Family influence and sufficient fruit and vegetable consumption in different stages of adolescence

Authors: Sasinee Thapsuwan and Sirinya Phulkerd
Institute for Population and Social Research, Mahidol University, Salaya, Thailand
sasinee.thap@gmail.com and sirinya.phu@mahidol.ac.th

Abstract (200 words)

Sufficient consumption of fruits and vegetables (FV) during adolescence can reduce risk of non-communicable diseases in older age. This study aimed to analyze prevalence of sufficient FV consumption in different stages of adolescence in Thailand, and examine association between family influences and other potential factors and sufficient FV consumption. The study used data from a nationally-representative household survey of the Thai population and selected sample of 1,367 adolescents aged 15-24 years. The study divided the sample into 2 groups: middle adolescence (15-17 years old) and late adolescence (18-24 years old). The respondents were asked about FV consumption, sociodemographic characteristics, meal consumption and family factors. Binary logistic regression analysis was used to investigate the association between the variables and FV consumption. Of the total sample, 8.3% and 15.9% had sufficient FV consumption, respectively. In late adolescence aged found the adjusted OR of independent variable in relation to FV intake includes eating 3 meals every day, family support and had role model in eating. This suggests that is important for a person to have a good habit of eating enough FV, as well as support from the family and a role model for eating the right food.

1. Introduction

Sufficient fruit and vegetable (FV) consumption contributes to reducing risk of developing non-communicable diseases (NCD) and mortality [1]. World Health Organization (WHO) recommends an average intake of at least 400 grams of fruits and vegetables combined per day for preventing NCD [2]. Despite FV benefit, FV intake remains low for a majority of the global population.

Adolescence is a crucial period within the process of developing good health [3]. It is in the phase of life between childhood and adulthood that can be shaped for correct dietary habits, including FV consumption and can be continued into adult life [4]. There is considerable evidence of associations between FV consumption and various factors including sociodemographic characteristics [5] and family related factors [6]. Family support for food intake is recognized as an important context of young people's eating habits [7]. In addition, the level of FV consumption varies according to socio-demographic characteristics of adolescents such as sex, age, independent living, lower BMI or lower quality of life [8]. However, influence of family factors and sociodemographic characteristics may vary across stages of adolescence.

There is little information about relationships between family and other potential factors and sufficient FV consumption in different stages of adolescence. Therefore, the aim of this study was to analyse prevalence of sufficient FV consumption in two stages of adolescence in Thailand (middle (15-17 years), late (18-24 years)), and examine association between family influences and other potential factors and sufficient FV consumption according to the WHO's recommended level.

2. Methods

2.1 Study design and participants

This study used data from a nationally-representative household survey of the Thai population, namely 'Survey on food consumption, food security and food literacy in Thai population. In this study a target age group for participants was 15-24 years old who give the answer questions about sociodemographic characteristics, family information and FV intake. The survey was conducted during June 2022 – November 2023.

2.2 Study variables

2.2.1 Dependent variable

FV intake: Data on FV intake were collected based on the number of days, number of serving per day and number of standard size (one rice-serving spoon) per serving. A standard serving was applied based on the Thai food guide known as a "Nutrition Flag" [9]. One serving of vegetable equaled 40 grams and one serving of fruit equaled 70-120 grams. WHO recommends at least 400 grams of FV per day (sufficient level). This study measured total FV intake per day by summing all recorded servings and calculated grams (based on Thailand's serving sizes).

2.2.2 Independent variables

Socio-demographic characteristics: Each respondent was asked to provide following information: sex (male and female), and place of residence (urban and rural.

Meal frequency: Each respondent was asked "Did you eat three complete meals everyday" Response to the question was coded as "yes" and "no."

Family factor: Each respondent was asked "Does your family help you eat healthier?" Response to the question was coded as "yes" and "no." The respondent was also asked "Who is your role model in eating behaviour?" and then selected one of the following answers: no model, parents and relative/friend/role model from media.

2.3 Statistic analysis

This study used descriptive statistics to present the classified socio-demographic characteristics, family factors, meal consumption and FV consumption at the difference stages of adolescence (middle adolescence: 15-17 years old and late adolescence: 18-24 years old). Then, binary logistic regression analysis was used to investigate the statistical association between sufficient FV intake and other variables. The association presented as Odds Ratios (OR) with 95% confidence intervals.

3. Results

Table 1 presents the characteristics of respondents with FV intake in two stages of adolescence. Of total 585 middle adolescents and 781 late adolescents, only 8.3% and 15.9% had sufficient FV intake, respectively. High percentage of FV intake in both adolescence groups were observed in males, living in rural area, eating three meals a day, having family support for food and having no role model in eating behaviour.

There were significant associations between place of residence and family support, and sufficient FV intake in middle adolescents. For late adolescents sufficient FV intake was associated with sex, meal consumption, family support, and role model variables.

Table 1: Chi-square test of association between socio-demographic characteristics, eating behavior, family support and FV intake at the difference stages of adolescence

Variables	**Middle adolescence (15-17 years old)** (n = 585)					**Late adolescence (18-24 years old)** (n=781)				
	FV intake <400 grams		FV intake ≥ 400 grams		$\chi 2$ (sig.)	FV intake <400 grams		FV intake ≥ 400 grams		$\chi 2$ (sig.)
	n	*%*	*n*	*%*		*n*	*%*	*n*	*%*	
Sex					0.756					0.027
Male	337	92.1	29	7.9		399	86.5	62	13.5	
Female	200	91.3	19	8.7		258	80.6	62	19.4	
Place of residence					0.015					0.168
Urban	243	94.9	13	5.1		330	85.9	54	14.1	
Rural	294	89.4	35	10.6		327	82.3	70	17.7	
Eating 3 meals a day					0.655					0.000
No	230	92.4	19	7.6		315	89.7	36	10.3	
Yes	307	91.3	29	8.7		342	79.5	88	20.5	
Family support					0.015					0.003
No	77	98.7	1	1.3		137	91.9	12	8.1	
Yes	460	90.6	48	9.4		520	82.1	112	17.9	
Role models in eating					0.573					0.004
No model	292	92.4	23	7.6		465	87.1	69	12.9	
Parents	174	91.6	16	8.4		158	77.8	45	22.2	
Relative/friend/role model from media	71	88.8	9	11.3		34	77.3	10	22.7	
Total	**537**	**91.7**	**48**	**8.3**		**657**	**84.1**	**124**	**15.9**	

*p≤0.05, **p≤0.01, ***p≤0.001

Table 2 shows the relationship between independents variables and FV intake. In Model I there was no significant association between independents variables and FV intake. In Model II sufficient the result from the binary logistic regression analysis shows the adjusted OR of independent variable in relation to FV intake. The analysis shows the variables that had significant ORs includes eating 3 meals every day (OR 2.566; 95% CI 1.669 to 3.946), family support (OR 2.340; 95% CI 1.179 to 4.647) and had role model in eating are relative/friend/role model from media (OR 2.229; 95% CI 1.017 to 4.884).

Table 2: Binary logistic regression model for socio-demographic characteristics, eating behavior, family support and sufficient FV intake in middle and late adolescence

Variables	Model I Middle adolescence (15-17 years old) (n = 585)					Model II Late adolescence (18-24 years old) (n=781)				
	B	Exp(B)	95% C.I. for Exp(B)		Sig.	B	Exp(B)	95% C.I. for Exp(B)		Sig.
			Lower	Upper				Lower	Upper	
Gender (Reference=Male)										
Female	0.149	1.160	0.626	2.152	0.637	0.398	1.498	0.996	2.226	0.052
Place of residence (Reference=Urban)										
Rural	0.596	1.816	0.916	3.598	0.087	-0.023	0.978	0.632	1.513	0.919
Eating 3 meals a day (Reference=No)										
Yes	0.319	1.376	0.740	2.559	0.313	0.943	2.566	1.669	3.946	0.000
Family support (Reference = No)										
Yes	2.188	8.918	0.793	100.348	0.076	0.850	2.340	1.179	4.647	0.015
Role models in eating (Reference=No model)										
Parents	-0.185	0.831	0.421	1.639	0.593	0.410	1.507	0.951	2.390	0.081
Relative/friend/role model from media	0.086	1.090	0.472	2.515	0.841	0.801	2.229	1.017	4.884	0.045
Cox & Snell R^2	**0.023**					**0.049**				

*p≤0.05, **p≤0.01, ***p≤0.001

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