CHAPTER 4

FINDINGS

4.1 Introduction

This chapter discusses the analysis output and the findings from the 'See, Select, Tell' module implementation. The efficacy of the 'See, Select, Tell' module is evaluated from consumers' food poisoning preventive behavior enabler namely knowledge, attitude and risk perceptions from the employment of quasi experimental study that involved pre and post assessment. Results from the analysis are presented into three sections according to the research phases that are Phase 1: Need Analysis; Phase 2: Design and Development; and Phase 3: Module Implementation.

4.2 Finding from Phase 1: Need Analysis

Data obtained from Phase 1: Need Analysis was processed using SPSS version 23. Descriptive analysis was employed to explain the respondents' sociodemographic profile, eating away from home food behavior and preference of food poisoning information communication delivery in the form of frequency and percentage. The score from food poisoning knowledge items were summed up and converted into percentage. Similarly, rating items for attitude, preventive behavior and risk perceptions were totaled up and converted into percentage. These constructs later were classified according to the percentage level 60% and more as having 'Good

knowledge' whilst 70% or more as possessed 'Good attitude'; 'Good preventive behavior' and 'Positive perception' with regard to food poisoning and its prevention (Ruby et al., 2019a; Talaei et al., 2015).

4.2.1 Respondents' sociodemographic profile

A total of 430 respondents were recruited among residents in Ampang Jaya. The mean age of the consumers was 43.28 ± 15.05 years. More than half of the consumers were female, and most of the consumers were of Malay ethnicity. Most of the consumers were married (69.1%) while 22.1% were single. A total of 44.4 % of the consumers obtained education from secondary school whilst 28.1% have certificate or diploma. Almost half of the consumers were unemployed whilst the other half worked in various sectors (Refer Table 4.1).

Table 4.1: Respondents' sociodemographic profile (n = 430)

Attribute		Mean (S.D)	
Age		43.28 (15.05)	
		n	**(%)**
Gender	Male	181	42.1
	Female	249	57.9
Ethnicity	Malay	403	93.7
	Chinese	22	5.1
	Indian	2	0.5
	Others	3	0.7
Marital status	Single	95	22.1
	Married	297	69.1
	Separated/widowed	38	8.8
Education level	Informal	6	1.4
	Primary school	45	10.5
	Secondary school	191	44.4
	Cert/STPM/Foundation	121	28.1
	Tertiary	67	15.6
Job sector	Self-employed	87	20,2
	Government	38	8.8
	Private	104	24.2
	Unemployed	201	46.8

Descriptive tests were used for the analysis. Data are presented as n (%).

4.2.2 Respondents' eating away from home behavior

From the descriptive analysis conducted on respondents' eating away from home behavior, more than half (68.6%) of the respondents bought their food from the restaurants. Most of the reasons they eat away from home was due to their busy lifestyle (52.6%), trying new cuisine (36.3%), reasonable price (20.2%) and a place for them to socialize (18.8%). Almost 35% of the respondents were not aware of the food premise grade when entering the premise. Nonetheless, most of them were aware of their rights as consumers in lodging complaints on insanitary food premise and mishandling

behavior. Table 4.2 summarized the findings on respondents' eating away from home food behavior.

4.2.3 Respondents' level of knowledge, attitude, risk perception and preventive behavior on food poisoning and its prevention

Respondents were evaluated on their food poisoning knowledge, attitude, preventive behavior, and risk perceptions. All scores were transformed into percentage and classified according to previous finding (Talaei et al., 2015; Ruby et al., 2019a). The scores were expressed as median (QR) due to non – normally distribution of the data. From the analysis, 77.2% of consumers were identified as having 'Good knowledge' with median score of 30.00 (26.00- 33.00). In addition, the median score of attitude was 63.00 (57.00 – 67.00) with 85.6% consumers were classified as having 'Good attitude'. Majority of the consumers (92.3%) were identified as practicing food poisoning prevention with median score of 47.00 (43.00 – 51.00). Nonetheless, 36.0% of the consumers exhibit as having 'Negative perception' towards food poisoning prevention. Table 4.3 illustrates the score and classification for the constructs evaluated.

Table 4.2: Respondents' eating away from home behavior (n = 430)

Attributes		n	(%)
1. Places of eating away from home	Restaurant	295	68.6
	Street vendor	41	9.5
	Food court	39	9.1
	Cafeteria	24	5.6
	Food kiosk	19	4.4
	Mobile vendor	8	1.9
	Others	4	0.9
2. Reasons of eating away from home	a) Too busy		
	Yes	226	52.6
	No	204	47.4
	b) Availability of the food premises		
	Yes	39	9.1
	No	391	90.9
	a) Peer recommendation		
	Yes	72	16.7
	No	358	83.3
	b) Trying new cuisine		
	Yes	156	36.3
	No	274	63.7
	c) Reasonable price		
	Yes	87	20.2
	No	343	79.8
	d) A place for socialize		
	Yes	81	18.8
	No	349	81.2
	e) Clean premise grade		
	Yes	45	10.5
	No	385	89.5
	f) Premise social rating		
	Yes	16	3.7
	No	414	96.3
3. Aware of food premise grade?	Yes	280	65.1
	No	50	11.6
	Not sure	100	23.3
4. Aware of the right as consumer to lodge complaint on insanitary food premise and mishandling behavior?	Yes	352	81.9
	No	27	6.3
	Not sure	51	11.8

Descriptive tests were used for the analysis. Data are presented as n (%).

Table 4.3: Food poisoning knowledge, attitude, preventive behavior, risk perceptions and environmental factors scores (n = 430)

Attribute	
(A) Food poisoning knowledge	**Median (QR)[a]**
Score	30.00 (26.00 – 33.00)
Knowledge level	**n (%)[b]**
i. Good	332 (77.2%)
i. Poor	98 (22.8%)
(B) Attitude	**Median (QR)[a]**
Score	63.00 (57.00 – 67.00)
Attitude level	**n (%)[b]**
. Good	368 (85.6%)
. Poor	62 (14.4%)
(C) Preventive behavior	**Median (QR)[a]**
Score	47.00 (43.00 – 51.00)
Behavior level	**n (%)[b]**
. Good	397 (92.3%)
. Poor	33 (7.7%)
(D) Risk perceptions	**Median (QR)[a]**
Score	56.00 (48.00 – 60.00)
Perceptions level	**n (%)[b]**
i. Positive	275 (64.0%)
i. Negative	155 (36.0%)

[a] Scores were exhibit as Median (QR) due to non-normally distributed data
[b] Attributes level were illustrated as n (%)

4.2.4 Preference on food poisoning communication delivery and reliable individual to deliver the information

Respondents rated their food poisoning communication delivery preference and reliable individual to deliver the information on a 5 – point Likert scale. The finding is exhibited in percentage (%) for each scale rated in the form of stacked graph (Figure 4.1). Almost half of the respondents (47.7%) rated mass media as a 'very important' medium of delivery for food poisoning information. This is followed by instructions on food label (43%) and printed media (40%) as the preferred media of information

delivery. Apart from that, forum has been rated as the highest 'important' for food poisoning information delivery platform (46%). The researcher also evaluated respondents' preference on the trusted individual to deliver information on food poisoning. Figure 4.2 exhibits that more than 80% respondents trusted healthcare personnel, scientists, and Ministry of Health to deliver information on food poisoning and its prevention. In addition, more than half of the respondents rated religion authority such as *Jabatan Kemajuan Islam Malaysia* (JAKIM) as 'most likely to trust' individual in disseminating information on food poisoning. On the other hand, politician and celebrity were the least rated for the reliable individual to share information on food poisoning (Figure 4.2).

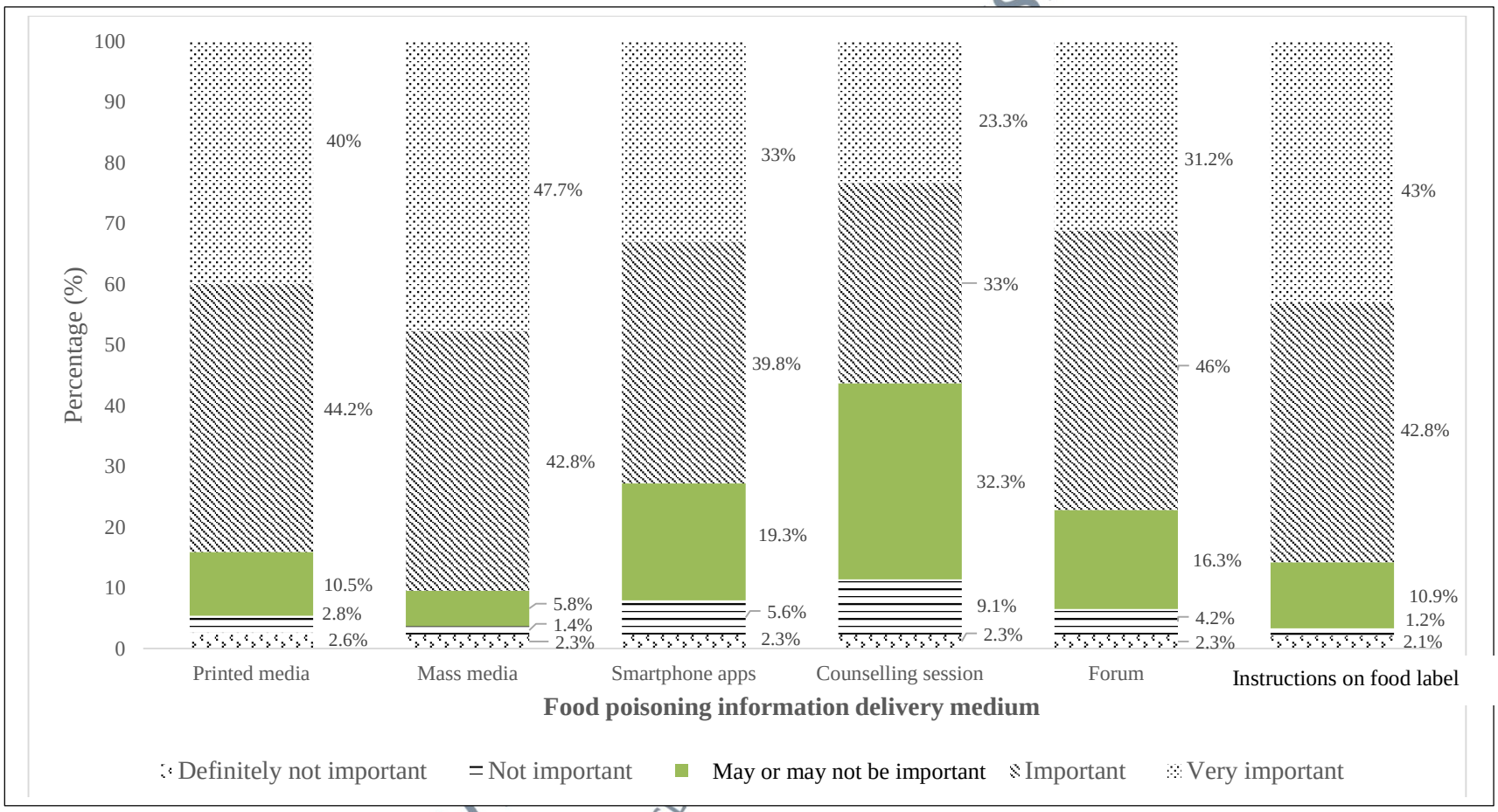

Figure 4.1: Consumers' preference on food poisoning information delivery medium.

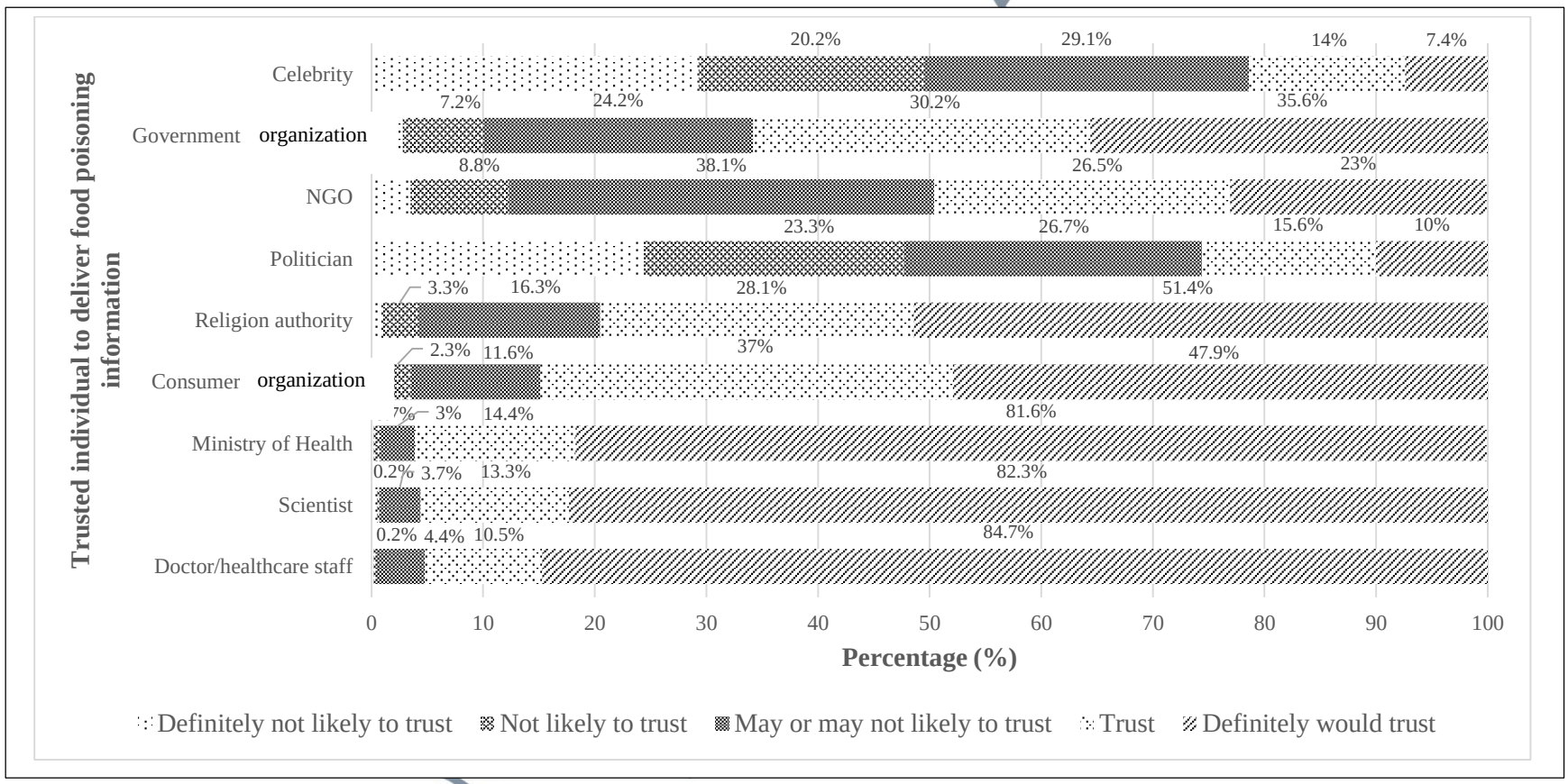

Figure 4.2: Trusted individuals to deliver information on food poisoning.

4.2.5 Relationship of food poisoning knowledge, attitude, risk perceptions and preventive behavior

The structural model relationships were determined using path coefficients that represent the relationships among the constructs. The path coefficients standardized value range between -1 and +1 of which coefficient close to +1 represent strong positive relationship and vice versa for negative values (Hair et al., 2014). In order to identify whether the coefficient was significant, bootstrapping was conducted. The bootstrap standard error allows the calculation of empirical *t* value. Hence, the three path analyses in current study exhibited that knowledge (β= 0.257, p =0.004), attitude (β= 0.381, p < 0.001), and risk perceptions (β= 0.242, p < 0.001) had significant positive relationship with food poisoning preventive behavior. Similarly, food poisoning knowledge had significant positive relationship with consumer's attitude (β= 0.321, p < 0.001).

Model predictive accuracy was identified by the coefficient of determination or R^2 value. The R^2 value ranged from 0 to 1 indicating higher levels of predictive accuracy (Hair et al., 2014). The model exhibited 0.221 indicating that the construct explained 22.1% variances to preventive behavior (Refer to Table 4.4). Hair et al. (2014) and Rasoolimanesh et al. (2016) proposed that R^2 value of 0.20 was considered high in discipline of consumer behavior. On the other hand, attitude towards food safety was 0.053 reflecting 5.3% of the variance explained in consumer's preventive behavior. In addition, blindfolding was employed in order to obtain Stone Geisser's Q^2 value in order to measure model's predictive relevance (Hair et al., 2014). Q^2 value larger than 0 indicated the path model's predictive relevance for the particular construct (Hair et al., 2014; Rasoolimanesh et al., 2016). The Q^2 for preventive behavior was 0.115 indicating a predictive relevance whilst for attitude was 0.028 that reflect a small predictive relevance. Thus, it was suggested that this structural model had a predictive

ability for the latent endogenous constructs (Hair et al., 2014; Ruby et al., 2019b). The structural model of food poisoning preventive behavior is summarized and illustrated in Table 4.4 and Figure 4.3.

Table 4.4: Structural model finding

Construct relationship	β- value	t-value	p -value	R^2	Q^2
Knowledge -> Attitude	0.321	4.023	<0.001[a]	0.053	0.028
Knowledge -> Preventive behavior	0.257	2.892	0.004[a]	0.221	0.115
Attitude -> Preventive behavior	0.381	4.344	<0.001[a]		
Risk perceptions -> Preventive behavior	0.242	3.731	<0.001[a]		

[a] statistically significant at p< 0.05

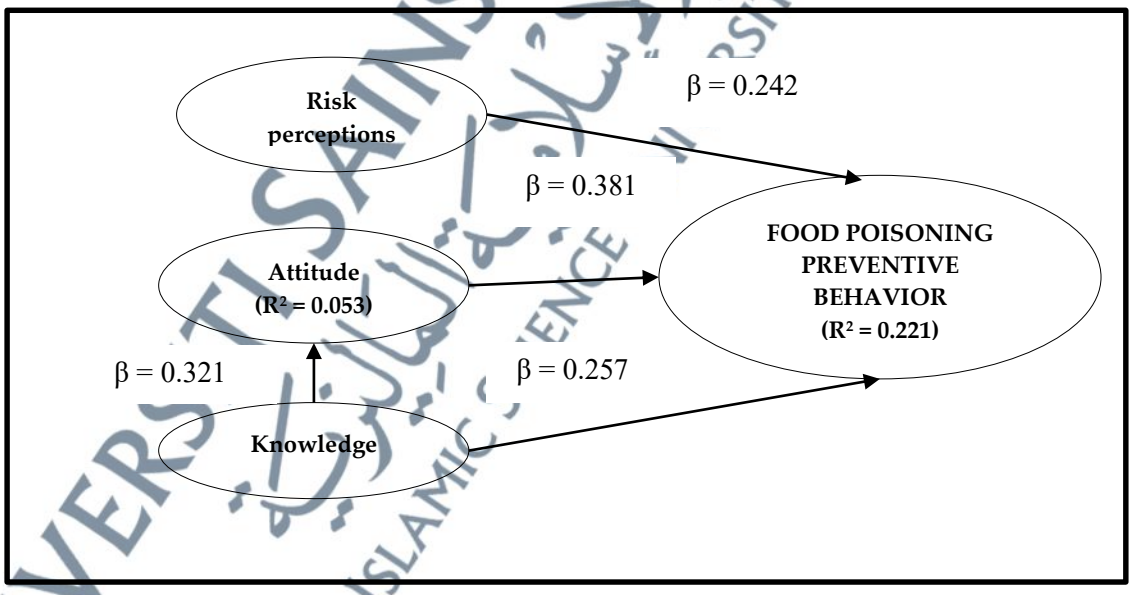

Figure 4.3: Food poisoning preventive behavior structural model.

4.2.6 Experts' concern on the need of food poisoning prevention module for the consumers

The researcher gathered some information on food poisoning prevention challenges, the availability of food poisoning prevention module for consumer and the need of food prevention module for the consumers from four experts in the field of Food Safety and Quality who were involved in food safety education and prevention measurement. Information was collected using an open – ended questionnaire. Table 4.6 summarized the response from the information gathered.

There were few challenges identified in food poisoning prevention. Most experts find that the food handler's attitude and behavior in ensuring the safety of the food prepared are the most challenging in food poisoning prevention. Moreover, those who attended the Food Handler Training course were the food premise owner, very little from kitchen operators attended the course. This could be an issue as the kitchen operators such as the cook and cook assistant might lack in knowledge of good kitchen practices.

In the light of food poisoning prevention module for the consumers, all experts agreed that there were no obstacles faced during delivering food poisoning prevention education. In addition, according to the experts, there were guidelines module developed on the food safety for consumers such as *Programme Keselamatan Makanan Dapur Asrama* (ProKEM), Guidelines for the Preparation of Clean and Safe Food in Canteen and Dormitory Kitchens, Food Hygiene and Safety Guide for Ceremonies and KENDIRI Module. Nevertheless, the content developed lacked on attitude –oriented element. Hence, some module improvements were suggested such as to include 'Letter of indemnity' for the consumers to practice food safety behavior and emphasize on

personal hygiene and food sanitary. In summary, all experts rated ‘10’ for the importance to have food poisoning prevention targeted to adult consumers (Table 4.5).

Table 4.5: Experts' concern on the need of food prevention module for the consumers

EXPERT	**QUESTION 1:** What is/are the challenge(s) in food poisoning prevention?	**QUESTION 2:** What is/are the obstacle(s) among the healthcare educators in delivering food poisoning prevention education? What are the contents that need to be improved/added in the module?	**QUESTION 3:** Is there any food poisoning prevention module targeted to adult consumers that was developed by the Malaysia Ministry of Health?	**QUESTION 4:** **Rate** the importance of food poisoning prevention module targeted for the adult consumers (scale 1 -10)
Expert 1 (Food Safety and Quality (FSQ) Division, Putrajaya)	Food handlers and food operators' practices and attitudes of who care less about food safety despite having attended Food Handler Training. Most operators understand about food safety but do not adhere to what has been learnt.	There are no obstacles in delivering food safety education. This is because the FSQ collaborates with schools and institutions in the delivery of food safety education.	FSQ has prepared a Food Safety Module (ProKEM) which covers the content of premises, operators, hygiene and maintenance, selection of raw materials, process control, pest control. It is recommended to provide an online module and in a form that is easy for users to understand.	10
Expert 2 (State Department of Health, Kedah)	The practices and attitudes of some food handlers who still do not practice good food handling practices even though food safety education has been provided. Although food handlers have attended Food Handler Training, it is not enough for food handlers who handle food in canteens, school dormitory kitchens and caterers.	Time and staff constraints to conduct a comprehensive training to each food handler. Most of the Food Handler Training or food safety courses are not delivered to important individuals such as cooks and assistant cooks (most of the time, only the representatives attended. They do not convey information to cooks and kitchen employees).	FSQ has issued several guidebooks such as Guidelines for the Preparation of Clean and Safe Food in Canteen and Dormitory Kitchens, Food Hygiene & Safety Guide for Ceremonies, KENDIRI Module and ProKEM as a reference during food safety education.	10

Table 4.5: (continued)

EXPERT	**QUESTION 1: What** is/are the challenge(s) in food poisoning prevention?	**QUESTION 2:** What is/are the obstacle(s) among the healthcare educators in delivering food poisoning prevention education? What are the contents that need to be improved/added in the module?	**QUESTION 3:** Is there any food poisoning prevention module targeted to adult consumers that developed by the Malaysia Ministry of Health?	**QUESTION 4: Rate** the importance of food poisoning prevention module targeted for the adult consumers (scale 1 -10)
Expert 3 (State Department of Health, Penang)	The food handlers' behavior that do not care about personal hygiene and handling food insanitary. Most of the customers rather choose taste over clean/ safe and healthy food.	There are no obstacles while delivering food poisoning education.	In my opinion, the existing modules or pamphlets consist complete information on food safety. Nevertheless, action should be better than words. Full legal enforcement should be implemented against food handlers who do not practice personal and food hygiene. The value of personal hygiene should be nurtured from the early age.	10
Expert 4 (State Department of Health, Negeri Sembilan)	Most food handlers find it difficult to ensure that clean and safe food handling practices. They understand what needs to be done but still refuse to maintain due to constraints such as time, attitude, lack of employees and others.	Consumers understand what is being delivered during the food safety course, but the effectiveness over a long period of time cannot be determined as most courses are one- off sessions.	There is a module for consumer. Some improvements to be made for existing module: a) To include letter of indemnity of 'Choosing clean and safe food 'to prevent food poisoning. b) To include the root cause of food poisoning based on the HACCP concept.	10

It is clearly observed from the Phase 1 finding that although more than half consumers' reported to have good knowledge and attitude, there are still a small percentage of 7.8% - 22.8% that had poor attitude and knowledge towards food poisoning prevention respectively. In addition, 36.0% of consumers were observed to have low perception on food poisoning prevention, indicated that they may perceived themselves to be less susceptible to get food poisoning and more barriers to adopt food poisoning prevention. The finding was supported by the structural model anlysis conducted of which knowledge, attitude, and risk perceptions were the significant predictors that associated with food preventive behavior. Hence, these underpinned the need to include the elements of knowledge, attitude and risk perceptions in the module content in Phase 2. In addition to the survey finding in Phase 1, experts expressed the need of having a module that went through empirical research in order to determine its effectiveness and efficacy. As such, the developed module is subsequently implemented and measured its usability in Phase 3.

4.3 Finding from Phase 2: Design and Development

4.3.1 Module validation score

The validation score of 'See, Select, Tell' module was calculated based on the percentage obtained from total experts' scores obtained from the sum of each module component from the Likert scale evaluation over the maximum score. The module components assessed include: (i) module objective; (ii) the content in each module scope; (iii) delivery strategy; (iv) resources; (v) topic evaluation; (vi) arrangement; and (vii) time allocation for each activity. The module was considered high validity if the percentage

obtained more than 70%. This percentage was later transformed into validity correlation coefficient. Table 4.6 exhibits the validity correlation coefficient and the validity attainment. All experts rated the module scope objectives as suitable with validity coefficient 0.9071. Similarly, the content embed in four module scopes are suitable (validity coefficient >0.70). The experts also agreed that delivery strategies, resources for each activity and topic evaluation are appropriate. Likewise, the module scope arrangement as well as time allocated for every activity were considered as acceptable by the experts (validity coefficient > 0.7).

Table 4.6: Module validation attainment for each component evaluated

No	Validation component	Validity percentage (%)	Validity coefficient	Validity attainment
1	The suitability of learning objectives for every module scope	90.71	0.9071	Attained
2	The suitability of the content in each module scope			
	i. Introduction to food poisoning	90.48	0.9048	Attained
	ii. Choosing a- safe to eat food	90.48	0.9048	Attained
	iii. Lodging food mishandling and insanitary food premise complaint	89.52	0.8952	Attained
	iv. Getting prompt treatment for food poisoning	79.52	0.7952	Attained
3	Delivery methods	90.61	0.9061	Attained
4	Learning resources	89.29	0.8929	Attained
5	Content evaluation	87.62	0.8762	Attained
6	Module scope arrangement	87.35	0.8735	Attained
7	Time allocation for each activity	90.65	0.9065	Attained

4.4 Finding from Phase 3: Implementation and Evaluation

4.4.1 Effectiveness of 'See, Select, Tell' module

Quantitative analysis was employed in order to determine the effectiveness of 'See, Select, Tell' module on the knowledge, attitude and risk perceptions towards food poisoning and its prevention. The data were analyzed using two methods. The first method was analysis between control and intervention groups, followed by pre and post analysis within the group. Data from control group and intervention group were separated and independent T-test was employed to identify any significant difference between two sets of data from two different groups (control and treatment group). On the other hand, paired T-test was used to determine the significant difference between two sets from the same group. Paired T-test analyzed whether there was any significant difference between pre and post intervention for both control and intervention group. In this case, the researcher compared the mean difference of knowledge, attitude, and risk perceptions towards food poisoning between respondents in control and intervention group. Chua (2012) elaborated that when everyone in the sample is measured two times and both measurement data are normally distributed, paired T-test can be used. This indicates those in the control and intervention has three different scores that involved independent variables (pre and post).

The assumptions for independent T-test were checked to ensure the validity of analysis and interpretation. Levene's test was conducted beforehand in order to evaluate the variance homogeneity for the calculated variables for two or more groups (Levene, 1960). Normality assumptions were met since the minimum sample size requirement for both control and intervention were 30 (Chua, 2012). Next, the homogeneity variances of

all dependent variables in the independent T-test were determined using Levene's Test for Equality of Variance. If the variance for both groups are equal, (p>0.5), output in the 'Equal Variance Assumed' is referred as it represents conventional method to evaluate the t value based on the degree freedom (df). On the other hand, output in the 'Equal Variance is not assumed' is referred if the variances of both groups are inequal as a t statistical evaluation.

4.4.1 a Food poisoning and prevention knowledge

The pre – test food poisoning and prevention mean scores for intervention and control groups were 21.20 (2.61) and 20.93 (3.09) respectively. Boxplot analysis in Figure 4.3 exhibits that the pre-test food poisoning knowledge scores were in the similar range score. Although the scores distribution were quite similar for both intervention and control group, the knowledge scores distribution were larger in the intervention group than control group with one outlier below the minimum scores, indicates that the sample score is outside the lowest range (Figure 4.4). Nonetheless, the independent T-test analysis suggested that the mean scores for both intervention and control group do not significantly differ from each other (df = 58, t = -0.361, p= 0.719) (Table 4.7).

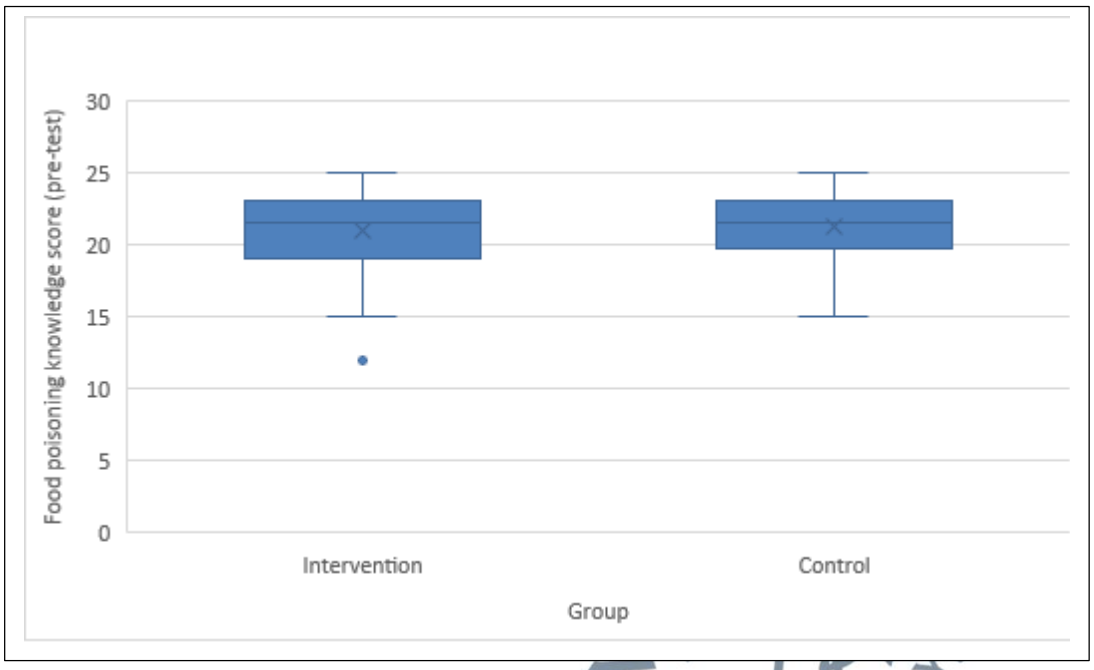

Figure 4.4: Boxplot comparison between intervention and control group for pre-test food poisoning knowledge scores.

Table 4.7: Mean scores for food poisoning knowledge between control and intervention group before intervention (pre-test) (n = 60)

Variables	Control mean (SD)	Intervention mean (SD)	df	t	*p*-value
Food poisoning knowledge	21.20 (2.61)	20.93 (3.09)	58.0	-0.361	0.719

Independent T-test was used (2-tailed)

On the other hand, the post – test mean scores for intervention and control groups were 36.53 (2.29) and 30.17 (3.87) respectively. The distributions of the scores for both groups were reflected in boxplot in Figure 4.5. It clearly illustrates that the mean food poisoning knowledge score in intervention group was higher than control group with smaller scores distribution range. This can be confirmed from the independent T-test analysis conducted whereby the post-test food poisoning knowledge scores were

significantly different between intervention and control group (df =58, t = 7.76, p <0.001) (Table 4.8).

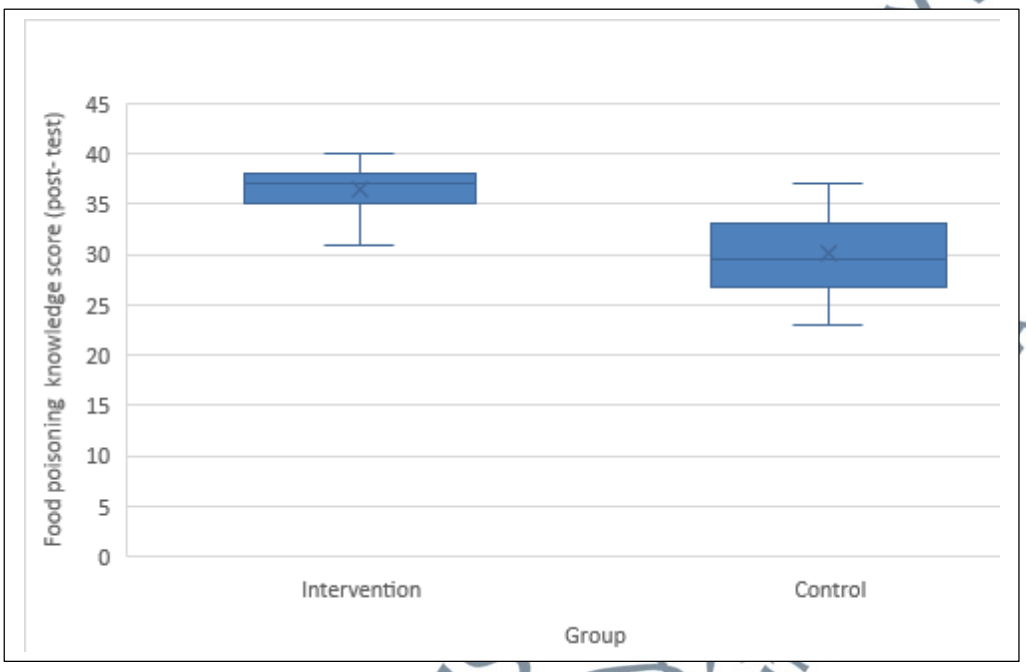

Figure 4.5: Boxplot comparison between intervention and control group for post-test food poisoning knowledge scores.

Table 4.8: Mean scores for food poisoning knowledge between control and treatment group after intervention (post-test) (n = 60)

Variables	Control mean (SD)	Intervention mean (SD)	df	t	*p*-value
Knowledge	30.17 (3.87)	36.53 (2.29)	58.0	7.76	<0.001*

Independent T-test was used.
*significant at p< 0.05 *(2-tailed)

Mean comparison analysis for both intervention and control group after 4 weeks of intervention are exhibited in Table 4.9. There were significant differences in knowledge

score between pre and post intervention in both groups. The knowledge mean scores of among the control group members were significantly increased from 21.20 (2.61) to 30.17 (3.87) after 4 weeks of intervention (t (29) = 9.95, p= <0.001, d = 1.82). A similar trend was observed in the intervention group of which the score increased from 20.93(3.09) to 36.53(2.29) (t (29) = 20.76, p= <0.001, d = 3.79). The effect size of knowledge in intervention group was found to exceed Cohen's convention for a large size effect (d = 3.79) in comparison to the control group that did not implement the module. (Cohen, 1988). The finding suggests that 'See, Select, Tell' module is capable of enhancing respondents' knowledge on food poisoning and its prevention.

A pre and post mean comparison of each knowledge construct was conducted to namely: etiologic agents; high risk foods; food poisoning sign and symptoms; food poisoning complications; spoilt food detection; and preventive measures. Table 4.10 exhibits that there was a significant increase of knowledge scores for all the six constructs assessed after 4 weeks of intervention for both control and module intervention groups (p<0.05). However, large differences were observed among the module intervention group for high-risk foods, signs and symptoms and preventive measure (t (29) = 17.503, p<0.001; t (29) = 9.54, p<0.001; and t (29) = 7.49, p<0.001 respectively).

Table 4.9: Comparison of pre and post food poisoning knowledge mean scores for control and intervention groups (n = 60)

Variables	Group	Pre score mean (SD)	Post score mean (SD)	df	t	*p*-value	Effect size (d)
Food poisoning knowledge	Control	21.20 (2.61)	30.17 (3.87)	29	9.95	<0.001*	1.82
	Intervention	20.93 (3.09)	36.53 (2.29)	29	20.76	<0.001*	3.79

Paired t-test was used.
* significant at $p<0.05$ (2-tailed)

Table 4.10: Comparison of pre and post food poisoning knowledge constructs mean scores for control and intervention groups (n = 60)

Knowledge constructs	Group	Pre score mean (SD)	Post score mean (SD)	df	t	*p*-value
Etiologic agent	Control	1.83 (1.29)	2.83 (1.05)	29	3.04	0.005*
	Intervention	1.93 (1.26)	3.43 (0.67)	29	5.74	<0.001*
High - risk food	Control	3.87 (1.94)	6.53 (2.03)	29	5.79	<0.001*
	Intervention	3.10 (1.54)	9.52 (0.87)	29	17.50	<0.001*
Sign and symptoms	Control	4.57 (1.17)	6.40 (1.16)	29	5.70	<0.001*
	Intervention	4.87 (1.43)	7.87 (1.25)	29	9.54	<0.001*
Food poisoning complications	Control	1.47 (1.36)	2.40 (1.33)	29	2.49	0.019*
	Intervention	1.77 (1.10)	3.00 (0.95)	29	4.14	<0.001*
Spoilt food detection	Control	2.63 (0.81)	2.90 (0.40)	29	1.55	0.133
	Intervention	2.23 (1.14)	3.00 (0.00)	29	3.70	0.001*
Preventive measures	Control	6.83 (2.01)	9.10 (1.03)	29	5.54	<0.001*
	Intervention	7.03 (1.89)	9.77 (0.57)	29	7.49	<0.001*

Paired t-test was used.
* significant at $p<0.05$ (2-tailed)

4.4.1 b Food poisoning prevention attitude

The food poisoning prevention attitude pre-test mean scores for both intervention and control group were 57.47 (9.28) and 55.57 (13.07) respectively. The boxplot analysis indicates the scores in intervention group were distributed in a smaller range as to compare to the control group with two outliers were detected below Q1. Similarly, one outlier was found in the control group below the minimum scores (Figure 4.6). However, both groups have similar food poisoning prevention attitude mean scores and these scores were not significantly different to each other based on independent T-test analysis (df = 58, t = 0.649, *p*= 0.519) (Table 4.11).

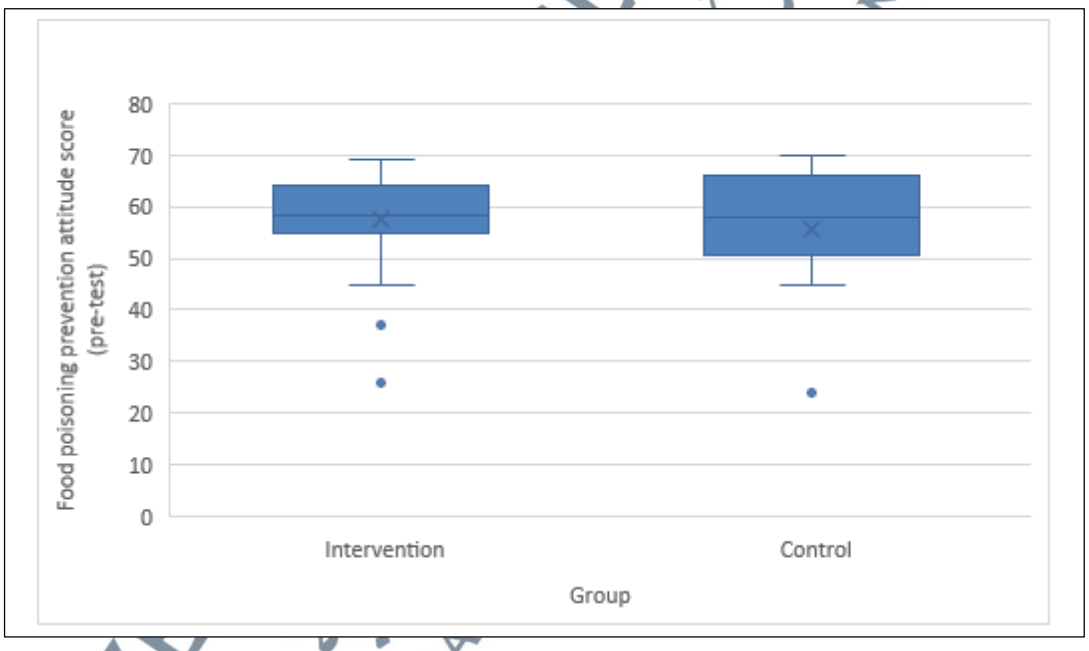

Figure 4.6: Boxplot comparison between intervention and control group for pre-test food poisoning prevention attitude scores.

Table 4.11: Mean scores for food poisoning prevention attitude between control and treatment group before intervention (pre-test) (n = 60)

Variables	Control mean (SD)	Intervention mean (SD)	df	t	*p*-value
Food poisoning prevention attitude	55.57(13.07)	57.47 (9.28)	58.0	0.649	0.519

Independent T-test was used (2-tailed)

In contrast to food poisoning prevention attitude after 4 weeks intervention, the attitude post-scores were 61.97 (10.0) and 55.27 (11.08) for intervention and control group respectively. The distribution scores in the intervention group were slightly larger than the control group with the maximum score close to Q3. In addition, the scores were dispersed widely with three outliers below the lowest scores range in the intervention group in comparison to the control group (Figure 4.7). The mean score was slightly higher in the intervention group than the control group. Nonetheless, the score difference was not significant (df = 58, t = 1.272, p =0.208) (Table 4.12).

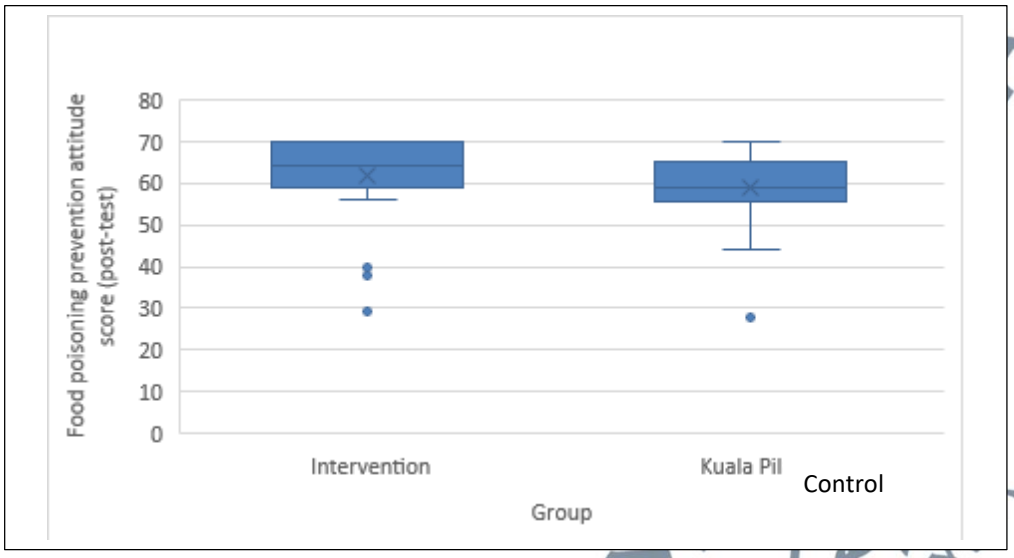

Figure 4.7: Boxplot comparison between intervention and control group for post-test food poisoning prevention attitude scores.

Table 4.12: Mean scores for food poisoning prevention attitude between control and treatment group after intervention (post-test) (n=60)

Variables	Control mean (SD)	Intervention mean (SD)	df	t	*p*-value
Food poisoning prevention attitude	58.9 (8.62)	61.97(10.0)	58.0	1.272	0.208

Independent T-test was used (2-tailed)

Mean comparison analysis was conducted to determine any significant difference in attitude mean score before and after 4 weeks intervention for both intervention and control group. There were significant differences in attitude scores between pre and post intervention in the module intervention group. The attitude mean scores of among the

intervention group members were significantly increased from 57.47 (9.28) to 61.97 (10.0) after 4 weeks of intervention (t (29) = 2.475, p= <0.001, d = 0.45). Nevertheless, the mean attitude scores for control group did not significantly different within the period of pre-and post-intervention (t (29) = 1.139, *p* = <0.264, d = 0.21) (Table 4.13). The effect size of attitude in intervention group was found small (d = 0.45), but slightly larger than the control group who did not implement the module (d = 0.2). The difference of effect size suggests that the implementation of the module may have effect on respondents' attitude towards food poisoning prevention in comparison to the control group (Cohen, 1988).

Table 4.13: Comparison of pre and post food poisoning prevention attitude mean scores for control and intervention groups (n=60)

Variables	Group	Pre score mean (SD)	Post score mean (SD)	df	t	*p*-value	Effect size (d)
Food poisoning prevention attitude	Control	55.57 (13.07)	58.90 (8.62)	29	1.139	0.264	0.21
	Intervention	57.47 (9.28)	61.97 (10.0)	29	2.475	0.019*	0.45

Paired t-test was used.
* significant at *p*<0.05 (2-tailed)

4.4.1 c Food poisoning prevention risk perceptions

The food poisoning prevention risk perceptions pre-test mean scores for both intervention and control group were 56.73 (7.27) and 56.67 (8.37) respectively. The boxplot analysis exhibits risk perception score distributions in both groups were very much similar (Figure 4.8). However, one outlier was found below the lowest scores in the intervention group (Figure 4.8). Independent T-test analysis indicates that the risk

perception mean scores in both groups were not statistically different (df = 58, t = 0.033, *p*= 0.974) (Table 4.14).

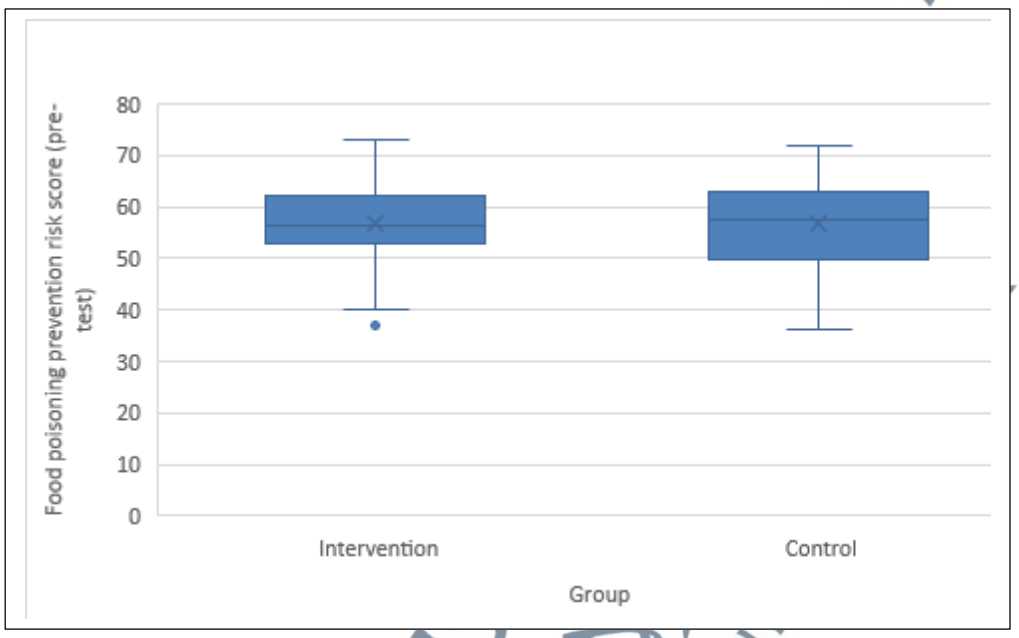

Figure 4.8: Boxplot comparison between intervention and control group for pre-test food poisoning prevention risk perceptions scores.

Table 4.14: Mean scores for food poisoning prevention risk perceptions between control and treatment group before intervention (pre-test) (n=60)

Variables	Control mean (SD)	Intervention mean (SD)	df	t	*p*-value
Food poisoning prevention risk perceptions	56.73(7.27)	56.67 (8.37)	58.0	0.033	0.974

Independent T-test was used (2-tailed)

The food poisoning prevention risk perceptions scores after 4 weeks intervention was 57.15 (6.65) and 55.27 (11.08) for intervention and control group respectively. The scores dispersion in control group was larger than intervention group with two outliers detected below the lowest range scores (Figure 4.9). The mean score was slightly higher in the intervention group than the control group. However, independent T-test indicates the score difference was not significant (df = 58, t = 0.805, *p* =0.424) (Table 4.15).

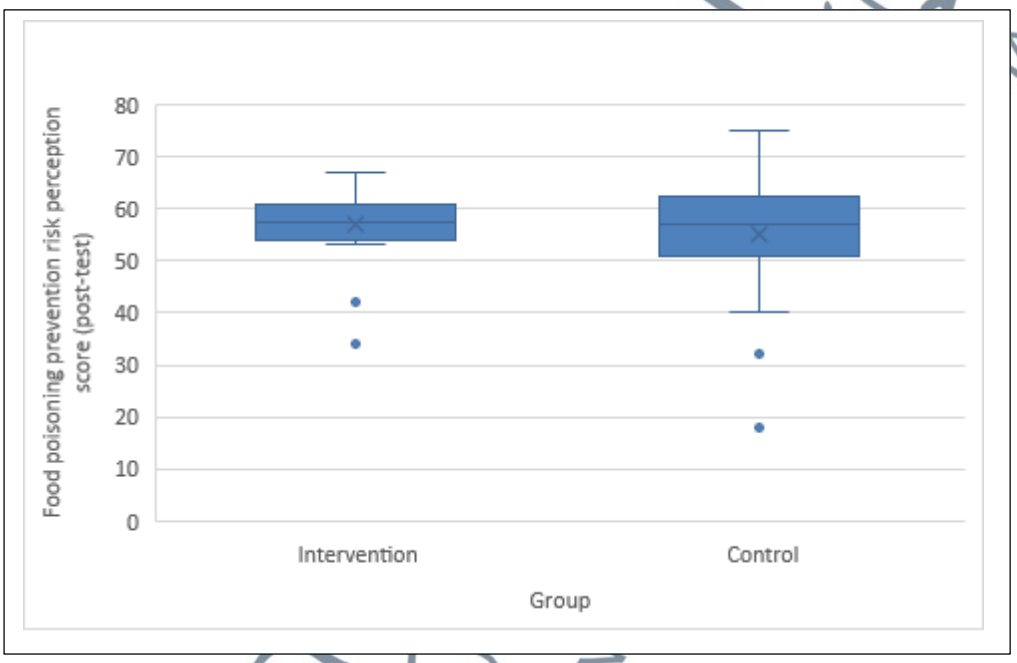

Figure 4.9: Boxplot comparison between intervention and control group for post-test food poisoning prevention risk perceptions scores.

Table 4.15: Mean scores for food poisoning prevention risk perceptions between control and treatment group after intervention (post-test) (n=60)

Variables	Control mean (SD)	Intervention mean (SD)	df	t	*p*-value
Food poisoning prevention risk perceptions	56.15 (6.65)	55.27 (11.08)	58.0	0.805	0.424

Independent T-test was used (2-tailed)

Paired T-test analysis was employed to compare risk perceptions mean score before and after 4 weeks intervention for both intervention and control. There were no significant differences in risk perceptions scores within pre and post intervention in both intervention and control group (t (29) = 0.471, p = 0.641, d = 0.09 and t (29) = 0.273, p = 0.787, d = 0.05 respectively) (Table 4.16). The effect size of risk perception in both intervention and control group were very small and negligible. However, Lakens (2013) proposed that a negligible effect size should not be interpreted rigidly, and the finding should be related to other effects in previous literature.

Table 4.16: Comparison of pre and post food poisoning prevention risk perceptions mean scores for control and intervention groups (n=60)

Variables	Group	Pre score mean (SD)	Post score mean (SD)	df	t	*p*-value	Effect size (d)
Food poisoning prevention risk perceptions	Control	56.67 (8.37)	55.27 (11.08)	29	0.471	0.641	0.09
	Intervention	56.73 (7.27)	57.17 (6.65)	29	0.273	0.787	0.05

Paired t-test was used.

4.4.2 Feedback on 'See, Select, Tell' module from the users

Descriptive analysis of frequency and percentage were employed to exhibit the users' feedback on 'See, Select, Tell module. The users were the respondents who received module intervention and the facilitators who delivered the module content. A stacked bar chart was used to illustrate the percentage of respondents' agreement that the module activities have achieved its specific objectives. The researcher also recorded respondents' opinion on the module content improvement using an open-ended question. On the other hand, facilitators' feedback on the efficiency of the module that includes (i) module learning outcome; (ii) module delivery strategies; and (iii) learning aids and materials; and (iv) evaluation strategy for every activity. Findings for this section were discussed based on the feedback from the respondent and facilitators as in the subsequent subsections.

4.4.2a Respondents' feedback on the module effectiveness: activities' objectives achievement

The findings were exhibited according to module scope. There were four module scopes: (i) Introduction to food poisoning; (ii) Choosing a safe – to – consume food; (iii) Food poisoning and mishandling complaint channel and (iv) Getting a prompt food poisoning treatment. Figure 4.10 illustrates the response from the respondents on module scope 1. More than 50% of the respondents strongly agreed that they are able to: (i) Define food poisoning (ii) List all food poisoning signs and symptoms; (iii) Identify food poisoning source of contamination; and (iv) Explain the effects of food poisoning to the country. Similarly, more than 60% agreed that '*Rantaian beracun'* activity enabled them

to define correctly on food cross-contamination and explain the occurrence of food cross – contamination.

In addition, more than half of the respondents also strongly agreed that activities in Module Scope 2: Getting a – safe – to – consume food have enabled them to identify high – risk food to contamination, determine clean food premises and good food handler's personal hygiene and to detect spoilt food using senses (Figure 4.11).

The incorporation of food poisoning and mishandling complaint channel in the module enabled respondents to be able to describe functions of '*Unit Keselamatan dan Kebersihan Makanan*' (UKKM) in handling food mishandling complaints and demonstrate the right steps in submitting food mishandling complaint using the available medium such as '*Sistem Pengurusan Aduan Awam*' (SISPAA) and Municipal Council complaint website (Figure 4.12).

Finally, most respondents strongly agreed /agreed that the activities in Module Scope 4: Getting prompt treatment for food poisoning have enabled them to identify high-risk individuals to food poisoning, food poisoning complications and to describe food poisoning medical treatment. The role – play activity on the other hand enabled respondents to understand the roles of family members and healthcare personnel in assisting food poisoning to get early treatment (Figure 4.13).

The researcher also gathered some information on respondents' opinion on the module content and improvement suggestions. Most of the respondents suggested that the module content to be conducted face – to – face in the future with various techniques of delivery such as group discussion and hands – on demonstration. In addition, some suggest a food premise visit in '*Detektif Along*' activity, for them to understand the criteria of clean

food premise. This was seen in the response '*Untuk aktiviti ini, boleh lakukan lawatan ke premis makan yang bersih serta tidak bersih'* .

In summary, all respondents were satisfied with the module activities conducted although it was conducted online. They felt that this programme benefited the community in everyday life since it involves choosing clean food and sanitary food premise as stated in the following response:

'Programme ini sangat bermanfaat untuk semua lapisan masyarakat kerana ilmu keracunan makanan ini penting dalam kehidupan seharian kita. Bukan sahaja ketika memilih atau membeli makanan di luar malah boleh dipraktikkan di rumah kerana bagi saya, banyak yang saya perlu perbetulkan dalam penyediaan makanan di rumah. Terima kasih di atas ilmu yang dikongsikan dalam programme ini. Semoga ia bermanfaat untuk kita semua' (Respondent 1 in intervention group).

This programme was believed to change the consumer's and food handler's awareness of the importance of decreasing the risk of getting food poisoning and to ensure the cleanliness of food premises and personal hygiene:

'Program ini bagus dalam memberi kesedaran kepada pengendali makanan, penjual dan pembeli tentang kepentingan mengelakkan keracunan makanan, mengurangkan risiko dan menjaga kebersihan diri, makanan dan premis' (Respondent 2 in intervention group).

In addition, this programme had changed the thought and perception of the respondents to be alert on the clean food premise environment to ensure the food safety and the knowledge they obtained from this programme can be disseminated to others as well:

'Program ini telah mengubah pandangan dan pemikiran saya agar lebih peka kepada persekitaran yang bersih penting dalam menjamin makanan yang disediakan bersih juga saya juga dapat menyebarkan kebaikan pengetahuan saya tentang bahaya keracunan makanan kepada orang sekeliling saya' (Respondent 3 in intervention group).

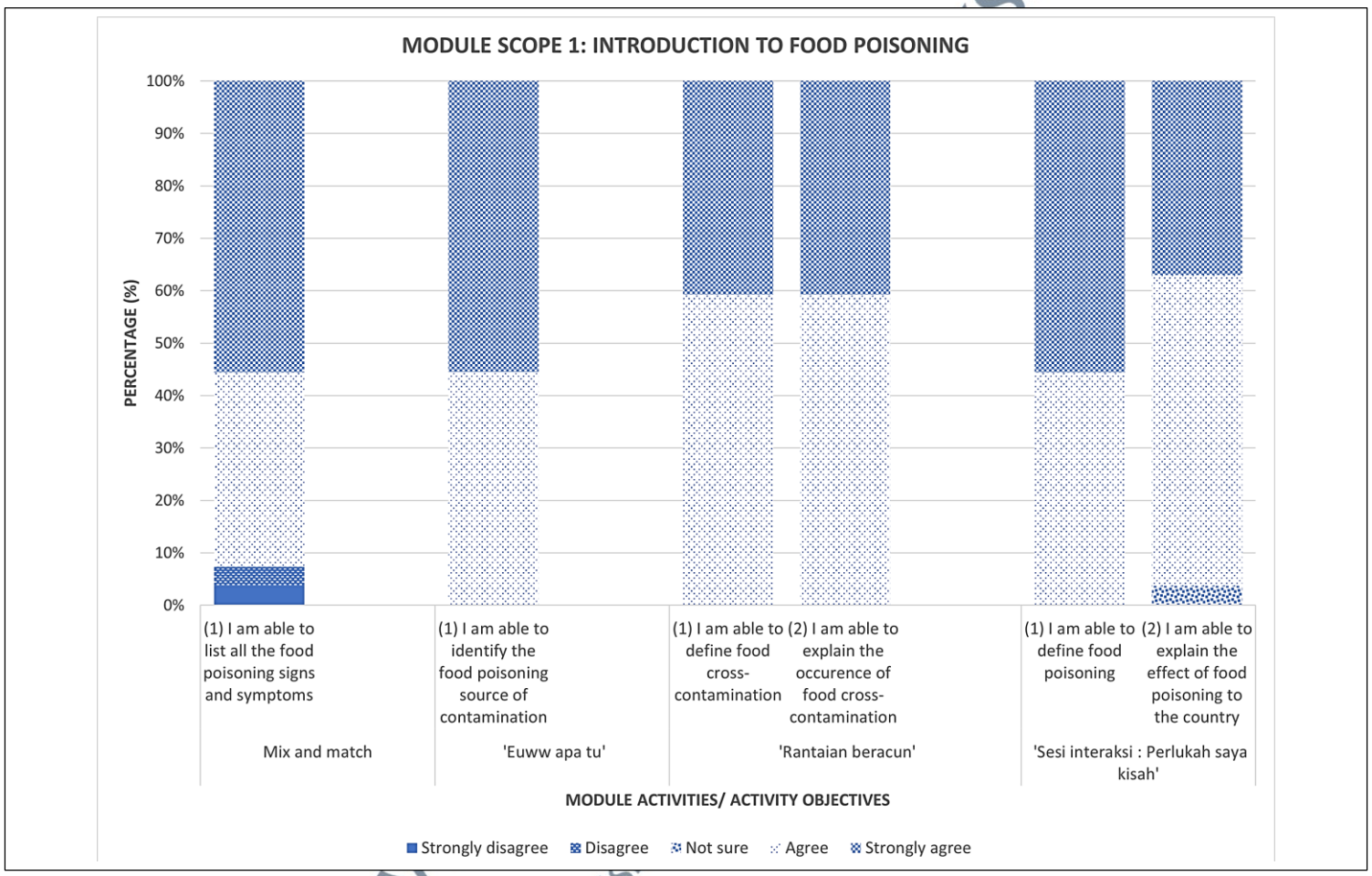

Figure 4.10: Respondents' feedback on Module scope 1: Introduction to food poisoning.

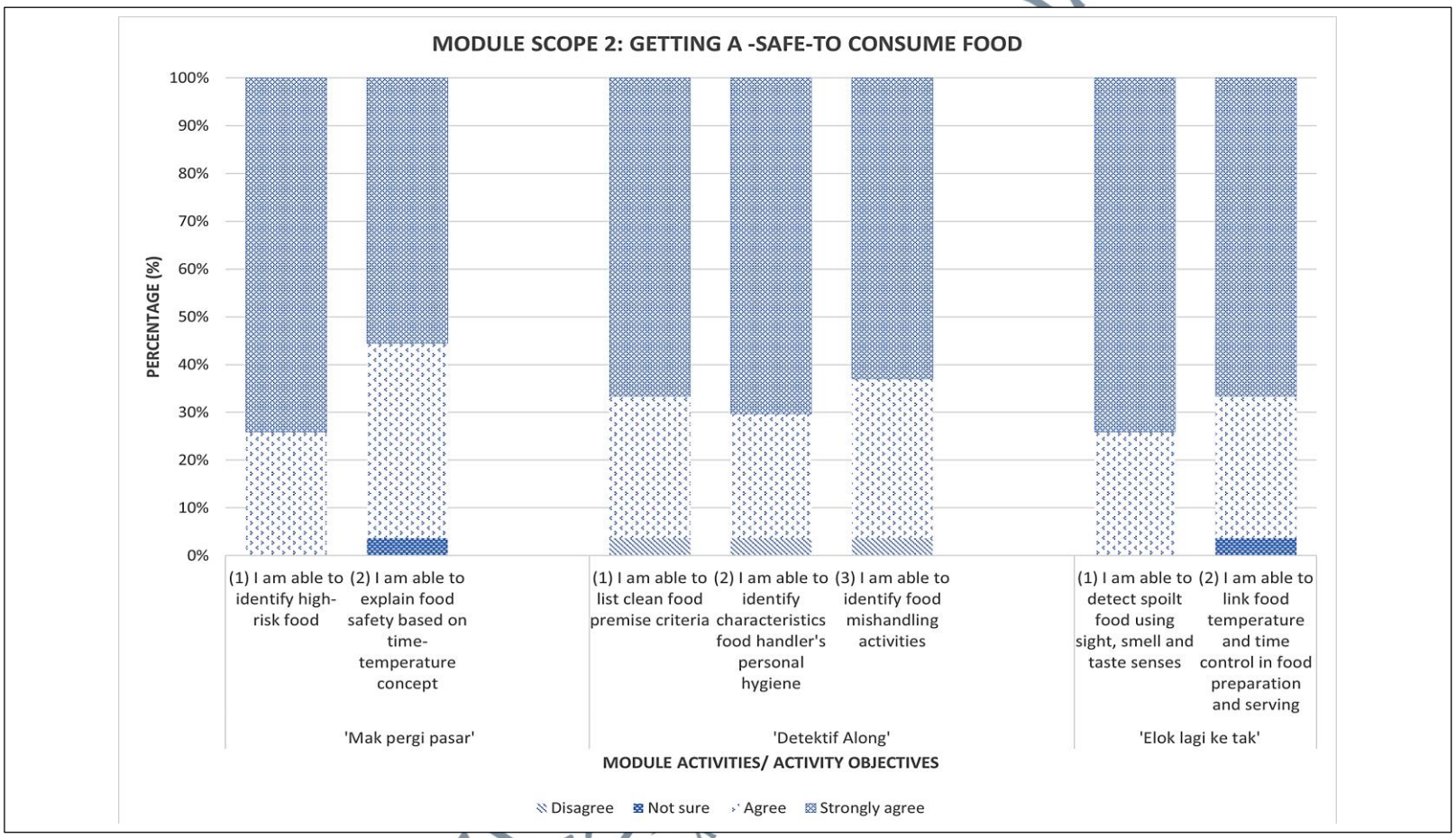

Figure 4.11: Respondents' feedback on Module scope 2: Getting a – safe –to – consume food.

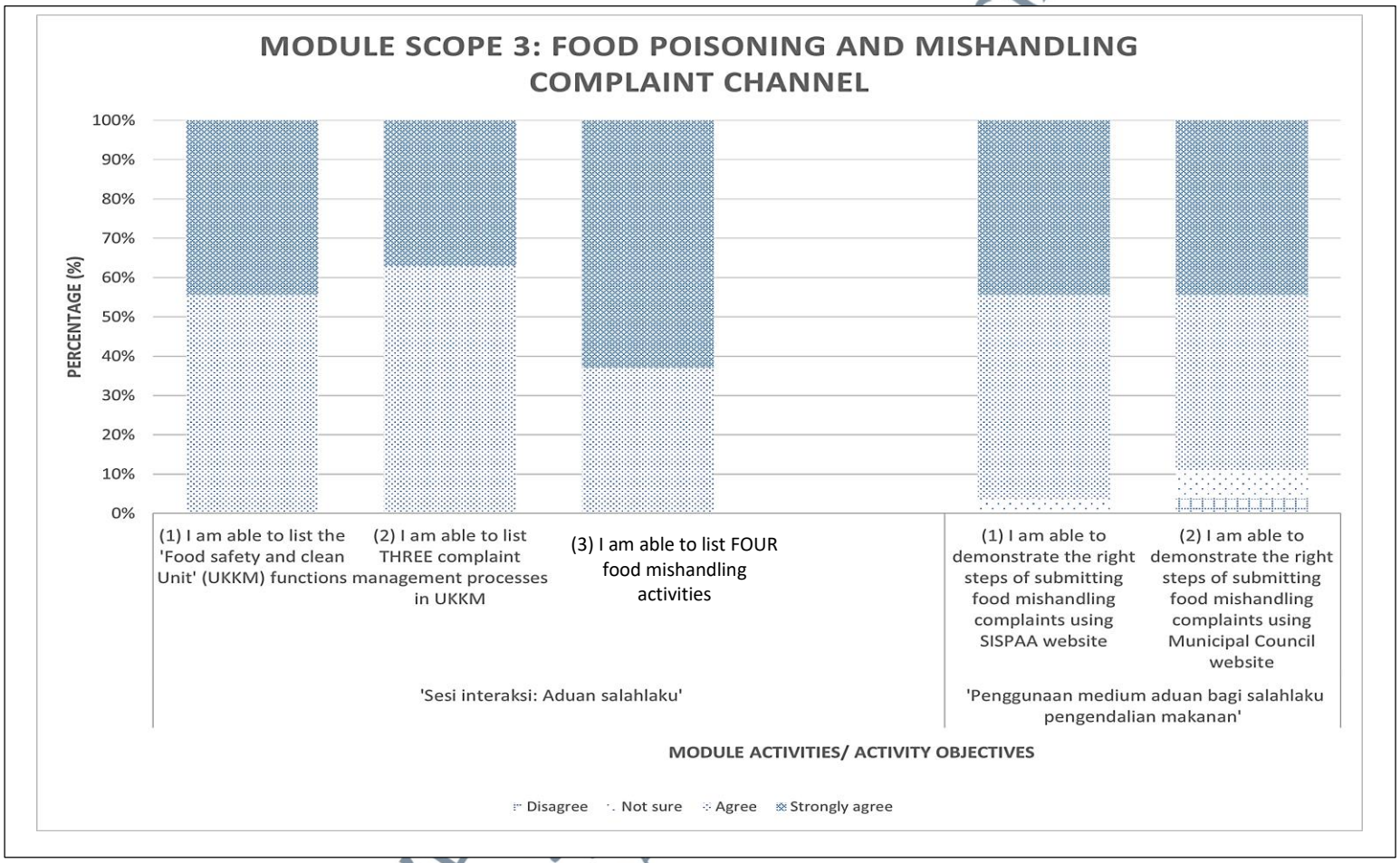

Figure 4.12: Respondents' feedback on Module scope 3: Food poisoning and mishandling complaint channel.

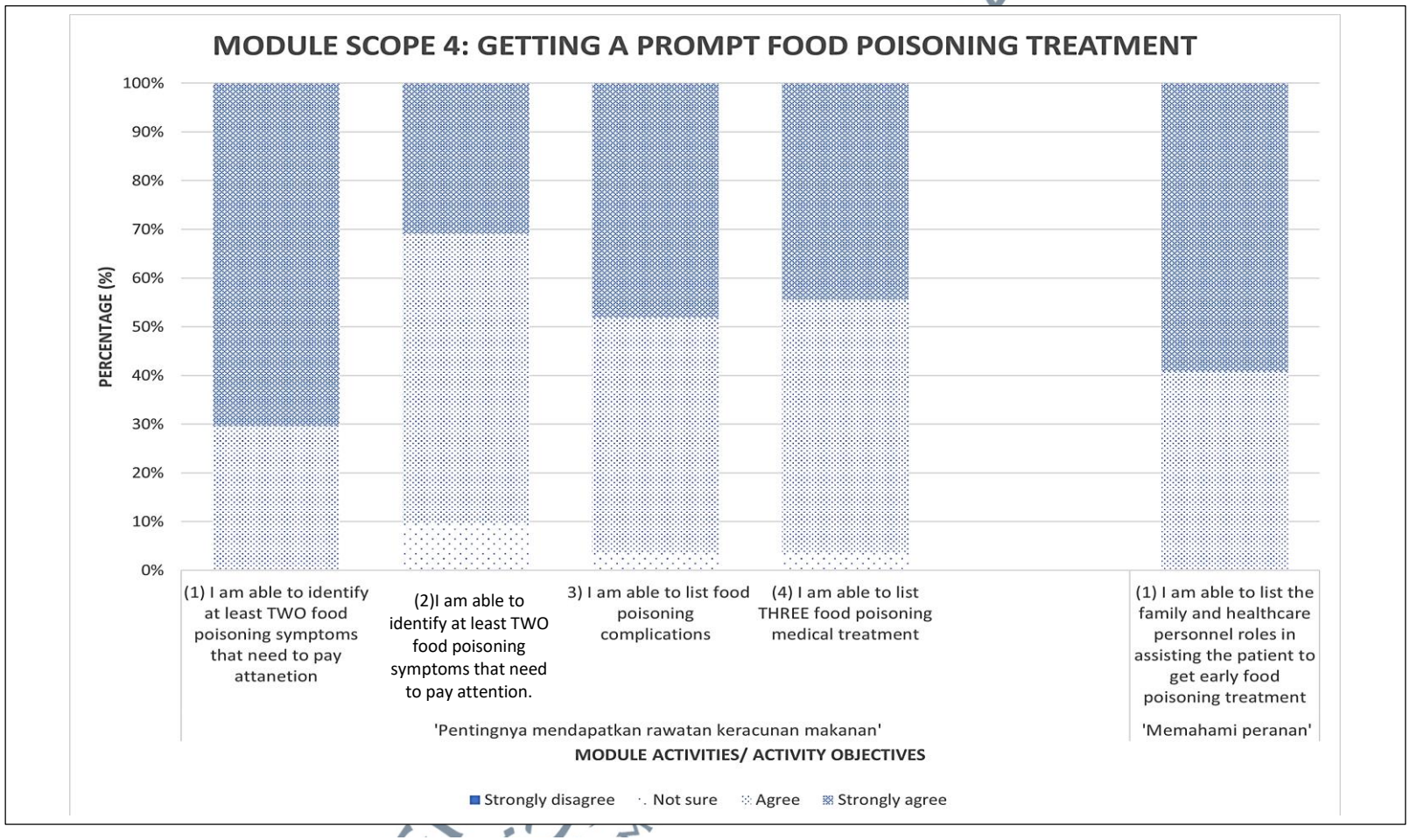

Figure 4.13: Respondents' feedback on Module scope 4: Getting a prompt poisoning treatment.

4.4.2b Facilitators' feedback on the module learning outcome, module delivery strategies, learning aids and materials, and evaluation

4.4.2b (i) Feedback on module learning outcome

The facilitators' feedback on module learning outcome attainment was recorded on Agree – Disagree scale. The percentage of agreement is exhibited in Figure 4.13. The majority of the facilitators agreed that the module activities have attained its learning outcome (Figure 4.14). In '*Rantaian beracun*' activity, some facilitators responded that the activity may or may not achieve its learning outcome (unsure) due to the video demonstration delivery method used. It was proposed that hands – on practical to be conducted for this activity for the respondents to gain more insight on food cross – contamination:

'Latihan amali perlu dilaksanakan agar peserta mudah memahami apa yang dimaksudkan dengan pencemaran silang' (Facilitator 1).

Some facilitators also proposed the incorporation of 'Time and temperature' concept in food preparation and serving may be more helpful to the respondents if the content can be elaborated further. This is due to some queries they received from the respondents that some food sold in premises that were exposed at room temperature for a longer period are still safe to be consumed:

'Semasa aktiviti ada peserta yang kurang jelas mengenai konsep suhu dan masa. Setelah diterangkan fasilitator, masih ada yang mempersoalkan keadaan makanan di kedai nasi lauk yang lama terdedah tapi masih elok di makan' (Facilitator 2).

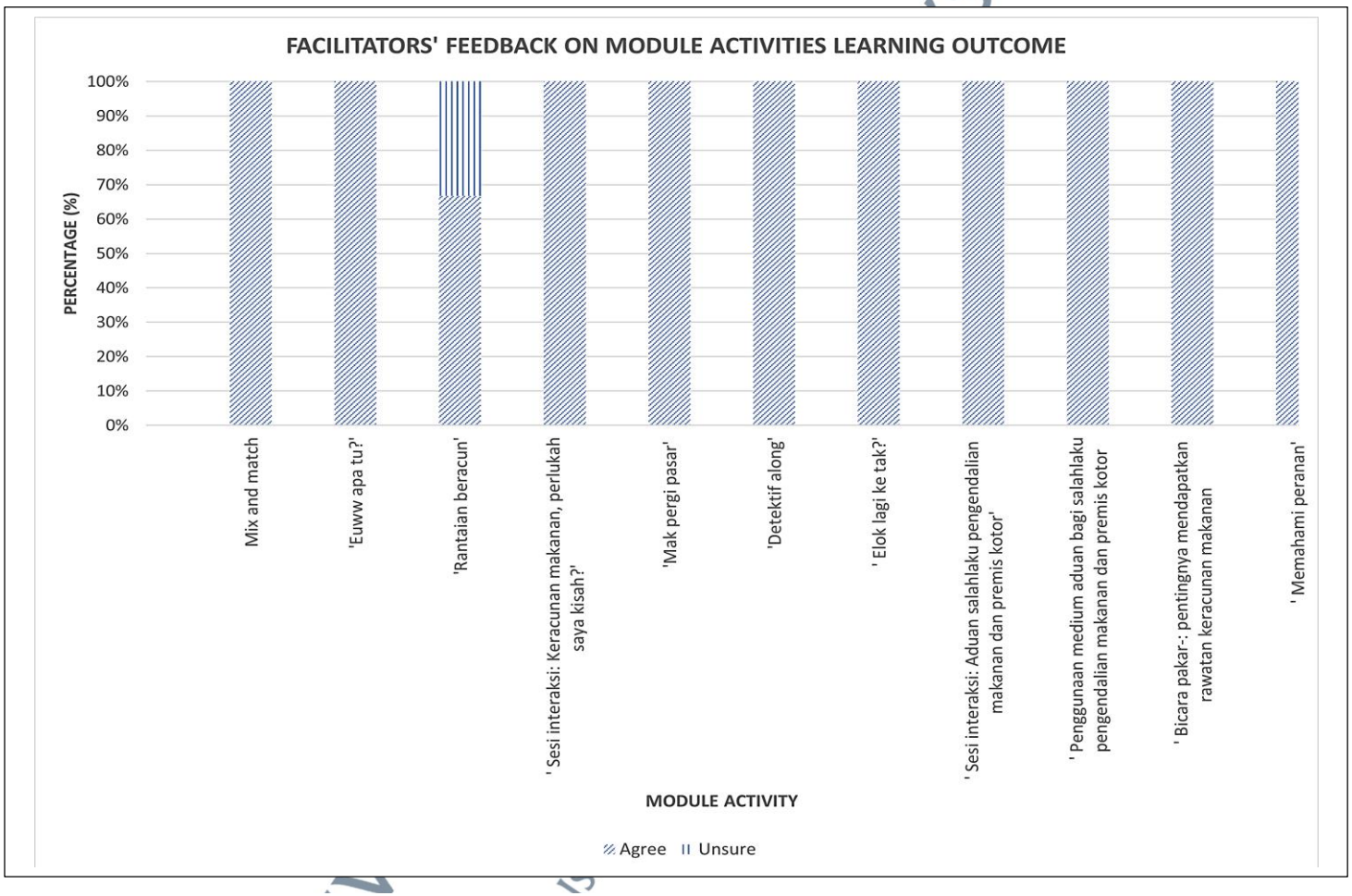

Figure 4.14: Facilitators' feedback on the module activity learning outcome attainment

4.4.2b (ii) Facilitators' feedback on module delivery strategies, learning resources and evaluation strategy

Overall, facilitators rated the module delivery strategies, learning resources and evaluation strategy as suitable. The implementation of interaction session, video demonstration and live demonstration during the module activities were regarded as suitable. Similarly, the multimedia learning aids, digital notes and interactive quiz had assisted the facilitators in delivering the module content. The facilitators also agreed that the time allocation for each activity was sufficient as well as evaluation strategy were appropriate (Figure 4.15).

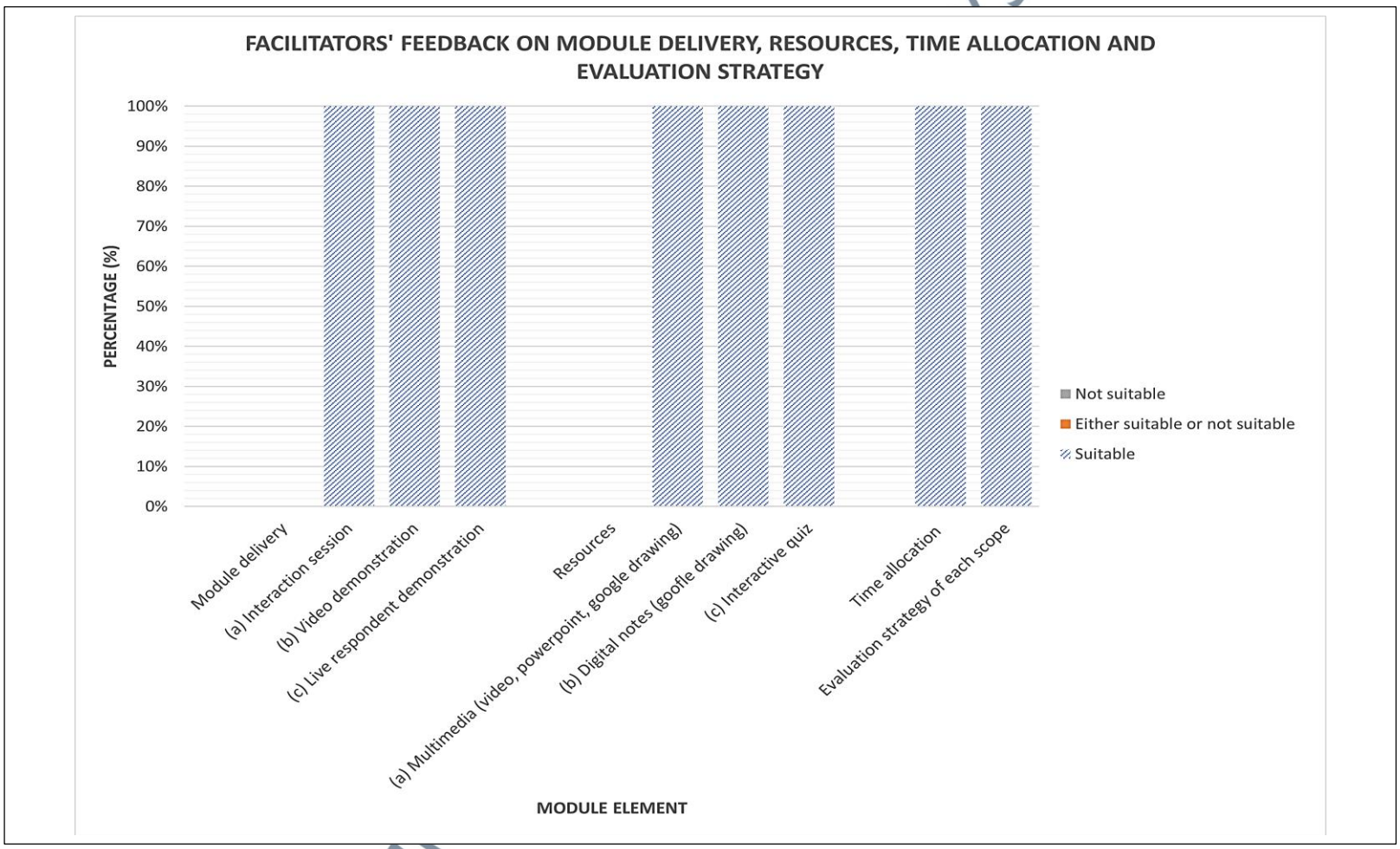

Figure 4.15: Facilitators' feedback on module delivery, learning resources, time allocation and evaluation strategies.

4.5 Conclusion

The data analysis performed is to answer all the research questions outlined. Table 4.17 summarized the findings from the analysis. A quantitative method was employed in order to determine the level of food poisoning knowledge, attitude, and risk perceptions in Phase 1. Similarly in Phase 2, descriptive analysis of percentage was employed to determine the experts' view scores on module design, objectives, delivery methods, learning resources and content evaluation method. On the other hand, mean analyses were conducted to determine the efficacy of the 'See, Select, Tell' module on the respondents' food poisoning prevention knowledge, attitude and risk perceptions. In addition, information gathered on the module usability from the respondents as well as facilitators using an open-ended question allows researcher to grasp other feedback that may not be captured from the items asked in the survey.

The findings addressed each research phase research questions. In Phase 1, the finding on the food poisoning prevention knowledge, attitude, preventive behavior and risk perceptions have underpinned the need to develop a food poisoning prevention educational module. The Phase 2 finding on the other hand outlined the appropriateness of the module elements that was validated by the experts. Finally, the Phase 3 finding described the efficacy of the module on the respondents' food poisoning prevention knowledge, attitude, and risk perceptions. All these findings will be discussed and argued in Chapter 5.

Table 4.17: Summary of statistical analysis involved and finding for each research phases

Research phase	Research questions	Statistical analysis involved	Findings
Phase 1: Need Analysis	(i) What is the food poisoning knowledge level of the consumers who ate away from home?	i. Descriptive analysis (frequency and percentage)	About 23% of the respondents have a poor knowledge level on food poisoning and its prevention.
	(ii) What is the food poisoning prevention attitude level of the consumers who bought outside food?		Although most of the respondents were practicing a good food preventive behavior, few of them are having poor attitude and negative perceptions towards food poisoning prevention (14.4% and 36.0% respectively).
	(iii) What is the food poisoning preventive behavior of the consumers who bought outside food?		
	(iv) What is the food poisoning prevention risk perceptions level of consumers who bought outside food?		
	(v) Is there any significant relationship between food poisoning prevention knowledge and attitude?	i. Path analysis and bootstrap	There was a positive significant association between food poisoning prevention knowledge and attitude. Null hypothesis is rejected.
	(vi) Is there any significant relationship between food poisoning prevention knowledge and preventive behavior?	i. Path analysis and bootstrap	There was a positive significant relationship between food poisoning prevention knowledge and preventive behavior. Null hypothesis is rejected.
	(vii) Is there any significant relationship between food poisoning prevention attitude and preventive behavior?	ii. Path analysis and bootstrap	There was a positive significant relationship between food poisoning prevention attitude and preventive behavior. Null hypothesis is rejected.

Table 4.17: Table 4.17: (continued)

Research phase	Research questions	Statistical analysis involved	Findings
Phase 1: Need Analysis	(viii) Is there any significant relationship between food poisoning prevention risk perceptions and preventive behavior?	i. Path analysis and bootstrap	There was a positive significant relationship between food poisoning prevention risk perceptions and preventive behavior. Null hypothesis is rejected.
Phase 2: Design and Development	(i) What are the appropriate design, module objectives, delivery methods, learning resources and content evaluation methods of the 'See, Select, Tell' module according to experts' view?	i. Descriptive analysis (validity coefficient)	All the module elements below achieved the attainment validity coefficient (>0.7) as validated by the experts: i. Module objectives: 0.907 ii. Module content: 0.875 iii. Delivery methods :0.9061 iv. Learning resources: 0.893 v. Content evaluation: 0.8762
Phase 3: Implementation and Evaluation	(i) Is there any significant difference in terms of food poisoning prevention knowledge scores before and after the module implementation?	i. Paired sample t-test (pre and post intervention) ii. Independent t-test (intervention and control group)	There was a significant increase of food poisoning knowledge scores in both intervention and control group after the 4 weeks intervention. The post – test scores were significantly higher in intervention group as to compared to the control group. Null hypothesis is rejected

Table 4.17: (continued)

Research phase	Research questions	Statistical analysis involved	Findings
Phase 3: Implementation and Evaluation	(ii) Is there any significant difference in terms of attitudes scores towards food poisoning prevention before and after the module implementation?	i. Paired sample t-test (pre and post intervention) ii. Independent t-test (intervention and control group)	There was significant increase in attitude scores among the intervention group after the 4 weeks intervention. No significant difference observes in attitude scores among the control group after 4 weeks of intervention. There was no significant difference of post-test attitude scores between control and intervention groups. Null hypothesis is rejected.
	(iii) Is there any significant difference in terms of risk perceptions towards food poisoning prevention scores before and after the module implementation?	i. Paired sample t-test (pre and post intervention) ii. Independent t-test (intervention and control group)	There was no significant difference in risk perceptions scores before and after intervention in both intervention and control groups. There was no significant difference of post-test risk perception scores between control and intervention groups. Null hypothesis is not rejected.

Table 4.17: (continued)

Research phase	Research questions	Statistical analysis involved	Findings
Phase 3: Implementation and Evaluation	(iv) What are the consumers' feedbacks on the usability of 'See, Select, Tell' food poisoning prevention module?	i. Descriptive analysis (frequency and percentage)	Majority of the respondents agreed that the "See, Select, Tell' module have achieved its learning objectives. Most of the facilitators agreed that all module activities have achieved its learning outcome. The facilitators also agreed that the module delivery strategies, learning resources, evaluation strategy and time allocation are appropriate and suitable.