Research Article

Knowledge, Attitude and Practices of Fruit Consumption among Female and Male Adolescents in Hulu Terengganu and Marang, Malaysia

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ABSTRACT

The study aimed to determine the level of knowledge, attitude and practice of fruit consumption and their associations among female and male adolescents in Hulu Terengganu and Marang. This a cross-sectional study involving 184 selected secondary school students in Hulu Terengganu and Marang, with 94 of them were female respondents and 90 were male. Data on socio-demographic, fruit consumption, knowledge, attitude and practices of fruit consumption were collected using validated questionnaire and food frequency questionnaire. Only 35.8 % of the respondents had adequate fruit consumption, 62.8% and 60.0% of female and male respondents had good knowledge, 63.8% and 60.0% of female and male respondents had good attitude and only 6.4% and 16.7% of female and male respondents had good practice. We also found a significant difference of practice in fruit consumption between male and female respondents ($p<0.05$). The result showed that there was positive significant correlations between knowledge and attitude as well as attitude and practices of fruit consumption ($p<0.05$). No correlation was reported between knowledge and practices of fruit intake. This showed that good attitude potentially improved knowledge and practice towards fruit consumption and vice versa. The results of this research showed that it is crucial to improve the main factors to influencie knowledge, attitude and practices of fruit consumption among adolescents.

INTRODUCTION

World Health Organization (WHO) reported that almost one fifth of adolescents aged 10−19 years old have a nutritional problem which affect their well-being and livelihood in later life (WHO 2014). Inadequate consumption of fruits contributed about 2.8 % of mortality cases of non-communicable diseases such as gastrointestinal cancer, heart disease and diabetes (WHO 2014). More than one third of adolescents was overweight or obese which related to low fruit consumption (Boeing *et al.* 2012). Since higher fruit preferences among adolescents was recommended for good dietary intake in later life, increasing the fruit intake is an important issue among adolescents nowadays (Craigie *et al.* 2011).

Fruits have been recognized as a nutritious food sources due to its health promoting agents with various micronutrients and phytochemical compounds (Liu 2013). The minimum fruit recommendation for adolescent is two servings daily, which approximately equivalent to 160 g of fruit (WHO 2003; Institute for Public Health (IPH) 2013). Despite its beneficial effect for human, fruit intake among adolescents worldwide is low. Only 31.5% of adolescents achieved the recommended intake where rural population contributed the higher percentage (IPH 2017). Among primary and secondary school students in Malaysia the proportion of students who prefer fruits as their snacks were 25.0% and 17.7%. Thus, in Malaysia, some strategies are taken to improve accessibility of high quality of fruits at the retail stores, expanding farm-to-institution

practices in schools, workplaces or hospitals as well as empowerment of policies to improve activities regarding fruit and vegetables in schools (IPH 2017).

Fruit consumption among adolescents are associated with the knowledge, attitude and practices of fruit consumption (Hassan *et al.* 2015). However, to the best of our knowledge, limited data were available on knowledge, attitude and practice of fruit consumption among adolescents in rural areas in Asian countries (Harrington 2016; Ham & Kim 2014).

The understanding on the association of Knowledge, Attitude and Practices (KAP) studies of fruit consumption may provide ideas in creating effective interventions to improve fruit consumption among adolescents which can lead to reducing the increasing risk of malnutrition (Rojroongwasinkul *et al.* 2013; Poh *et al.* 2013). Risk of malnutrition is high among the low socio-economy status group; thus, by focusing on the rural area, the study will help guide public policies in developing healthy environment, which is suitable to this demography (Menezes *et al.* 2017). Therefore, the current study is aimed to assess the current KAP of fruit consumption among adolescents in rural area. Since minimal research was done in rural areas, thus this study will be focusing in the Hulu Terengganu and Marang areas to represents the rural Terengganu, Malaysia.

METHODS

Design, location, and time

A cross-sectional study was carried out to determine the knowledge, attitude and practices of fruit consumption among female and male secondary school students in Rural Terengganu. Ethical approval for the study was received on 1st January 2019, with the reference number UNISZA/UHREC/2018/66.

Sampling

Convenience purposive sampling method was used in this study. List of secondary school in Marang and Hulu Terengganu were obtained from the District Education Office. A total of four schools from the two selected districts with eight classes, whose students aged 14 and 16 years old, provided a total sample of 184 respondents. The respondents were chosen based on the inclusion and exclusion criteria.

The eligibility criteria were: 1) Age 14 and 16 years old, were not taking any Malaysian Public examination; 2) School is located in rural Terengganu; 3) Willing to take part in the study; 4) Able to read, write and understand questionnaire. Students with acute or severe diseases, special need children, international students and those who were unable to understand the questionnaire were excluded. The chosen respondents completed the questionnaire with informed consent and briefing given prior to the data collection.

Randomization of sampling method. The list of the secondary schools in Terengganu were obtained form the Ministry of Education: 1) Stage 1: Two out of eight school districts in Terengganu were selected randomly where Marang and Hulu Terengganu were chosen. Thirteen schools met the inclusion criteria of which were 12 schools in rural Marang districts. Meanwhile, in Hulu Terengganu districts, there were 141 schools that met the inclusion criteria, of which 11 were in rural area; 2) Stage 2: One rural school was chosen randomly from each of the selected districts. The total class in Form II and IV for each schools were identified; 3) Stage 3: Three classes were selected randomly or each form: Form II and Form IV in each selected schools. Hence, total of 12 classes; 4) Stage 4: The students were identified randomly from the enrollment of each selected classes.

Data collection

Data were collected at schools in Hulu Terengganu and Marang, Malaysia. To ensure the quality of the data collected, the selected respondents were grouped into 17 groups, with 10 students in each group. Students were guided by the researcher to fill in the questionnaires. The weight and height of the respondents were measured and respondents were asked to fill the anthropometric data and socio-demographic information first followed by the KAP questionnaire and next, the food frequency questionnaire.

Research instruments

Other than anthropometric and socio-demographic information, respondents answered the KAP Questionnaire and Food Frequency Questionnaire (FFQ). These questionnaires have been tested for reliability and validity (Makumbe 2014; Daud *et al.* 2018; Harrington 2016;

Mohamed *et al.* 2018). Pilot test was done prior to the study to test for the internal consistency. The internal consistency of the questionnaire was sufficient, with 0.720, 0.867 and 0.716 for knowledge, attitude and practices respectively. The total scores for each domain were calculated and categorized as poor (≤50% of total score), moderate (51% to 69%) and good (≥70% of total score) (Harrington 2016).

Knowledge domain. This domain consisted of nine closed-ended positive statement questions regarding the general knowledge, recommendations and benefits of fruit intake. Each question was provided with three scales, 'yes', 'no' and 'not sure' answer with the marks of 2, 1 and 0 respectively. It gave a total score range of 0–18 for knowledge section.

Attitude domain. It consisted of 12 statements with five Likert scale answers provided. Likert scales answers were scored as follows: Strongly agree – 4; Agree – 3; Disagree – 2; Strongly disagree – 1; Not sure – 0, with the total score range of 0–48. 'Strongly agree' indicated maximum adherence towards fruit consumption. The statement was overall related to their belief towards benefits of fruits consumption.

Practice domain. It consists of eight questions with multiple choice answers as follows: 'always', 'sometimes', 'rarely' and 'never'. Subjects were asked regarding their practice towards fruit consumption, such as their habits of taking fruits in school and at home, fruits as a choice of snacking and the frequency of taking fruits. Each question regarding good practice was provided with a score of "4" for always, while the lowest practice was given "1" for never.

Food frequency questionnaire (FFQ). Respondents were asked specifically on the frequency of fruits consumption over the past 12 months (Mohamed *et al.* 2018). The frequency of fruit consumption was referred to the past 12 months in order to avoid the seasonal factors or narrow ranges of fruit intake among the adolescents. There were 15 types of seasonal fruit that were included in the FFQ which was chosen from the majority of the fruits that were among the respondents in the pilot study. The general format of the questionnaire contained instructions on how to use the FFQ, portion size options and frequency options with the help of visual illustrations. Frequency of fruit consumption was recorded in nine categories: 1) None per month; 2) One to three times per month; 3) One time a week; 4) Two to four times per week; 5) Five to six times per week; 6) One time a day; 7) Two to three times per day; 8) Four to five times per day and; 9) Six and more times per day) (Mohamed *et al.* 2018). In each category, there were options for how frequently each fruit item was consumed and the serving size of the fruit intake daily. The frequency of fruit intake was taken as an average, multiplied with the serving size of the fruit in a meal and categorized into groups of less than two servings per day, adequate intake of two serving per day, and more than two serving per day.

Data analysis

Data was entered and analyzed using IBM SPSS software version 22.0. Descriptive statistics was used to calculate and categorized the socio-demographic characteristics of subject, prevalence of fruit consumption, level of knowledge, attitude and practice of fruit consumption. Numerical data was presented as Median (IQR) since they were not normally distributed, while categorical data was presented as frequency and percentage. The score of knowledge, attitude and practices of fruit consumption of both genders were analyzed by using Mann-Whitney Test. The correlation among KAP variables was tested by using Spearman's Correlation Test. All tests were two-sided and a $p<0.05$ was considered statistically significant.

RESULTS AND DISCUSSION

This study involved 184 respondents, where 94 of them were female and the rest were male. The majority of female respondents were 16 years old (56.4%) while for the average age for male respondents was 14 years old (52.2%).

Anthropometric and socio-demographic information

The height and weight of all respondents were measured and BMI value were calculated based on the measured height and weight. The results indicated that majority of the respondents had normal weight and they were within normal BMI. They also had low-to-normal socio-economy status based on the location of their houses, number of siblings and current parents' occupation (Table 1).

Majority of the respondents came from Malay ethnicity and had larger household,

Table 1. Socio-demographic characteristics of respondents

Characteristics	Female (n=94) n (%)	Male (n=90) n (%)	Total (n=184)
Body mass index (kg/m^2)			
Severely thin	3 (3.2)	8 (8.9)	11 (5.9)
Thin	12 (12.8)	8 (8.9)	20 (10.9)
Normal	44 (46.8)	52 (57.8)	96 (52)
Overweight	15 (16.0)	11 (12.2)	26 (14)
Obese	20 (21.3)	11 (12.2)	31 (17.2)
Weight (kg)	51.496±13.61	52.765±17.50	
Height (cm)	149.921±6.26	157.846±8.50	
Body mass index (z-score)	0.554±1.46	0.175±1.60	
Socio-economy status			
High	15 (16)	10 (11)	25 (14)
Normal	37 (39)	35 (39)	72 (39)
Low	42 (45)	45 (50)	87 (47)
Parents occupation			
Employed	17 (18)	28 (31)	45 (24)
Self employed	52 (55)	40 (44)	92 (50)
Not employed	25 (27)	22 (25)	47 (26)
Number of household member			
3−5	20(21)	15 (17)	35 (22)
6−8	48 (51)	40 (44)	88 (45)
9 and above	26 (28)	35 (39)	61 (33)

consisting of six to ten members per family. More than half of their parents were self-employed, such as managing a small business and others. However, one third of the parents' respondents worked at the office.

Prevalence of fruit consumption

Fruit consumption among adolescents from school in both district, Hulu Terengganu and Marang was categorized into three groups which are group of less than two serving per day, group of adequate two serving and group of more than two serving (Malaysian Dietary Guidelines 2017) (Table 2).

Most of the respondents had inadequate fruit consumption (64.1%), followed by excessive fruit consumption (21.7%) and the last was adequate fruit consumption of 2 servings

Table 2. Percentage of fruit consumption among female and male adolescents in Hulu Terengganu and Marang districts in rural Terengganu

Gender (n=184)	<2 servings/day (95% CI)	2 servings/day (95% CI)	>2 serving/day (95% CI)
Overall (n %)	118 (64.1)	26 (14.1)	40 (21.7)
Female	63 (67.0)	13 (13.8)	18 (19.1)
Male	55 (61.1)	13 (14.4)	22 (24.4)

*Descriptive statistics test; CI: Confidence Interval

per day (14.1%). Only 13.8% and 14.4% of female and male respondents had adequate fruit consumption, respectively. Based on the data from food frequency and serving size, most of the student prefered local fruits such as orange, apple and bananas, due to the higher accessibility in rural areas.

Despite the study involved rural students, our study found that 61.1% of male students and 67.0% female students had inadequate fruit consumption. This is in contradiction with the National Health & Morbidity Survey 2017 (NHMS), which reported higher prevalence of adequate fruit servings per day among Malaysian adolescents in rural areas and female respondent contributed the most (IPH 2017). However, another study proposed that fruit prevalence was higher among men because they believed that fruit was a high energy-dense food, which gave masculinity and power to them (Ward 2012). While on the other hand, female had higher probability and willingness to change their lifestyle and meet the fruit recommended intake serving due to dieting and good body image (Voelker *et al.* 2015).

Another determinant for fruit consumption is higher SES (Socioeconomic Status), since it allows greater chances to buy healthy food including fruits (Lallukka *et al.* 2010). However, this current study does not report on the SES relationship with the fruit consumption among respondents.

Respondents' knowledge, attitude and practices towards fruit consumption
Table 3 below showed that majority of female and male respondents had high knowledge level towards fruit consumption and no significant difference was found between male and female respondents with the percentage of 62.8% and 60.0% with the Median (IQR) of 14.00 (3.00) and 13.00 (3.00) respectively.

Table 3. Level of knowledge towards fruit consumption among respondents (n=184)

Level of knowledge	n=184		p^*
	Female n=94 n (%)	Male n=90 n (%)	
Poor (0−50)	4 (4.3)	4 (4.4)	
Moderate (51−69)	31 (33.0)	32 (35.6)	0.797
Good (70−100)	59 (62.8)	54 (60.0)	
Median (IQR)	14.00 (3.00)	13.00 (3.00)	

*Mann-whitney test

Only around a quarter, 24.5% and 26.7% of female and male, respondents who agreed with the statement of 'Consumption of fruits based on food pyramid is two servings respectively. This showed that the respondents knew about the benefit of fruit but not for its recommended amount.

Even though the results indicated high knowledge level among respondents, many did not know the recommended amount of fruit to be taken. This is similar to a study in Sarawak which found that two third of students were not aware of the recommended daily serving of fruit consumption (Aung *et al.* 2012). A slightly different level of knowledge between gender might be due to the fact that minority of male respondents might not be interested in nutritional knowledge (Kołłajtis-dołowy & Żamojcin 2016). Family education level, self-efficacy of the individua and environmental supports are some predictors that influenced the awareness and knowledge level regarding benefits of fruits among the respondent (Ismail *et al.* 2013).

In terms of attitude towards fruit consumption, the majority of respondents had good attitude towards food consumption with 63.8% of female respondents and 60.0% of male respondent had good attitude. The Median (IQR) were; 35.00 (6.25) for female respondents and 35.00 (6.00) for male respondents. There was no significant difference in terms of attitude score found between male and female (Table 4).

The highest percentage was found for the female respondents who strongly agreed with the statement of 'Eating more fruit will make me healthier' (62.8%); meanwhile, male respondents agreed more with the statement 'Fruits look appealing and appetizing' as compared to other statement in attitude domain. This showed different attitude approach in male and female respondents regarding fruit.

One of the reasons that rural adolescents has higher attitud toward fruit consumption was their believe on the beneficial effect of fruit to their body (Daud *et al.* 2018). The difference of self-efficacy of the respondent itself play a main role to influence the interconnection between self-efficacy towards healthy food and good dietary habit (Winzenberg *et al.* 2005).

More than half of the female respondents responded strongly agree for the statement 'fruits taste good to me'. The adolescents reported that the main reasons for lower fruit consumption among them were expensive price, low accessibility and low taste preferences towards fruit. However, the stronger predictor was knowledge regarding beneficial effects of fruit (Ilesanmi 2014).

Parental influence was another important determinant in influencing fruit consumption practice among adolescents. A study in Subang Jaya explained that most of the respondent completely relied on their parents in choosing and eating certain fruits (Ismail *et al.* 2013).

Even though majority of respondents showed good knowledge and attitude levels but they had moderate practice level towards fruit consumption. As shown in Table 5 below, most of the female and male respondents had moderate practice level followed by poor practice level and good practice level noted the least. The Median (IQR) for practice scores among female and male respondent were 17.00 (5.00) and 19.00

Table 4. Attitude level towards fruit consumption among respondents

Level of attitude	n=184		p^*
	Female n=94 n (%)	Male n=90 n (%)	
Poor (0−50)	1 (1.1)	1 (1.1)	
Moderate (51−69)	33 (35.1)	35 (38.9)	0.404
Good (70−100)	60 (63.8)	54 (60.0)	
Median (IQR)	35.00 (6.25)	35.00 (6.00)	

*Mann-whitney test

Table 5. Practice level towards fruit consumption among respondents

Level of practise	n=184		p^*
	Female n=94 n (%)	Male n=90 n (%)	
Poor (0−50)	37 (39.4)	22 (24.4)	
Moderate (51−69)	51 (54.3)	53 (58.9)	0.003
Good (70−100)	6 (6.4)	15 (16.7)	
Median (IQR)	17.00 (5.00)	19.00 (4.25)	

*Mann-whitney test

(4.25), respectively, with a statistically significant difference between both genders.

For the question of 'How often do you have fruit as a snack or as part of your meals?', only 12.8% of female and 11.1% of male respondents who reported regular intake of fruits, which showed poor practice level of fruit intake.

For the practice aspect, majority of the respondents had a moderate practice level towards fruit consumption, where male respondents who had a moderate practice level was slightly higher (58.9%) as compared to the female respondents (54.3%). The moderate practice level might be related to the availability of fruit at home or school. Low SES among rural area population might affect accessibility to fruit in terms of money and travel distance to the supermarkets, except for the minority who have their own fruit farms (Dean 2011). Furthermore, previous study reported that dietary habits of male respondents was not influenced by the accessibility of healthy food at home, but the main factor contributed to

it was their low taste preference towards healthy food including fruits.

Correlation between knowledge (K), attitude (A) and practice (P) score of fruit intake among the respondents

Table 6 below shows that knowledge and attitude score towards fruit intake had a statistically significant (p=0.036) but weak and positive correlation (r=0.155). However, there was no correlation reported between knowledge and practice scores. Meanwhile, weak, positive and statistically significant correlation can be seen between attitude and practice scores (p=0.007).

Current study also showed that there was statistically significant but weak and positive correlation between knowledge and attitude (p<0.05) and between attitude and practice (p<0.001), while no correlation was reported between knowledge and practice of fruit consumption. This indicates that the attitude towards fruit consumption among the respondents

Table 6. Correlation between knowledge, attitude and practice of fruit intake among respondents in rural Terengganu

KAP domains	Total number of respondents (n=184 students)	
	r	p
Knowledge - attitude	0.155*	0.036
Knowledge - practice	-0.063	0.397
Attitude - practice	0.198**	0.007

*Spearman's correlation test; KAP: Knowledge, Attitude, Practise

had lower likelihood to influence the knowledge and practice of fruit consumption among the respondents. Basically, knowledge, attitude and practice of the individual itself is not directly linked to each other, since it also can be influenced by other external factors such as socio-economic status or family lifestyle.

The level of correlation differed from the current study due to the respondents' bias, but both indicated positive correlation. A study in China also reported the similarly where they showed good attitude towards eating healthy, including fruit consumption, had a positive relationship with the dietary practice of the respondents (Yu *et al.* 2014).

Knowledge level has showed no relationship with the attitude and practice of fruit consumption among the respondents in this study, which was in line with the study conducted by Banwat *et al.* (2012) where it reported that good knowledge was not strongly associated with the individual practice level. Outcome from this study found that out of 92.4% of their respondents who had moderate knowledge, 69.2% of them practiced fruit consumption daily, which shows that high level of knowledge was not strongly associated with fruit intake (Banwat *et al.* 2012). However, a study by Perera & Madhujith (2012) argued that knowledge was positively correlated to the individual practice of fruit consumption, where there was only 2.1% chances of an individual to increase fruit and vegetables consumption with better knowledge.

CONCLUSION

Majority of the adolescents recruited as respondent from Hulu Terengganu and Marang districts had good knowledge, good attitude and moderate practice towards fruit consumption. The knowledge, attitude and practice level towards fruit consumption among respondents can be considered acceptable, but it was not reflected on their fruit consumption since more than half of the respondents had inadequate fruit consumption. This might be associated with their limited knowledge on adequate amount of daily intake of fruit, in comparison to the overall knowledge about fruit consumption. Lastly, there was poor statistically significant positive correlation reported between knowledge and attitude ($p<0.05$) and between attitude and practice ($p<0.001$). Meanwhile, no correlation was reported between knowledge and practice of fruit consumption.

In future studies, it is encouraged to conduct study among respondents from both rural and urban areas in Terengganu and to involve samples that are representative of Malaysian adolescents population in rural areas. Future research requires further investigations of other factors influencing fruit consumption among growing adolescents during these critical periods and carried out by one-on-one interview by the researcher to reduce bias.

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DECLARATION OF CONFLICT OF INTERESTS

There is no conflict of interest involved in this study.

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