95	**0.020**
	Master's Degree	18	57.83±7.35	
	Doctor of philosophy (PhD)	4	47.50±8.54	

One way ANOVA used for ethnic, age, occupation, household income, no. of children and highest educational level.Significant difference (p<0.05)

Table 9 Post hoc test using tukey HSD

Demographic profile	Group	Mean difference	P-value
Occupation	Private sector employee - Student	4.104	0.024
	Private sector employee – Government workers	5.622	0.001
Ethnic	Malay - Chinese	9.526	0.019
Highest education level	Doctor of philosophy – Certificate/diploma Doctor of philosophy – Master's degree	-10.868-10.333	0.019 0.030

The mean difference is significant at the 0.05 level.

For preparation method, 86 consumers (51.2%) follow the instruction on the packaging, 39 consumers (23.2%) soaks in boiling water while 36 consumers (21.4%) soaks in warm water. Another 7 consumers (4.2%) follow the instruction given by seller. None of the consumers prepares the herbal tea by soaking it in room temperature water. Most of the herbal tea packaging has a straightforward preparation instruction to be followed by the consumer. A total of 55 consumers (32.7%) takes herbal tea as daily practices, either drinking it once or twice per day. According to Rocha et al., out of 489 respondents, only 27.2% of respondents drink herbal infusions once or more a day. Besides, only 29.7% of respondents reported drinking tea once or more times a day, with most of that drinking tea only once a day. Every week, respondents regularly consume herbal infusions. As herbal tea is known for its beneficial effect on health, more than half of the consumers consume herbal tea to improve health status (97 consumers, 57.7%). Other than that, 30 consumers (17.9%) consumed herbal tea for losing weight and only 1 consumer (0.6%) drink herbal tea for cosmetic purposes. The most common reason in taking herbal products and dietary supplements mentioned by survey respondents were to improve overall well-being, help control arthritis, help avoid

Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile

Copyright:
©2023 Norhayati et al.   92

or manage colds, or improve memory.[45] In this modern era, the internet is known as a perfect medium to gain knowledge with 90 consumers (53.6%) choose internet as the source of knowledge about herbal tea followed by 39 consumers (23.2%) gains the knowledge from literature and 20 consumers (11.9%) obtained the knowledge from family. The internet makes it much easier for individuals to search for health information themselves and become more vulnerable to a broader health information range. Even in 1997, 41% of US Internet users went online to access healthcare information.[46] Survey by Alexieva et al.[47] also shows that as a credible source of knowledge. 66% of respondents used the internet, while 60% sought information from friends and family members, approximately 29% looked for information in books and 51% in newspapers and magazines. On the other hand, the most preferred place for consumer to purchase herbal tea are hypermarket/mini market, trusted agent/stockist and pharmacy with 64 (38.1%), 30 (17.9%) and 28 (16.7%) respectively. The huge number of hypermarket/mini markets make it accessible for buying products.[44] Al-Arifi[48] found that the main reasons for consumer to select from a specific outlet is because they had an experienced herbal practitioner present (42%) and had a wide variety of herbal remedies (41%). Closeness to home (22%) and proximity to other shops were other variables that influenced their choices (18%). Consumers choose several factors that influence them in choosing herbal tea and quality is chosen as the highest factor with 133 consumers (36.7%).

Apart from that, price (70), taste (63) and brand (56) are highly chosen as factors that influence the selection of different type of herbal tea products. These results were tally with De Godoy et al.[49] where quality is chosen as the first followed by brand and lastly price by 100 consumers. Quality, and prices maintain as the main factors influencing the purchase decision although in different types of products. As an example, product quality and price have an essential effect on Japanese electronic brand goods' purchasing decision. The customers would consider the quality of the product and price in making purchase decisions, in which case consumers believe that Japanese electronic brands have good quality that has high durability and reasonable price.[50] From the total of 168 consumers, 74 (39.78%) of them experience side effects from drinking herbal tea. Frequent farting, stomachache and dizziness were the most frequent side

effect occurred to the consumers. Tsai et al.[51] claimed that, although many herbal consumers believe that herbs are healthy, it has been documented that herbal products are associated with mild to serious adverse effects such as heart attacks, chest pain, abdominal pain, and headache. Overall, in this study, consumers prefer to consume one type of herbs and use tea bag as it is more convenience. Almost half of consumers experience side effects but still consume herbal tea at least once per week. Consumers believe that herbal tea will help to improve health status and they consider internet as main medium to find information about herbal tea.

Association of consumers' consumption practices and demographic profiles

The relationship between the respondent's demographic profile and herbal tea consumption was analyzed using Chi-square and probability value was recorded to determine the significant relationship. Table 11 shows the association between consumers' practices of herbal tea and demographic profile. Based on the results, there is a significant association ($p<0.05$) between gender ($p=0.011$) and marital status ($p=0.047$) of respondents with types of herbal tea consumed. Female consumers highly prefer herbal drinks with one type of herbs only compared to male consumers who prefer to drink herbal drinks with two or more herbs. Then, both single and married consumers prefer herbal drinks with one type of herbs only. Association between age, household income, marital status, and number of children with forms of herbal consumed have a significant association ($p<0.05$) with 0.001, 0.039, 0.025 and 0.036. Married people (107 respondents) drank much tea than single individual (87 respondents) as reported by Teh et al.[14] Respondents of different age who are administrative personnel, retirees and common workers were loyal tea consumers, while students and soldiers seldom drank tea. These people are from a different generation but similarly, enjoy their cup of tea. Vieux et al. found that tea and herbal tea consumption increased with age, as did coffee.[44] One in four adults aged over 50 years consumed tea but fewer than 1 in 10 children or adolescents. Kim Sooi and Lean Keng[42] also reported that it had been found that the association between age and household income with herbal usage is essential ($p < 0.05$).

Table 10 Herbal tea consumption practices of the respondents

Practices		Frequency (n=168)	Percentage (%)
	One type of herbs only.	94	56.0
Types of herbal consumed	Two or more types of herbs.	60	35.7
	Others	14	8.3
	Tea bag	120	71.4
	Original form of dried Herb	22	13.1
Form of herbal tea consumed	3in1 sachet	12	7.1
	Homemade herbal tea	10	6.0
	Others	4	2.4
	Headaches	9	4.4
	Dizziness	12	5.9
	Frequent farting	35	17.2
	Nauseous	8	3.9
Side effects of herbal tea consumption	Stomach-ache	29	14.2
	Heartburn	6	2.9
	Poor sleep	9	6.0
	No side effect	94	9.0
	Other	2	1.0

Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile

Copyright:
©2023 Norhayati et al. **93**

Table 10 Continued...

Practices		Frequency (n=168)	Percentage (%)
	Herbal traditional store	10	6.0
	Pharmacy	28	16.7
	Sensei drug store	6	3.6
	Online purchase	17	10.1
Place to buy	Trusted agent/stockist	30	17.9
	Hypermarket/mini market	64	38.1
	Morning market/night market	2	1.2
	Other	11	6.5
	Follow the instruction on the packaging	86	51.2
	Follow the seller's instruction	7	4.2
Method of preparation	Soak in warm water	36	21.4
	Soak in boiling water	39	23.2
	Soak in room temperature	00	0
	Once per day	38	22.6
	Twice per day	17	10.1
Times of consumption.	Once per week	51	30.4
	Twice per week	31	18.5
	Three times or more per week	31	18.5
	For slimming	30	17.9
	For preventing purpose	17	10.1
	To boost energy	17	10.1
Reason for drinking	To boost energy	17	10.1
	For curative purpose	6	3.6
	For cosmetic purpose	1	0.6
	To improve health status	97	57.7
	Magazine	4	2.4
	Internet	90	53.6
Knowledge source	Literature	39	23.2
	Professional	8	4.8
	Family	20	11.9
	Other	7	4.2
	Quality	133	36.7
	Price	70	19.3
	Brand	56	15.5
Factors influence choose herbal tea	Taste	63	17.4
	Post-purchase service	8	2.2
	Your available income	17	4.7
	Advertisement	15	4.1

Table 11 Association between consumers' practices of herbal tea and demographic profile

Practices	Demographic profile	Chi square	p-value
	Gender	9.100[a]	**0.011**
	Age	6.154[a]	0.406
	Occupation	4.554[a]	0.602
Types of herbal consumed.	Household income	4.549[a]	0.603
	Marital status	6.117[a]	**0.047**
	No. of Children	13.626[a]	0.092
	Ethnic	2.083[a]	0.912
	Highest education level	3.953[a]	0.861

Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile

Copyright:
©2023 Norhayati et al.   94

Table 11 Continued...

Practices	Demographic profile	Chi square	p-value
	Gender	7.135[a]	0.129
	Age	32.004[a]	**0.001**
	Age	32.004[a]	**0.001**
	Occupation	16.451[a]	0.171
Form of herbal consumed	Household income	21.884[a]	**0.039**
	Marital status	11.187[a]	**0.025**
	No. of Children	27.572[a]	**0.036**
	Ethnic	5.224[a]	0.95
	Highest education level	16.092[a]	0.447
	Gender	1.400[a]	0.844
	Age	3.984[a]	0.984
	Occupation	7.326[a]	0.835
Side effect of herbal tea consumption	Household income	12.429[a]	0.412
	Marital status	0.986[a]	0.912
	No. of Children	10.061[a]	0.863
	Ethnic	16.586[a]	0.166
	Highest education level	5.932[a]	0.989
	Gender	7.651[a]	0.364
	Age	33.855[a]	**0.038**
	Occupation	38.537[a]	**0.011**
Place to buy	Household income	21.285[a]	0.442
	Marital status	21.323[a]	**0.003**
	No. of Children	61.166	**0.000**
	Ethnic	41.282[a]	**0.005**
	Highest education level	36.064[a]	0.141
	Gender	6.199[a]	0.102
	Age	18.950[a]	**0.026**
	Occupation	18.140[a]	**0.034**
Method of preparation	Household income	11.528[a]	0.241
	Marital status	12.755[a]	**0.005**
	No. of Children	17.911[a]	0.118
	Ethnic	7.047[a]	0.595
	Highest education level	12.479[a]	0.408
	Gender	2.720[a]	0.606
	Age	12.417[a]	0.413
	Occupation	25.403[a]	**0.013**
Times of consumption	Household income	12.867[a]	0.379
	Marital status	7.731[a]	0.102
	No. of Children	16.524[a]	0.417
	Ethnic	12.767[a]	0.386
	Highest education level	14.814[a]	0.538
	Gender	22.927[a]	**0.000**
	Age	24.077[a]	0.064
	Occupation	24.758[a]	0.053
Reason for drinking	Household income	29.605[a]	**0.013**
	Marital status	16.359[a]	**0.006**
	No. of Children	30.616[a]	0.06
	Ethnic	31.479[a]	**0.008**
	Highest education level	18.510[a]	0.554
	Gender	1.906[a]	0.862
	Age	14.123[a]	0.516
	Occupation	12.912[a]	0.609
Knowledge source	Household income	17.558[a]	0.287
	Marital status	5.990[a]	0.307
	No. of Children	24.494[a]	0.221
	Ethnic	38.516	**0.001**
	Highest education level	22.615[a]	0.308
	Gender	6.258[a]	0.395
	Age	26.700[a]	0.085
	Occupation	30.660[a]	**0.032**
Factors influence in choosing herbal tea	Household income	22.561[a]	0.208
	Marital status	24.454[a]	**0.000**
	No. of Children	37.447[a]	**0.039**
	Ethnic	15.465[a]	0.63
	Highest education level	24.129[a]	0.454

Note: Significant difference (p<0.05)

Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile

Copyright:
©2023 Norhayati et al.

95

In this study, mainly places to buy herbal tea are highly associated with demographic profiles as five from eight demographic social stated give p-value lower than 0.05. People age 18-26 years old prefer to buy herbal tea products from supermarket/minimarket as while people age 46 years old and above prefer to buy from stockist/trusted agent. Next, there is a significant association ($p<0.05$) between respondents' age, occupation, and marital status with method of preparation. People with age range 18-26 years old and 46 years and above directly follow the instruction on packaging to prepare herbal tea and they did not follow the seller's instruction. Besides that, the different demographic profile also influences the forms of herbal consumed as many have a significant association.

Conclusion

Most respondents have a moderate level of knowledge and answered 7-13 out of 20 herbal related questions correctly. This shows that, the respondents are knowledgeable and understand on herbal tea used in daily life. It is very important for them to know how to select the proper plants where a few herbs are hard to identify due to similar morphological characteristics. In this study, respondents have a moderate to high attitude level toward herbal tea. It shows that respondents consume herbal tea because they believed that herbal tea is safe and give various health benefits. Hence, consumers with higher educational level generally have higher knowledge level on herbal tea with a significant different ($p< 0.05$). Attitude level shows a significant different ($p<0.05$) with age, occupation, ethnic and highest educational level. In addition, there is significant association ($p<0.05$) between age, household income and number of children of respondents with form of herbal consumed. There is also a significant association ($p<0.05$) between gender and marital status of respondents with types of herbal tea consumed. Diverse consumption practice shows various significance difference between the demographic profile. Significance difference shows that, there is a measurable different between the two associated group.

Acknowledgments

Conflicts of interest

The authors declare that there is no conflict of interests.

References

1. Hayat K, Iqbal H, Malik U, et al. Tea and its consumption: benefits and risks. *Crit Rev Food Sci Nutr*. 2015;55(7):939–954.

2. mansur k. tea production in Malaysia: culture versus challenges and prospect to Malaysian economics. *Int J Res Innov Soc Sci*. 2019;3(6):2454–6186.

3. Tanui JK, Fang W, Feng W, et al. World black tea markets: relationships and implications for the global tea industry. *J Int Food & Agribus Mark*. 2012;24(2):148–168.

4. Vidović S, Cvetkovic D, Ramić M, et al. Screening of changes in content of health benefit compounds, antioxidant activity and microbiological status of medicinal plants during the production of herbal filter tea. *Ind Crops Prod*. 2013;50:338–345.

5. Fu Y, Yang J chao, Cunningham AB, et al. A billion cups : The diversity, traditional uses, safety issues and potential of Chinese herbal teas. *J Ethnopharmacol*. 2018;222:217–228.

6. Ravikumar C. Review on herbal teas. *J Pharm Sci Res*. 2014;6(5):236–238.

7. Preedy V. Processing and impact on antioxidants in beverages. 2014.

8. Chandrasekara A, Shahidi F. Herbal beverages: bioactive compounds and their role in disease risk reduction - a review. *J Tradit Complement Med*. 2018;8(4):451–458.

9. Damiani E, Carloni P, Rocchetti G, et al. Impact of cold versus hot brewing on the phenolic profile and antioxidant capacity of rooibos (*Aspalathus linearis*) herbal tea. *Antioxidants*. 2019;8(499):19.

10. Duarte SC, Salvador N, Machado F, et al. Mycotoxins in teas and medicinal plants destined to prepare infusions in Portugal. *Food Control*. 2020;115:107290.

11. Zakaria MH, Omar NR, Mohammad Nor, et al. Transformation of herbal industry in Malaysia. *Food Fertil Technol Cent Asian Pacific Reg*. 2019.

12. Aziz RA. Turning Malaysia into a global herbal producer : a personal perspective / Ramlan Abdul Aziz. Universiti Teknologi Malaysia, Skudai: 2003.

13. Kozak M, Sobczak P, Krajewska M, et al. Evaluation of health promoting properties and quality of herbal teas obtained from fine-grained fraction of herbs. *J Cent Eur Agric*. 2017;18(2):388–403.

14. Teh DY, Jaafar SN, Asma Ali. Consumers' knowledge and attitude towards Chinese herbal tea and consumption of Chinese herbal tea in selected district in Kedah. *J Food Sci*. 2020;4:666–673.

15. Rocha C, Moura AP, Cunha LM. Consumers' associations with herbal infusions and home preparation practices. *Food Qual Prefer*. 2020;86:104006.

16. Van Wyk AS, Prinsloo G. Health, safety and quality concerns of plant-based traditional medicines and herbal remedies. *South African J Bot*. 2020;133:54–62.

17. Suparmi S, Ginting AJ, Mariyam S, et al. Levels of methyleugenol and eugenol in instant herbal beverages available on the Indonesian market and related risk assessment. *Food Chem Toxicol*. 2019;125:467–478.

18. Soon GC. Regulation of traditional and complementary medicine (T & Cm) in Malaysia : issues & challenges from a legal perspective. 2018.

19. Van Wyk AS, Prinsloo G. Medicinal plant harvesting, sustainability and cultivation in South Africa. *Biol Conserv*. 2018;227:335–342.

20. Yeong SW, Choong YC. Knowledge and characteristics of herbal supplement usage among community pharmacy customers in a Malaysian population. *Complement Ther Med*. 2017;35:92–108.

21. Nazir M, Arif S, Khan RS, et al. Opportunities and challenges for functional and medicinal beverages: current and future trends. *Trends Food Sci Technol*. 2019;88:513–526.

22. Xinn J. Challenges faced by Malaysia current tea industry. 2017.

23. Jibril AB, Kwarteng MA, Chovancova M, et al. The influence of selected factors on the use of herbal products. *J Compet*. 2019;11(4):57–72.

24. Mamun A Al, Hayat N, Zainol NRB. Healthy eating determinants: a study among Malaysian young adults. *Foods*. 2020;9(8):974.

25. Wang X, Cheng Z. Cross-sectional studies: strengths, weaknesses, and recommendations. *Chest*. 2020;158(1):S65–S71.

26. Zangirolami RJ, Echeimberg J, Leone C. Research methodology topics: aross-sectional studies. *J Hum Growth Dev*. 2018;28(3):356–360.

27. Department of statistics. ICT use and access by individuals and households survey report 2020. *Dep Stat Malaysia*. 2021;157.

28. Krejcie R V, Morgan DW. Determining sample size for research activities. *Educ Psychol Meas*. 1970;30(3):607–610.

Evaluation of consumer's knowledge, attitude, practice towards herbal tea consumption, preparation and their association with demographic profile

Copyright:
©2023 Norhayati et al.

96

29. Jenn NC. Designing a questionnaire. *Malays Fam Physician.* 2006;1(1):32–35.

30. Lefever S, Dal M, Matthíasdóttir Á. Online data collection in academic research: advantages and limitations. *Br J Educ Technol*. 2006;38(4):574–582.

31. Taherdoost H. A review of technology acceptance and adoption models and theories. *Procedia Manuf.* 2018;22:960–967.

32. Kember D, Leung DYP. Establishing the validity and reliability of course evaluation questionnaires. *Assess & Eval High Educ.* 2008;33(4):341–353.

33. Bolarinwa OA. Principles and methods of validity and reliability testing of questionnaires used in social and health science researches. *Niger Postgrad Med J.* 2015;22(4):194–201.

34. Sheard J. *Quantitative data analysis*. In: Williamson K, Johanson G, eds. Research methods. Second Edn. *Chandos Publishing*. 2018:429–452.

35. Nulty DD. The adequacy of response rates to online and paper surveys: What can be done?. *Assess Eval High Educ.* 2008;33(3):301–314.

36. Saleh A, Bista K. Examining factors impacting online survey response rates in educational research: perceptions of graduate students. *J Multidiscip Eval*. 2017;13(29):63–74.

37. Park K, Park N, Heo W, et al. What prompts college students to participate in online surveys?. *Int Educ Stud*. 2018;12(1):69.

38. Kayan Fadlelmula F. Attitudes of pre-service teachers towards teaching profession. *Turkish J Educ 2*. 2013;2(4):55–63.

39. Hassali M, Palaian S, Shafie A, et al. Perceptions and barriers towards provision of health promotion activities among community pharmacists in the State of Penang, Malaysia. *J Clin Diagnostic Res*. 2009;3(3):1562–1568.

40. Maguire P, Mothersill C, McClean B, et al. Modulation of radiation responses by pre-exposure to irradiated cell conditioned medium. *Radiat Res*. 2007;167(4):485–492.

41. Sani A, Naab F, Aziato L. Influence of educational level on knowledge and practice of breast self-examination among women in Sokoto, Nigeria. *J Basic Clin Reprod Sci*. 2016;5(2):100.

42. Kim Sooi L, Lean Keng S. Herbal medicines: Malaysian women's knowledge and practice. *Evid Based Complement Alternat Med*. 2013;2013:438139.

43. Nworu CS, Udeogaranya PO, Okafor CK, et al. Perception, usage and knowledge of herbal medicines by students and academic staff of University of Nigeria: A survey. *Eur J Integr Med*. 2015;7(3):218–227.

44. Vieux F, Maillot M, Rehm CD, et al. Tea Consumption patterns in relation to diet quality among children and adults in the United States: analyses of NHANES 2011-2016 data. *Nutrients*. 2019;11(11):2635.

45. Marinac JS, Buchinger CL, Godfrey LA, et al. herbal products and dietary supplements: a survey of use, attitudes, and knowledge among older adults. *J Osteopath Med*. 2007;107(1):13–23.

46. Rice RE. Influences, usage, and outcomes of internet health information searching: multivariate results from the pew surveys. *Int J Med Inform*. 2006;75(1):8–28.

47. Alexieva IN, Popova AT, Mihaylova DS. Trends in herbal usage –a survey study. *Food Res*. 2020;4(2):500–506.

48. Al-Arifi MN. Availability and needs of herbal medicinal information resources at community pharmacy, Riyadh region, Saudi Arabia. *Saudi Pharm J*. 2013;21(4):351–360.

49. De Godoy, Deliza R, Gheno LB, et al. Consumer perceptions, attitudes and acceptance of new and traditional mate tea products. *Food Res Int*. 2013;53(2):801–807.

50. Suhaily L, Darmoyo S. Effect of product quality, perceived price and brand image on purchase decision mediated by customer trust (study on Japanese brand electronic product). *J Manaj*. 2017;21(2):179–194.

51. Tsai HH, Lin HW, Simon PA, et al. Evaluation of documented drug interactions and contraindications associated with herbs and dietary supplements: A systematic literature review. *Int J Clin Pract*. 2012;66(11):1056–1078.