

CHAPTER 4

FINDINGS

4.1 Introduction

The Chapter 3 has provided details of the research methodology, its purpose and how it was designed and carried out. Quantitative research methods and techniques were implemented in order to answer to the research questions. Hence, Chapter 4 discussed the findings and discussions from data collected and analyzed in the previous chapter. This chapter is organized in a sequence of similar manners to the arrangements in Chapter 3 whereby the study was carried out in three stages consequently.

4.2 Stage 1: Findings from Cross Sectional Survey based on Theory of Planned Behaviour with Health Consciousness as Mediating variable

4.2.1 Measurement Model Assessment: Common Method Bias

Firstly, the collected data is investigated for its potential common method bias. This study adopted Harman's one factor test as used by previous studies (Gaskin & Happell, 2014; Podsakoff et al., 2003). Common method variance is commonly attributed to the measuring method rather than the constructs represented by the measures. It is considered a potential problem because the measurement error threatens the validity of the conclusions of the study (Podsakoff et al., 2003). Hence, the Harman's one-factor test for common method bias was conducted using SPSS version 21.0 prior to further data analysis. Result is shown in Table 4.1.

Table 4.1: Common Method Bias

Component	Total Variance Explained					
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.035	38.598	38.598	10.035	38.598	38.598
2	2.964	11.400	49.998	2.964	11.400	49.998
3	2.416	9.294	59.292	2.416	9.294	59.292
4	2.052	7.892	67.184	2.052	7.892	67.184
5	1.315	5.058	72.241	1.315	5.058	72.241
6	.955	3.673	75.914			
7	.845	3.250	79.164			
8	.779	2.995	82.159			
9	.669	2.572	84.731			
10	.530	2.039	86.770			
11	.508	1.955	88.725			
12	.443	1.706	90.431			
13	.412	1.583	92.014			
14	.377	1.450	93.464			
15	.337	1.297	94.761			
16	.279	1.072	95.833			
17	.224	.861	96.694			
18	.186	.716	97.410			
19	.150	.579	97.989			
20	.125	.480	98.468			
21	.089	.344	98.812			
22	.087	.335	99.147			
23	.068	.261	99.409			
24	.059	.228	99.637			
25	.050	.194	99.831			
26	.044	.169	100.000			

Extraction Method: Principal Component Analysis.

If the overall variance retrieved by one component surpasses 50%, common method bias is evident in the study. From the results obtained, the total variance recovered by one component is 38.598%, which is less than the suggested threshold of 50%. Thus, there is no concern with common method bias in this data.

4.2.2 Measurement Model Assessment: Measurement Reliability and Validity

Anderson & Gerbing (1988) recommended using a two-step method to test the model developed in research. In the measurement model, the validity and reliability of the instruments were assessed following the guidelines of Hair et al. (2019) and Ramayah et al. (2018) before the research hypotheses were tested in the structural model.

For measurement model:

- i) internal consistency was determined by calculating Cronbach's alpha and composite reliability scores.
- ii) convergent validity was assessed by referring to AVE and composite reliability scores.
- iii) discriminant validity was assessed by Fornell-Larcker's criterion and Heterotrait-Monotrait Ratio (HTMT) Test.

4.2.2.1 Internal Consistency

Henseler et al. (2015) mentioned that internal consistency is the first step which needs to be checked in measurement model. Cronbach's alpha is a popular method for assessing the consistency of questionnaire respondents. It shows how “the set of items of each construct are closely related as a group” (Hair et al., 2019).

Cronbach's alpha value of 0.7 or above is considered good (Hair et al., 2019). Besides Cronbach's alpha, composite reliability test was employed to further examine the internal consistency of the measurement model. While Cronbach's alpha assumes that all items have equal outer loadings, composite reliability considers the varying outer loadings of the items. The threshold for composite reliability is 0.7 to be considered good (Hair et al., 2010). In PLS, composite reliability could be more appropriate to check the internal consistency as Henseler et al. (2015) mentioned that Cronbach's alpha can underestimate internal consistency reliability in PLS models. Table 4.2 shows the Cronbach's alpha and composite reliability scores for this study.

Table 4.2: Cronbach's Alpha and Composite Reliability Scores

Latent Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Attitude	0.891	0.930	0.817
Health Consciousness	0.763	0.840	0.513
Intention	0.687	0.829	0.642
Self-Efficacy	0.858	0.902	0.698
Social Influence	0.972	0.975	0.782
Criteria	>0.6	>0.7	>0.5

As shown in Table 4.2, both the Cronbach's alpha and composite reliability for each construct were higher than 0.7 except for the Intention construct where the Cronbach's alpha value is 0.687 which is still able to fulfil the threshold of 0.6 (Straub & Gefen, 2004). Furthermore, its composite reliability value is 0.829, which is good. Therefore, the constructs are said to have achieved good internal consistency reliability.

4.2.2.2 Indicator Reliability

Outer model loadings are used to examine the reliability and validity of reflective constructs. In other words, it explains the information about the relationship between indicators and latent variables. A general guideline is that the outer loadings should be more than 0.7 to be deemed reliable for their construct (Hair et al., 2019). In other words, a larger value than 0.7 represent a more common relationship between the item and its construct. However, Hair et. al (2019) also mentioned that it is also acceptable if one or two loadings are lesser than the recommended 0.7 especially when they are theoretically important. Table 4.3 shows the item loadings for each item in the construct.

Table 4.3: Item Loadings for Each Item in The Construct

Latent Construct	Items	Outer loadings
Attitude	AT1	0.919
	AT2	0.920
	AT3	0.871
Health Consciousness	HC1	0.769
	HC2	0.704
	HC3	0.685
	HC4	0.695
	HC5	0.727
Intention	CI1	0.921
	CI2	0.958
	CI3	0.399
Self-Efficacy	SE1	0.837
	SE2	0.690
	SE3	0.930
	SE4	0.868

Table 4.3, continued.

Latent Construct	Items	Outer loadings
Social Influence	SI1	0.880
	SI2	0.920
	SI3	0.687
	SI4	0.738
	SI5	0.897
	SI6	0.924
	SI7	0.913
	SI8	0.922
	SI9	0.926
	SI10	0.935
	SI11	0.944

4.2.2.3 Convergent Validity

The extent to which an item correlates positively with other items in the instrument is referred to as convergent validity (J. Hair et al., 2010). Besides that, another commonly used validity indicator is the Average Variance Extracted (AVE). The AVE value represents level of variance picked up by a construct with regards to the level of variance caused by the measurement error. AVE of 0.5 and above is considered good while below 0.5 is undesirable (J. Hair et al., 2019). All the constructs AVE as shown in Table 4.2 are above 0.5, which met the minimum criteria, thus indicating satisfactory convergent validity. In short, AVE measures the convergent validity together with composite reliability (CR) value. In order to provide convergent validity, AVE should be 0.5 or more and CR 0.7 or more. Furthermore, CR should be higher than AVE.

4.2.2.4 Discriminant validity

According to Henseler et al. (2015), discriminate validity is important to determine measurement items that are theoretically not supposed to be related are actually not related to each other . In other words, indicators load more strongly on their corresponding construct than on other constructs (Chin et al., 2003). Fornell-Larcker's criterion is a commonly used by researchers to assess the measurement model's discriminant validity. Using this criterion, a construct's AVE square root is compared to the correlation of that construct and other constructs. As a guide, the AVE square root values in the diagonal matrix should be greater than the values in its column and row (Fornell & Larcker, 1981). As seen in Table 4.4, the results of the AVE square root values in the diagonal matrix (**bolded**) are larger than those within its column and row. Hence, the findings met the criterion for discriminant validity.

Table 4.4: Results of Fornell-Larcker's Criterion Test

	Attitude	Health Consciousness	Intention	Self- Efficacy	Social Influence
Attitude	0.904				
Health Consciousness	0.136	0.717			
Intention	0.367	0.242	0.801		
Self-Efficacy	0.158	0.204	0.260	0.836	
Social Influence	0.235	0.209	0.231	0.502	0.884

Further to Fornell and Larcker criterion test, the discriminant validity were further assessed using the Heterotrait-Monotrait Ratio (HTMT) criterion suggested by Henseler et al. (2015). The HTMT values should be ≤ 0.85 for the the stricter criterion and for the more lenient criterion is it should be ≤ 0.90 . As shown in Table 4.5, the

values of HTMT were all lower than the stricter criterion of ≤ 0.85 as such we can conclude that the respondents understood that the five constructs are distinct. Taken together both these convergent and discriminant validity tests has shown that the measurement items are both valid and reliable.

Table 4.5: Results of Heterotrait-Monotrait Ratio (HTMT) Test

Heterotrait-Monotrait Ratio (HTMT)					
	Attitude	Health Consciousness	Intention	Self- Efficacy	Social Influence
Attitude					
Health Consciousness	0.160				
Intention	0.434	0.318			
Self-Efficacy	0.170	0.242	0.308		
Social Influence	0.246	0.226	0.249	0.520	

4.2.3 Results for Structural Model

The structural model was assessed with the SmartPLS software's Partial Least Square (PLS) algorithm procedure known as "Bootstrapping." Bootstrapping is the nonparametric process that analyses the statistical significance of relationships in Partial Least Square Structural Equation Modelling (PLS-SEM) results. In Bootstrapping, several subsamples are randomly extracted (with replacement) from the original set of data, which is then used to estimate the PLS path coefficients (Hair et al., 2013). This procedure is repeated until a huge number of random subsamples have been generated, normally about 5,000 subsamples.

As suggested by Hair et al. (2017), the multivariate skewness and kurtosis were first assessed. From the data analysis using WebPower statistical power analysis

online (Wulandari et al., 2021) as shown in Figure 4.1, Mardia's multivariate skewness ($\beta = 9.753$, $p < 0.01$) and Mardia's multivariate kurtosis ($\beta = 50.547$, $p < 0.01$), the value of skewness is greater than 0.4 and kurtosis value is not in range [6.858, 9.3], the data then do not follow multivariate normal distribution (Wulandari et al., 2021); which further supported the use of PLS-SEM in data analysis. Hence, following the suggestions of Hair et al. (2019) for structural model assessment, the path coefficients, the standard errors, t-values, and p -values for the structural model using a 5,000-sample re-sample bootstrapping procedure were reported. In this study, the relationship between the latent constructs were confirmed by examining the path coefficient (β), p -value and R^2 , which were part of the output of the Bootstrapping method of 5,000 subsamples.



Figure 4.1: WebPower Statistical Power Analysis

4.2.3.1 Coefficient of Determination (R^2)

The R^2 value indicates the amount of variance in dependent variables that is explained by the independent variables. As a result, a higher R^2 value indicates that the structural model has greater predictive potential. In this study, the R^2 values are obtained using the SmartPLS algorithm function, and the t-statistics values are generated using the SmartPLS bootstrapping function. The bootstrapping method was used to produce 5000 samples from 423 cases in this study. The result of the structural model is presented in Figure 4.2

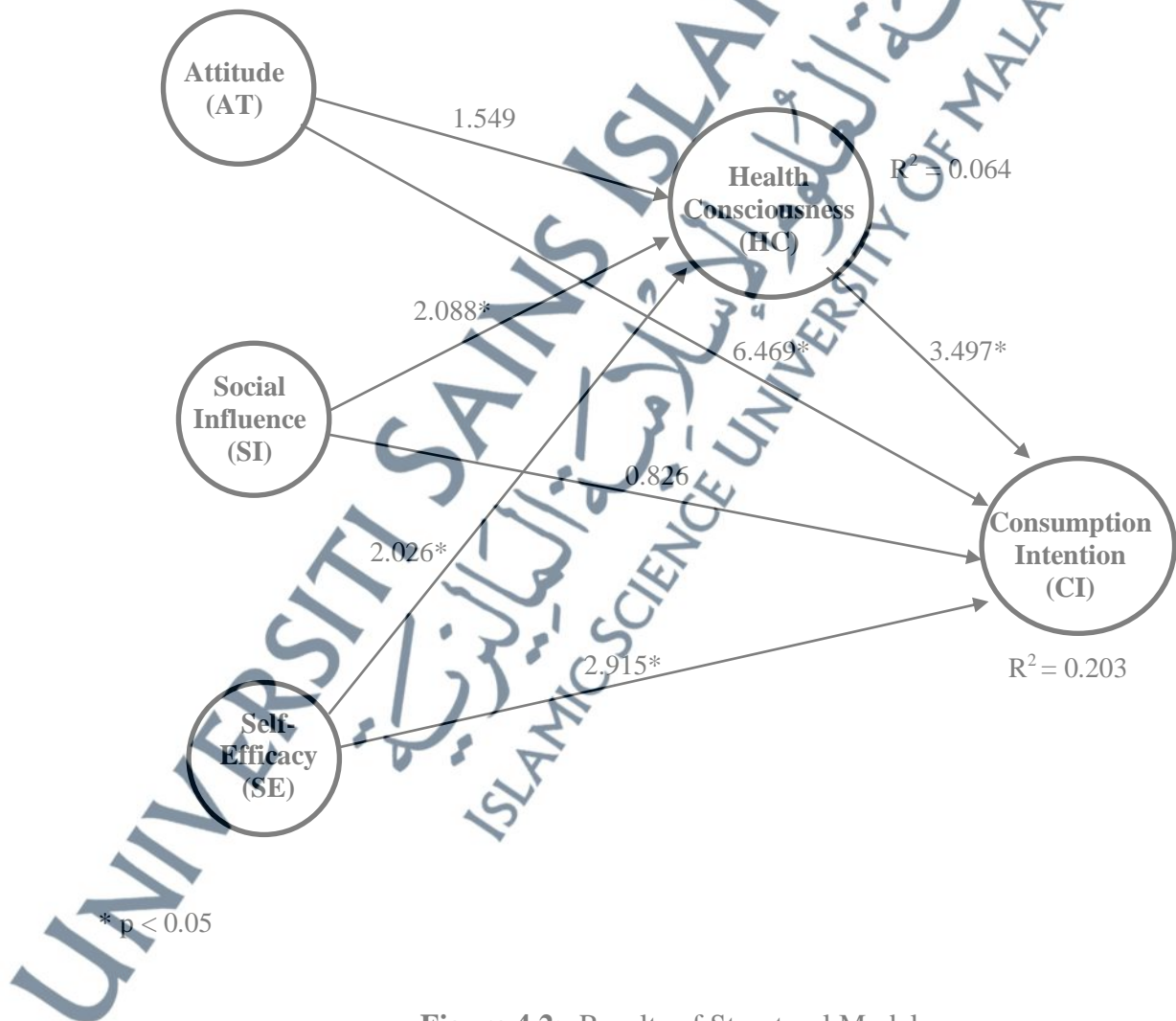


Figure 4.2: Results of Structural Model

As suggested by Chin (1998), “ R^2 lesser or equal to 0.190 is considered weak, R^2 values around 0.333 is moderate, while values around 0.670 is considered significant”. As shown in Figure 4.2, the total predicted R^2 for consumption intention (CI) is 0.203, this means that 20.3% of the variance for goat milk consumption intention is moderately explained by its independent variables and thus the structural model has a moderate level of explanatory power.

4.2.3.2 Path Coefficients

When used in conjunction with PLS-SEM, the path coefficient refers to the direct influence of the independent variable on the dependent variable in a structural model. (*Statistics Solutions*, 2020). In this study, the path coefficient (β) was calculated using the PLS algorithm output to assess the relationship between the independent and dependent variables. The path coefficient of most of the independent variables are greater than 0.100, indicating that they have some influence on the model except for SI→CI that has a path coefficient of 0.047. Finding from this data suggest that social influence does not influence consumers’ goat milk consumption intention.

Moreover, t-statistics for all paths are calculated using the SmartPLS bootstrapping method in order to test for the significance level of each relationship based on the results of the t-statistics analysis. All the hypothesized paths are listed in Table 4.6, along with the path coefficients, observed t-statistics, and significance level. After analyzing the outcomes of the path assessment, it is determined whether the presented hypotheses are supported or not supported.

Table 4.6: Structural Model Direct Effects (N=423)

Path	Path Coefficient (β)	Std. Error	t-value	p-value	Results
Attitude → Consumption Intention	0.310	0.048	6.469	0.000	Supported
Social Influence → Consumption Intention	0.047	0.057	0.826	0.409	Not Supported
Self-efficacy → Consumption Intention	0.155	0.053	2.915	0.004	Supported
Health Consciousness → Consumption Intention	0.159	0.045	3.497	0.001	Supported

Note: 95% confidence interval with a bootstrapping of 5000

(beta: >0.1, t value >1.96, p value < 0.05: significant)

4.2.3.3 Hypotheses Testing

Assessment of the path coefficient shows that Attitude ($\beta = 0.310, p < 0.05$), Self-efficacy ($\beta = 0.155, p < 0.05$), and Health consciousness ($\beta = 0.159, p < 0.05$) were all positively related and directly influence goat milk consumption intention. Findings from the data also suggests that social influence does not influence the consumption intention.

4.2.3.4 Mediation Effects

To test the mediation hypothesis, the recommendations of Preacher and Hayes (2004; 2008) was followed and bootstrapped the indirect impact to see if it was significant. It is reasonable to conclude that there is significant mediation if the confidence interval does not straddle a zero. Furthermore, the mediation hypothesis was tested for type of mediation, if any, according to recommendation of Zhao et al. (2010). Figure 4.3 shows a three-variable model of the mediator (M), the independent variable (X) and the dependent variable (Y). The effect of the independent variable on the mediator is represented by path *a* while the effect of the mediator on the dependent variable is represented by path *b*. Path *c* represents the direct effect of the independent variable on the dependent variable.

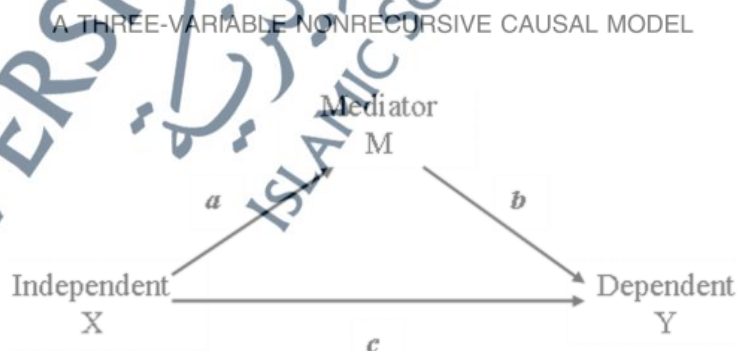


Figure 4.3: The General Framework of a One-Mediator-Model (Zhao et al., 2010)

Table 4.7: Structural Model Indirect Effects (N=423)

Paths	Path Coefficient (β)	Std. Error	t-value	p-value	Confidence Interval		Mediation Result
					2.50%	97.50%	
Attitude → Health Consciousness → Consumption Intention	0.014	0.009	1.465	0.143	-0.003	0.033	Direct only
Social Influence → Health Consciousness → Consumption Intention	0.020	0.012	1.604	0.109	0.000	0.049	Indirect only
Self-Efficacy → Health Consciousness → Consumption Intention	0.020	0.012	1.625	0.105	0.001	0.046	Complementary

As shown in Table 4.7, the finding shows that health consciousness mediates the relationship between social influence and consumption intention. Following recommendation by Zhao et al. (2010), since it was found that path *a* (SI → HC) and path *b* (HC → CI) are significant, and path *c* (SI → CI) is not significant, there is mediated effect ($a \times b$) but no direct effect from *c*. Hence, this is an indirect-only mediation as shown in Figure 4.4. This implies that the mediator is “identified to be consistent with the hypothesized theoretical framework” (Zhao et al., 2010). In short, the relationship between social influence and goat milk consumption intention is mediated significantly by health consciousness.

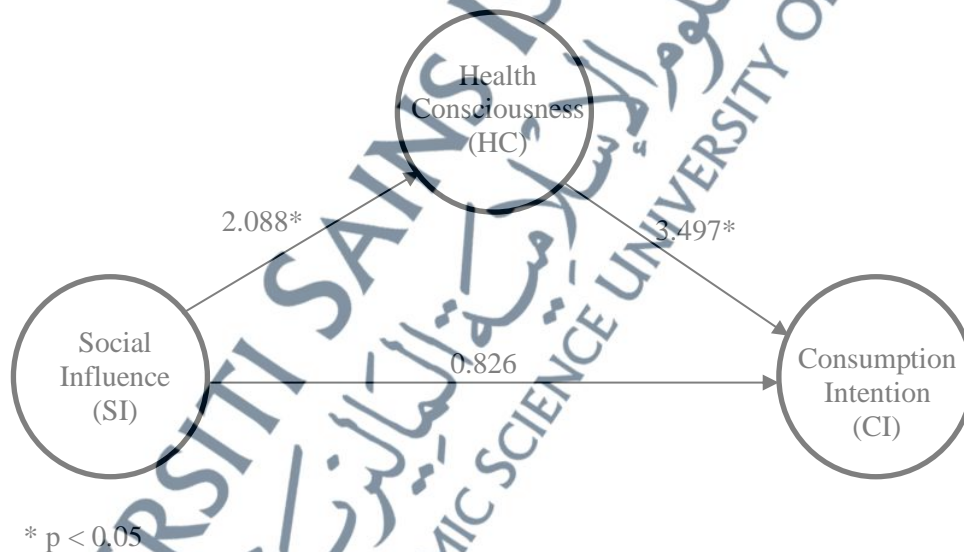


Figure 4.4: Health Consciousness Mediates the Relationship Between Social Influence and Consumption Intention

The data further shows that health consciousness is a significant mediator between Self-efficacy and Consumption intention. As for the type of mediation, the researcher follows recommendation by Zhao et al. (2010).

Since the findings show that the paths a ($SE \rightarrow HC$) and path b ($HC \rightarrow CI$) are significant, and path c is also significant, this type of mediation is identified as Complementary mediation. There is significant mediated effect ($a \times b$) and significant direct effect in path c as shown in Figure 4.5. In other words, the relationship between self-efficacy and goat milk consumption intention is mediated significantly by health consciousness.

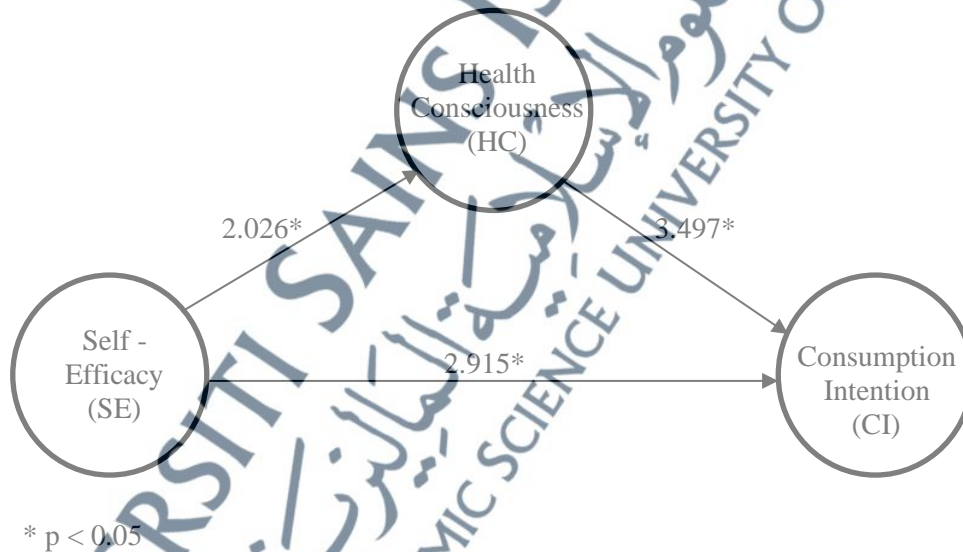


Figure 4.5: Health Consciousness Mediates the Relationship Between Self-Efficacy and Consumption Intention

However, according to the findings, Health consciousness does not mediate the relationship between Attitude and Consumption intention. Following recommendation by Zhao et al. (2010), since it was found that $(a \times b)$ is not significant, and path c is significant, there is no mediation effect (direct-only effect) as shown in Figure 4.6. Hence, health consciousness does not mediate the relationship between attitude and goat milk consumption intention.

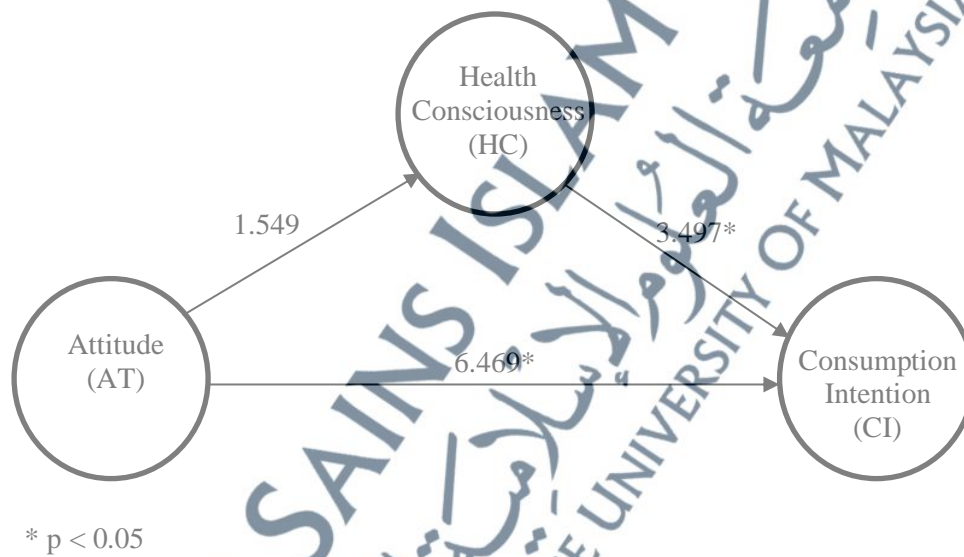


Figure 4.6: Health Consciousness Does Not Mediate the Relationship Between Attitude and Consumption Intention.

4.3 Stage 2: Findings from Cross Sectional Survey on Knowledge, Attitude, and Practice (KAP) towards Goat Milk Consumption Among Multicultural Malaysians

4.3.1 Sociodemographic of Respondents

In this study, a total of 398 complete questionnaires were collected. The demographic profile of the respondents was compiled in Table 4.8. Most of the respondents 30.2% (n=120) who took part in this survey were from the age group of 35-44 years old; followed closely by the 25-34 years old group (27.6%, n=110). It was found that more than half (55.8%, n=222) of the respondents were female compared to 44.2%, (n=176) male respondents. In terms of ethnicity, majority of the respondents were from the Malay ethnic and followed by the Chinese ethnic at 63.8%, (n=254) and 26.1%, (n=104), respectively. Indian respondents comprised of 7.5%, (n=30) from overall respondents. The “Others” ethnics (2.5%, n=10) were combination of Iban (n=6), Bidayuh (n=3), and Punjabi (n=1). In terms of education, 95.9% (n=382) of the respondents obtained at least secondary school education and above.

Table 4.8: Demographic characteristics of the respondents (N=398)

Characteristics	n	(%)
Age categories		
20-24	69	17.3
25-34	110	27.6
35-44	120	30.2
45-54	66	16.6
55-64	27	6.8
65 and above	6	1.5

Table 4.8, continued.

Characteristics	n	(%)
Gender		
Male	176	44.2
Female	222	55.8
Ethnicity		
Malay	254	63.8
Chinese	104	26.1
Indian	30	7.5
Others ^a	10	2.5
Education		
No formal education	1	0.3
Primary school	15	3.8
Secondary school	108	27.1
College/University	274	68.8

^a Punjabi – 1, Bidayuh – 3, Iban – 6

4.3.2 Knowledge, Attitude, and Practice Score towards Goat Milk

An initial summary of the data collected were obtained using descriptive analysis to describe general state of respondents' knowledge, attitude, and practice towards goat milk. Table 4.9 shows the mean, standard deviation, maximum and minimum values of the constructs.

Table 4.9: Descriptive Statistic of the Constructs (N=398)

Construct	Min value	Max value	Mean	Standard Deviation
Knowledge	2.83	5.00	3.93	0.603
Attitude	1.00	5.00	3.71	0.686
Practice	0.00	1.00	0.41	0.319

4.3.3 Knowledge of Goat Milk Health Benefits

Knowledge levels on goat milk health benefits were determined using the mean score. From descriptive data analysis, the mean score for level of knowledge among the respondents was 3.93 from the total score of 5.00. Table 4.10 shows that the knowledge level was shown to be at low borderline satisfactory level. Based on mean score, only 53.0% (n=211) of the respondents were considered to have good knowledge of goat milk health benefits (respondents obtained above mean score value). On the other hand, 47.0% (n=187) of the respondents scored below total mean score which were considered as low level of knowledge on goat milk health benefits.

Table 4.10: Respondents' Levels of Knowledge on Goat Milk Health Benefits (N=398)

Level of Knowledge	Number of Respondents (n)	Percentage (%)
Good	211	53.0
Low	187	47.0

Furthermore, the study also revealed that among the multicultural respondents, the mean score was significantly higher for Malay at 3.98 (SD = 0.572), followed by Indians at 3.83 (SD = 0.388), Chinese at 3.74 (SD = 0.614), and Others ethnicities at 3.70 (SD = 0.443) as shown in Table 4.11.

A similar trend was found among the Malay and Indian respondents in which the percentage of respondents who scored above the mean score were higher than those who obtained lower than the mean score for knowledge. This suggests that more Malay and Indian respondents scored higher and have better knowledge level of goat milk health benefits compared to the rest.

Table 4.11: Respondents' Levels of Knowledge on Goat Milk Health Benefits, By Ethnicity (N=398)

	Mean score	Level of Knowledge, n (%)	
		Good [Above Mean Score]	Low [Below Mean Score]
Malay	3.98 (SD = 0.572)	146 (57.5%)	108 (42.5%)
Chinese	3.74 (SD = 0.614)	42 (40.4%)	62 (59.6%)
Indian	3.83 (SD = 0.388)	18 (60.0%)	12 (40.0%)
Others	3.70 (SD = 0.443)	5 (50.0%)	5 (50.0%)

Pearson Chi-Square 57.331 (p=0.029)

Furthermore, this study also shows that on overall, respondents were aware that goat milk helps strengthen the bones (Item K6 Susu kambing dapat membantu

menguatkan tulang) as the mean score is the the highest at 4.15 (SD = 0.786). Table 4.12 shows the mean score for each item for knowledge of goat milk health benefits.

Table 4.12: Mean Score for Each Item for Knowledge of Goat Milk Health Benefits (N=398)

	Items	Mean	Std. Dev.
K1	Susu ibu lebih baik daripada susu kambing.	3.99	0.753
K2	Susu kambing lebih mudah dihadam berbanding susu lembu.	3.79	0.727
K3	Susu kambing sesuai diambil oleh pelbagai tahap umur.	3.76	0.738
K4	Susu kambing dapat membantu melancarkan sistem penghadaman.	3.82	0.721
K5	Susu kambing mengandungi pelbagai zat yang diperlukan badan.	4.05	0.676
K6	Susu kambing dapat membantu menguatkan tulang.	4.15	0.786

The respondents in this study also show lower awareness pertaining to suitability (Item K3 Susu kambing sesuai diambil oleh pelbagai tahap umur) with a mean of 3.76 (SD = 0.738) and digestibility of goat milk (Item K2 Susu kambing lebih mudah dihadam berbanding susu lembu.) with a mean of 3.79 (SD = 0.727).

4.3.4 Attitude towards Goat Milk

The mean score for attitude towards goat milk consumption among the respondents was obtained at 3.71 (n=180) from the maximum total score of 5. Table 4.13 shows respondents' level of attitude towards goat milk. Based on mean score, 45.2%

(n=180) of the respondents were considered to have positive attitude towards goat milk consumption (above mean score).

Table 4.13: Respondents' Levels of Attitude Towards Goat Milk (N=398)

Level of Attitude	Number of Respondents (n)	Percentage (%)
Good	180	45.2
Low	218	54.8

On the other hand, 54.8% (n=218) were found to score below the mean score for attitude towards goat milk consumption. Table 4.14 shows the level of attitude of respondents by ethnicity. The mean score was significantly higher for Malay at 3.84 (SD = 0.625), follow by Indian (3.60, SD = 0.724), Chinese (3.46, SD = 0.726) and Others (3.20, SD = 0.689).

Table 4.14: Respondents Attitude Towards Goat Milk, by Ethnicity (N=398)

	Mean score	Level of Attitude, n (%)	
		Good [Above Mean Score]	Low [Below Mean Score]
Malay	3.84 (SD = 0.625)	132 (52.0%)	122 (48.0%)
Chinese	3.46 (SD = 0.726)	34 (32.7%)	70 (67.3%)
Indian	3.60 (SD = 0.724)	13 (43.3%)	17 (56.7%)
Others	3.20 (SD = 0.689)	1 (10.0%)	9 (90.0%)

Pearson Chi-Square 62.291 (p=0.000)

Percentage of Malay respondents who scored above the mean score for attitude towards goat milk consumption was found to be significantly higher than all other ethnics; which suggests that Malay respondents has a more positive attitude towards goat milk consumption compared to the rest of the multicultural respondents. Overall, there is significant difference for attitude towards goat milk consumption between different ethnicities of respondents.

4.3.5 Practice towards Goat Milk

In this study, it was found that 53.8% (n=214) of the respondents had experienced drinking goat milk for the past one year. Figure 4.7 shows the breakdown details of the practice of goat milk among respondents by ethnics. The percentage of Malay (54.3%, n=138), Chinese (54.8%, n=57), and Indians (53.3%, n=16) respondents who consumed goat milk were just slightly higher than those who had not tried goat milk. However, for 'Others' group, majority of the respondents (70.0%, n=7) had not tried goat milk.

On the other hand, the study reported that 46.2% (n=184) of the respondents has never tried goat milk. Only 5.5% (n=22) of the respondents reported to drink goat milk almost every day (more than three times a week). Consumption of goat milk among most respondents were found to be infrequent and not consistent.

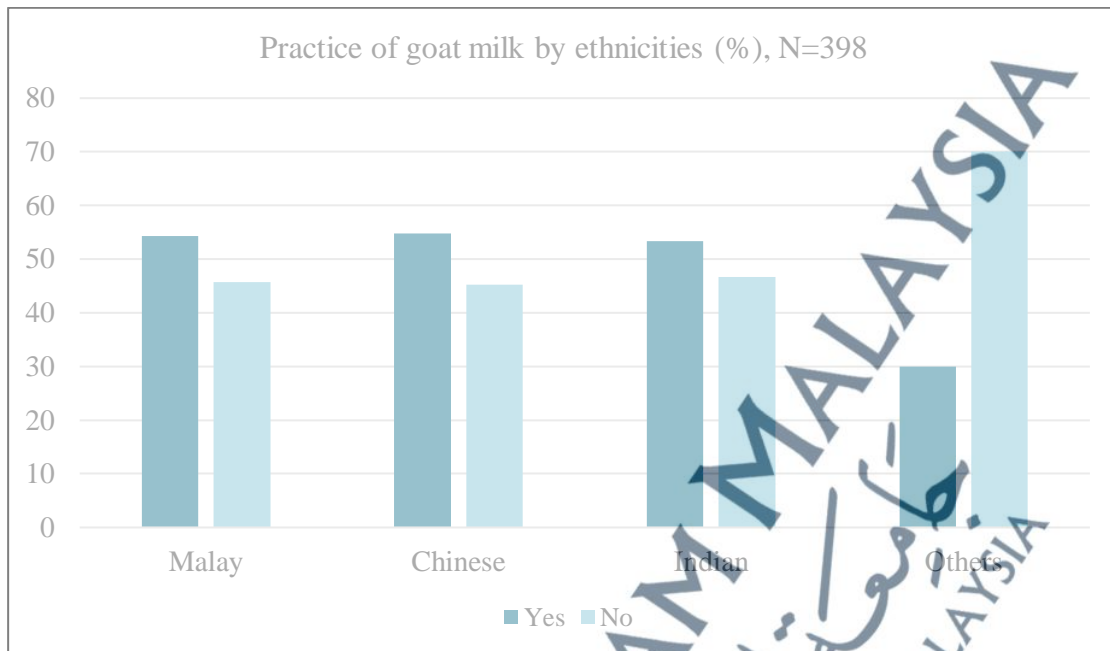


Figure 4.7: Practice of Goat Milk among Respondents by Ethnicities (N=398)

There is no statistically significant mean score difference ($p=0.503$) in goat milk consumption level among multicultural Malaysians.

It is also interesting to note that from the group of respondents that consume goat milk, majority of them (26.6%, $n=106$) consume only less than 1 cup (240 ml) of goat milk per serving. According to Malaysian Dietary Guidelines (2020), Ministry of Health Malaysia recommends taking 1 to 2 servings of dairy each day. Only 2.0% ($n=8$) of the respondents who consume goat milk takes more than 1.5 cup (355 ml) per serving. This finding suggests that the consumption rate and consumption volume of goat milk among respondents are low.

4.3.6 Impression on Goat milk

Besides, practice of goat milk, researcher also studied the impressions of goat milk among the respondents who consume goat milk. In this study, it was found that 66.8% (n=143) of the respondents has good impression on goat milk such as good taste, sweet and thick taste (creamy) while 33.2% (n=71) has poor impression such as dislike the smell of goat milk, strange taste and do not remember the impression on goat milk. The positive and negative impressions were categorised based on study by Ozawa et al. (2009). However, data analysis shows that there is no significant difference of impression on goat milk taste among the ethnics. Results are tabulated in Table 4.15.

Table 4.15: Impression on Goat Milk Among Respondents Who Consume Goat Milk, by Ethnics (n=214)

	Positive Impression (good taste, sweet, and thick taste)	Negative Impression (dislike the smell, strange taste and don't remember)
Malay	97	41
Chinese	32	25
Indian	12	4
Others	2	1
Total	143 (66.8%)	71 (33.2%)

Pearson Chi-Square 15.716 (p=0.612)

4.3.7 Binary Logistic Regression

According to Nick and Campbell (2007) “Binary logistic regression models are used to study effects of predictor variables on categorical outcomes and normally the outcome is binary.” In this study the predictor variables are knowledge of goat milk health benefits, attitude towards goat milk, gender, ethnicity, education level, and total household income.

The Box-Tidwell transformation involves adding a term of the form $(X)(\ln X)$ to the logistic regression equation. A statistically significant coefficient for this variable implies there is evidence of nonlinearity in the relationship between $\text{logit}(Y)$ and X . Results from the Box-Tidwell procedure suggests that there is linear relationship between the continuous independent variables and the logit transformation of the dependent variable, which fulfill the assumption for binary logistic regression to be conducted as shown in Table 4.16.

Table 4.16: Test of Nonlinearity in the Logit

Variable	β	S.E.	Wald	df	<i>p</i> -value	Exp(β)
Knowledge	12.80	6.28	4.16	1	0.15	360890.432
Attitude	16.30	5.91	7.61	1	0.36	11949743.96
LN_Knowledge	-5.24	2.63	3.96	1	0.16	0.005
LN_Attitude	-6.17	2.49	6.16	1	0.38	0.002
Constant	-52.69	13.84	14.50	1	0.00	0.000

Note: Non-significant ($p > 0.05$): there is linearity in the logit.

The overall model was found to be statistically significant, $\chi^2(9) = 130.46, p < 0.05$. The Cox & Snell R^2 and Nagelkerke R^2 values are both methods of calculating the explained variation. Referring to Nagelkerke R^2 value, the explained variation in the dependent variable based on this model is 37.8%.

The Hosmer-Lemeshow tests the null hypothesis that predictions made by the model fit satisfactorily with observed group memberships. A nonsignificant chi-square ($p=0.052$) indicates that the data fit the model well.

Based on the analysis, the model correctly classifies 73.9% of cases. This is also known as the percentage accuracy in classification. 59.9% of participants who consumed goat milk were predicted by the model to consume goat milk. In other words, the model has 59.9% sensitivity. Furthermore, 83.0% of participants who did not consume goat milk were correctly predicted by the model as not consume goat milk which indicates the model has 83.0% specificity. Table 4.17 represents the classification table for accuracy, sensitivity, and specificity.

Table 4.17: The Classification Table for Accuracy, Sensitivity, and Specificity.

Observed	Predicted			Percentage Correct
	Practice			
	No	Yes		
Practice	No	200	41	83.0
	Yes	63	94	59.9
Overall Percentage				73.9

As the respondent's knowledge of goat milk health benefits increases by 1 unit, the odds of goat milk consumption are increased by 1.6 times when the other independent variables are controlled. More importantly is the attitude towards goat milk. In this study, it was found that when the respondent's attitude increased by 1 unit, the odds of goat milk consumption are increased by 6.5 times when the other independent variables are controlled. Another significant predictor is age. When the respondent's age increased by 1 unit, the odds of goat milk consumption are increased by 1.5 times when the other independent variables are controlled. Table 4.18 shows the variables in the logistic regression.

Table 4.18: Variables in the Logistic Regression

Variable	β	S.E.	Wald	p-value	Odds ratio (e^{β})
Constant (Intercept)	-10.363	1.636	40.114	0.000	0.000
Knowledge	0.488	0.220	4.921	0.027	1.629
Attitude	1.872	0.232	64.906	0.000	6.502
Age	0.407	0.118	11.854	0.001	1.502
Gender	-0.354	0.255	1.927	0.165	0.702
Ethnicity					
Malay (Ref.)			0.295	0.961	
Chinese	0.060	0.314	0.036	0.849	1.062
Indian	0.249	0.469	0.282	0.596	1.282
Others	0.029	0.979	0.001	0.977	1.029
Education	-0.133	0.247	0.288	0.591	0.876
Total Income	0.184	0.110	2.827	0.093	1.203

Overall, results from binary logistic regression show that knowledge ($p = 0.027$), attitude ($p = 0.000$) and age ($p = 0.001$) added significantly to the prediction model, but gender, ethnicity, education level, and total income did not add significantly to the model.

4.4 Stage 3: Findings from the Nutrition Education Intervention

Results from the cross-sectional survey on knowledge, attitude, and practice towards goat milk consumption among multicultural Malaysians has shown that consumption of goat milk among Malaysians were low where 46.2% of the participants did not have experience with goat milk consumption.

Regression analysis found that knowledge ($p = 0.027$), attitude ($p = 0.000$) and age ($p = 0.001$) added significantly to the prediction model. Hence, an intervention programme was implemented to evaluate the impact of educational intervention on increasing the practice towards goat milk consumption by improving goat milk health benefits knowledge and attitudes towards goat milk consumption. This stage was carried out to answer the research question: Does nutritional intervention programme increase knowledge, attitude, and practice towards goat milk in the intervention group?

4.4.1 Socio-demographic Data

A total of 152 eligible undergraduate participants recruited from USIM and KUTAR were randomly assigned into either the control (74 participants) or intervention group (78 participants). After eight weeks, 58 participants from the control group and 58 participants from the intervention group completed the web-based campaign yielding response rates of 78.4% and 83.3% respectively.

The baseline characteristics of the participants were recorded and presented in Table 4.19. The baseline characteristics were shown to be comparable between the intervention and control group with no significant difference in gender ($p=0.427$), ethnicity ($p=0.9$), and monthly income ($p=0.658$). Age and education levels are homogenous as the participants were recruited from undergraduate universities students.

Table 4.19: Baseline Characteristics of The Campaign Participants (N=116)

Characteristics	Control group (n=58)		Intervention group (n=58)		p-value
	Frequency (f)	Percent (%)	Frequency (f)	Percent (%)	
Age					
18-24	58	100	58	100	
Gender					
Male	16	27.6	20	34.5	0.427
Female	42	72.4	38	65.5	
Ethnicity					
Malay	21	36.2	22	37.9	0.900

Table 4.19, continued.

Characteristics	Control group (n=58)		Intervention group (n=58)		<i>p</i> -value
	Frequency (f)	Percent (%)	Frequency (f)	Percent (%)	
Ethnicity					
Chinese	30	51.7	28	48.3	
Indian	6	10.3	6	10.3	
Others ^a	1	1.7	2	3.4	
Education					
Tertiary	58	100	58	100	
Monthly Income					
Less than RM 2,000	14	24.1	20	34.5	0.658
RM 2,000 to RM 3,999	17	29.3	12	20.7	
RM 4,000 to RM 5,999	17	29.3	12	20.7	
RM 6,000 to RM 7,999	2	3.4	6	10.3	
RM 8,000 to RM 9,999	5	8.6	4	6.9	
More than RM 10,000	3	5.2	4	6.9	

Punjabi - 2, Serani - 1

4.4.2 Pre and Post Intervention among Control and Intervention Group for Goat Milk Consumption

Paired sample t-test was used to compare the mean value for knowledge, attitude, and practice of control and intervention group. Results show that for control group, there were no significant mean difference between pre and post intervention for knowledge ($t(57) = 0.518$, $p=0.607$), and attitude ($t(57) = 0.509$, $p=0.613$), as shown in Table 4.20.

Table 4.20: Pre and Post Intervention for Control and Intervention group (N=116)

Variable	Group	Pre (n=58)		Post (n=58)		df	t-value	p-value	Effect Size (d)
		Mean	SD	Mean	SD				
Knowledge	Control	3.770	0.336	3.733	0.436	57	0.518	0.607	0.068
	Intervention	3.621	0.306	4.149	0.395	57	8.484	0.000*	1.114
Attitude	Control	3.351	0.528	3.402	0.487	57	0.509	0.613	0.067
	Intervention	3.443	0.553	4.247	0.453	57	8.414	0.000*	1.105
Practice	Control	1.586	0.497	1.396	0.493	57	2.102	0.040*	0.276
	Intervention	1.535	0.503	1.880	0.329	57	4.316	0.000*	0.567

Paired t-test, significance level 0.05 (2-tailed)

After 8 weeks of continuous exposure to goat milk related information and activities, participants in the intervention group shown significant improvement in their knowledge ($t(57) = 8.484, p=0.000, d=1.114$) and attitude ($t(57) = 8.414, p=0.000, d=1.105$) towards goat milk post intervention. As for practice towards goat milk consumption, there is significant difference between the pre and post intervention ($t(57) = 2.102, p=0.040, d=0.276$) of the control group and there is significant difference between the pre and post intervention ($t(57) = 4.316, p=0.000, d=0.567$) in the intervention group. In data analysis, feedback from respondents that show they did not practice goat milk consumption for the past one year was coded as “1” and feedback from respondents that indicate they practice goat milk consumption during the past one year was coded as “2”. Thus, the mean value that fall closer to “2” indicates higher consumption than “1”. With that, it was found that after the 8 weeks intervention

programme, the mean value for practice of goat milk among the intervention participants were higher (1.880 (SD = 0.329), $p=0.000$) compared to the control group (1.396 (SD = 0.493, $p=0.040$).

4.4.3 Mean differences between Control and Intervention Group after Eight-Week Goat Milk Intervention Programme

Independent t-test analysis shows there are significant mean differences between the control and intervention group in all constructs of knowledge, attitude, and practice after the 8 weeks intervention programme as shown in Table 4.21.

Table 4.21: Mean Score for Control and Intervention Group After Eight-Week Intervention Programme (N=116)

Variable	Control (n=58)		Intervention (n=58)		df	t-value	p-value	Effect Size
	Mean	SD	Mean	SD				
Knowledge	3.733	0.436	4.149	0.395	114	-5.397	0.000	0.709
Attitude	3.402	0.487	4.247	0.453	114	-9.680	0.000	1.271
Practice	1.397	0.493	1.879	0.329	114	6.201	0.000	0.814

Independent t-test. Significant at 0.05 level (2-tailed)

4.4.4 Intervention Programme Evaluation

After the completion of the eight-week health education intervention programme, evaluation forms were sent to participants via their emails. Participants evaluated on the suitability and quality of the programme using the 5-point Likert Scale from 1-Strongly Disagree, 2-Disagree, 3-Not Sure, 4-Agree, and 5-Strongly Agree. The results of the programme evaluation are shown in Table 4.22.

Table 4.22: Results of Evaluation of Intervention Programme Suitability and Quality (n=32)

Items	Mean	SD
1. The intervention strategy (health benefits campaign) used is suitable to increase awareness of goat milk health benefits.	4.31	0.644
2. The materials used to deliver information were suitable.	4.16	0.574
3. The activities conducted during the campaign were suitable.	4.19	0.535
4. The duration of the campaign is appropriate.	4.00	0.440
5. I am more aware of goat milk health benefits after the campaign compared to before.	4.41	0.560
6. I have a greater liking towards goat milk after the campaign compared to before.	4.09	0.530
7. The campaign has provided opportunities for me to try goat milk.	4.38	0.554

On overall, the campaign was highly rated by the participants especially at providing exposures from different aspects about goat milk. Participants especially recorded their gratitude and appreciation to the invited nutritionist in the live webinar

session. In the interactive webinar, participants grabbed the opportunity to ask questions such as:

- Why does goat milk smell goaty?
- Is goat milk with strong or mild goaty-smell nutritionally better?
- How to reduce goaty-smell of goat milk?

Furthermore, participants also mentioned that they were really excited to join the Quiz and contests as the prizes sponsored by Orient EuroPharma Sdn. Bhd. under the company Corporate Social Responsibility Programme were very attractive and good quality. Hence, they had put in more efforts to study the intervention materials sent to them every week. Overall, participants think that the web-based intervention programme is interesting as it occupies their Saturday mornings with activities that they can easily reached at the convenience of their fingertips. Eight-weeks duration was just nice, as it was neither too brief nor too extensive until it bores the participants. All the participants who replied to the feedback form agreed that they have better awareness of goat milk health benefits, greater likings towards goat milk and the campaign have provided opportunity for the participants to try goat milk. As for the participants in control group, all intervention materials and goat milk sample were also given to them after the completion of the programme.

4.5 Conclusion

This chapter arranged and compiled the findings for the three stages of the study. In the first stage, the influence of attitude, social influence, and self-efficacy on consumers' goat milk consumption intention were analysed using SEM-PLS. In the second stage, descriptive statistics and bivariate analysis were done to study the knowledge, attitude, and practice levels towards goat milk consumption. And last but not least, the results for pre- and post-intervention within groups and between groups were also recorded.

