RESEARCH ARTICLE

Socio-demographic and lifestyle factors associated with understanding fast food consumption among adults in Cambodia [version 1; peer review: awaiting peer review]

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Abstract

Background: Over the past decades, fast food has been rapidly gaining popularity and availability worldwide. Its consequential impact on human health is among the highest in terms of non-communicable diseases. Therefore, this study aimed to investigate the level of understanding of fast food consumption among adults in Phnom Penh, the capital city of Cambodia.

Methods: A cross-sectional analytical study aimed to investigate the level of understanding of factors associated with fast food consumption, among adults in Phnom Penh. Multi-stage random sampling was used to select 749 respondents from 12 communes of five districts in Phnom Penh. A structured questionnaire was used to assess the level of understanding of fast food consumption, and associated factors. Data were analyzed using descriptive statistics, together with bivariate and multivariable logistic regression. Crude odds ratios (CORs) and adjusted odds ratios (AORs) with 95% confident intervals (CI) were calculated to show the strength of associations.

Results: The understanding of factors associated with fast food consumption was poor in 52.07% (95% CI: 48.48-55.66), fair in 22.70% (95% CI: 19.69-25.70) and good in 25.23% (95% CI: 22.12-28.35) of those surveyed. After adjusting for other covariates, unsatisfactory levels of knowledge around fast food consumption were found to be significantly associated with not taking regular exercise (AOR = 1.53; 95% CI: 1.15-2.25; p<0.001) and sleeping less than eight hours per night (AOR = 1.64; 95% CI: 1.09-2.12; p=0.014).

Conclusion: Health promotion and disease prevention should be conducted among at-risk populations in order to raise the level of understanding of factors around fast food consumption.

Open Peer Review

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Any reports and responses or comments on the article can be found at the end of the article.

Keywords
Fast food consumption, level of knowledge, lifestyle, Cambodia

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Introduction

Fast food is rapidly gaining popularity the world over. In past decades, both the demand for and availability of fast food have been increasing worldwide[1]. Specifically, the net worth of the fast food industry increases measurably from day to day, and fast food menus are becoming more and more extensive[2]. Many individuals and families now routinely consume takeaway food at home, with 25% of all food expenditure being on takeaway food[3]. The popularity of fast-food restaurants is also on the rise. In 2001, the USA had approximately 220,000 fast food outlets, with the revenues from the sales reaching over $125 billion USD[4]. Globally, in 2013, the market share of fast food was approximately $447.1 billion USD, and increased by 4.4% between 2013 and 2019 to reach $617.6 billion USD[5]. The story is no different for at least five of the 10 Association of Southeast Asian Nations (ASEAN) countries. The fast food industry in Thailand is worth approximately $700 million USD, and between $300 million and $500 million in each of Cambodia, Vietnam, Laos and Myanmar[6]. With over 31,000 restaurants worldwide, McDonald's has branches in 126 countries on six continents[7]. Furthermore, many other fast food chains and independent restaurants are in existence all over the world. Burger King operates more than 11,100 restaurants in 65 countries[8], and KFC operates across 25 countries.

An individual who consumes fast food once week is at a 20% higher risk of developing coronary heart disease compared to an individual who never eats fast food[9]. This increases to a 50% higher risk if that individual consumes fast food two or three times per week, and increases to an 80% chance of developing coronary heart disease if an individual consumes fast food more than three times per week. Consuming fast food more than twice a week is associated with a 27% risk of developing type 2 diabetes[9]. Consequently, the World Health Organization recommends keeping fast food consumption to a minimum[10]. In the USA, 80% of the population consume fast food, compared to 67%, 63%, and 56% in New Zealand, Australia and the UK, respectively[11]. Fast food consumption among adolescents varies greatly worldwide. For example, 13% of Mexican adolescents consume fast food[12], whereas the rate in Brazilian, Canadian and Australian adolescents is 20%[13], 30%[14] and 89.9%[15], respectively. Fast food consumption also varies greatly across ASEAN countries, such as Malaysia (59%), Thailand (58%), Vietnam (53.6%), and Indonesia (9.5%)[16,17].

Cambodia currently enjoys a vigorous rate of economic growth. This growth is thought of as stable, with rates of 7.1% in 2014, 7% in 2015, and similarly from 2016 onwards. Much of this growth has been attributed to the garment manufacture sector, together with the service and construction industries. The stability of growth is thought to be because of recouping costs from local demand and high exports of garments manufactured in the country, balancing out the stagnation experienced in the agriculture industry and the less dramatic growth in tourism. Poverty in Cambodia is on the decrease. In 2012, the poverty rate was 7.7%, representing approximately 3 million people below the poverty line, and over 8.1 million people being near poverty. Approximately 90% of those living in poverty reside in the countryside. In 2009, the World Bank estimated that the level of poverty in Cambodia had reduced sufficiently so as to reach the Millennium Development Goal[18].

Due to the increases in population and economic power, along with significant growth of the fast-food sector, in an analysis of the causes of death in Cambodia, cardiovascular diseases now represent the leading cause of death of all non-communicable diseases. Non-communicable diseases account for 52% of the total number of deaths in Cambodia. Of these, cardiovascular diseases represent 24%, cancers 13%, chronic respiratory diseases 4%, diabetes 2% and the final 9% by other non-communicable diseases. Adult risk factors for cardiovascular disease include raised blood pressure (19.4% in males and 14.9% in females)[19], and 5.4% of the urban population were reported as living with diabetes in 2010[20]. Hence, the rapid increase in popularity of fast food constitutes a significant public health concern, requiring investigation. Little is known about the understanding of factors surrounding fast food consumption among adults in Phnom Penh, Cambodia.

Methods

Ethical statement

The study design was reviewed and approved by the human research ethics committee at the Khon Kaen University (Reference No. HE582071). All participants gave written informed consent prior to the commencement of the questionnaire interview.

Study setting and design

A cross sectional study was conducted using a structured questionnaire administered by in-person interview. Interviews were conducted between March and July, 2018. The sample comprised 749 individual residents of Phnom Penh, selected using a multi-stage random sampling technique.

Study participants

Multi-stage random sampling was used to select the sample of 749 study participants. Five districts were randomly selected using a lottery method by which the researcher gives each district a number, drawing numbers from the box randomly to choose the five samples from the total of 12 districts within Phnom Penh. Then, either two or three communes were randomly selected from each selected district, to a total of 12 communes. The sample size for this study was calculated using an established formula[21] and the estimated sample size was 749. A systematic random sampling procedure was used to select 749 households from a list of all households in a given commune, which were provided by each commune chief, out of a total 44,436 households. All households in the 12 communes were labelled with a number and every 10 households were selected until the target was fulfilled with 749 households. Finally, one household member aged 18–59 was randomly selected from each household (unless the household had only one member).

The inclusion criteria for the study were that participants were between 18 and 59 years of age, and that they were able to understand the questionnaire. Residents with any serious

health problems at time of data collection (causing them to be bedbound), diarrhea (defecating more than three times per day), pregnancy, mental illness, deformity or lower limb amputation were excluded from participating in the study.

Questionnaire

The questionnaire was designed specifically to answer the research question, and was informed by literature review. A pilot study (n = 30) was conducted to assess content validity. One district in Phnom Penh municipality was selected for the pilot study that was different from the five districts used for the main study. Some items that were found to be difficult to understand were changed after pilot testing. Following the results of the pilot study, the questionnaire content was approved by five experts in the field of nutrition. The experts were sent the questionnaires and had three weeks to check its content. Experts recommended few changes to the questionnaire following their assessment. Internal consistency was assessed using Cronbach's alpha, and found to have a reliability coefficient of 0.857.

The questionnaire had three parts (see *Extended data*)[22]: part 1 covered demographic and socioeconomic characteristics (gender, age, marital status, educational attainment, occupation, number of family members, personal monthly income); part 2 covered lifestyle and behavioral factors (tobacco use, alcohol consumption, food habits, soft drink consumption, physical activity and sedentary behavior); and part 3 covered the understanding of factors associated with fast food consumption. Prior to participant interviews, the questionnaire was translated into Khmer by an independent translator

Study procedures

A field team of three research assistants underwent one-day training to standardize their knowledge of the study objectives and administration of the questionnaire. Researchers used the face-to-face questionnaire to interview the participants at their home in their free time after work. Data was collected after informing participants about the objectives of the study, benefits and assuring confidentiality to those who was eligible for this study. Some participants refused to participate, the reasons being that they were tired after work, or that they did not want to provide information (due to perceptions of privacy/security). The raw data of the 749 respondents were recorded into MS-Excel for database management before in-depth analysis.

Dependent variable

Knowledge of fast food consumption was the dependent variable used in the study, and took levels poor, fair and good. Participants were asked seven questions relating to fast food to determine their knowledge, answering true or false to each statement. The correct answer was given a score of 1, and the incorrect answer given a score of 0. The minimum total score was 0, and the maximum was 7. Responses were categorized using Bloom's cut off with poor knowledge being assigned to scores <60%, fair knowledge for scores between 60 and 79%, and good knowledge for scores ≥80%.

Predictor variables

Age, household income and expenditure, and the number of individuals in the household were coded as continuous variables. Gender (male or female), marital status (single, married or divorced/widowed/separated), level of education (no formal education, primary, secondary, high school, associated degree, bachelor's degree, master's degree, or doctoral degree and higher), occupation (farmer, unemployed, non-governmental organization employee, self-employed, student, government officer, home maker, unskilled worker, or other), people they were cohabiting with (spouse, parents, relatives, none, friend, or other), smoking (yes, no), alcohol consumption (yes, no), vegetable intake (standard portion size of rice spoons/day), fruit intake (portions/day), number of episodes of exercise per week, hours of screen time per day, and hours of sleep per night were coded as categorical variables.

Statistical analysis

Data were imported to Stata version 13 (College Station, Texas, USA) for analysis. Continuous and categorical data were inspected using descriptive statistics to determine the frequencies and percentages (categorical variables) and means, medians and standard deviations (continuous variables) of each socioeconomic, demographic and lifestyle characteristic collected. Bivariate logistic regression was used to estimate the association between each socioeconomic and lifestyle factor and the outcome measure of understanding of fast food consumption. Crude odds ratios (CORs) were computed using 95% confidence intervals (CIs) and variables with statistical significance of $p<0.25$ were entered into the final model. In the final model, multivariate logistic regression was used to estimate the association between socioeconomic lifestyle factors and understanding of fast food consumption. Adjusted odds ratios (AORs) were then computed using 95% CIs. Significance was considered at $p<0.05$.

Results

Characteristics of respondents

A total of 749 participants from five districts and 12 communes were recruited for this study. The socio-demographic characteristics of respondents are summarized in Table 1. Participants were 50.20 % female with an average age of 32 ± 11 years[23]. The relationship status of participants was 53.94% married, 43.52% single, and 2.54% divorced/widowed/separated. Regarding educational attainment, 31.91% of participants had completed high school, 26.44% had completed Bachelor's degrees, whereas 15.22% had only completed primary school. The most common occupations were private company workers (28.97%), self-employed (21.36 %) and students (20.16%), with only 0.67% reporting to be farmers and 0.93% unemployed. Nearly half of the sample lived with their spouse (47.93%), a quarter lived with parents (25.37%), 12.95% lived with other relatives, and only 13.89% of participants lived with fewer than

three family members. Monthly earnings ranged from $40 to $5,100 US with a median of $300 ± 687 USD. Monthly expenditure ranged from $20 to $3,750 USD with median $200 ± 394 USD.

Lifestyle factors

Only 10.41% of participants smoked, and 54.34% had consumed alcohol in the past 12 months. Most participants (65.95%) ate at least 6 portions of vegetables per day, 21.76 % ate between 4 and 6 spoonfuls of vegetables per day, and only 12.28% ate less than 4 spoonfuls. Similarly with fruit, only 44.33% of respondents ate fewer than three portions of fruit portions per day, 20.03% ate between three and five portions per day, and 35.65% ate at least five portions. 54.21% of respondents consumed fewer than six spoonfuls of meat per day, and 45.79% consumed at least six spoonfuls of

Table 1. Socioeconomic and demographic characteristics of respondents.

Characteristics	Number	Percentage (%)
Overall	**749**	
Gender		
Female	376	50.20
Male	373	49.80
Age (years)		
18–29	359	47.93
30–39	206	27.50
40–49	108	14.42
50–59	76	10.15
Mean (SD)	32.26 (11.12)	
Median (Min: Max)	30 (18:59)	
Marital status		
Married	404	53.94
Single	326	43.52
Divorced/widowed/ separated	19	2.54
Educational attainment		
High school	239	31.91
Bachelor degree	198	26.44
Primary school	114	15.22
Secondary school	95	12.68
No formal education	69	9.21
Associated degree	19	2.54
Master degree or higher	15	2.00
Occupation		
Private company worker	217	28.97
Self-employed	160	21.36
Student	151	20.16
Government officer	69	9.21
Others	56	7.48
Housewife	48	6.41
Unskilled worker	25	3.34
Nongovernmental organization employee	11	1.47
Unemployed	7	0.93
Farmer	5	0.67
Number of family members		
<3	104	13.89
3–4	326	43.52
≥5	319	42.59
Mean (SD)	4.46 (1.88)	
Median (Min: Max)	4 (1:12)	
Persons sharing accommodation with		
Spouse	359	47.93
Parents	190	25.37
Relatives	97	12.95
Alone	50	6.68
Friends	33	4.41
Others	20	2.67
Income (USD/Month)		
<200	153	20.43
200–300	163	21.76
>300	433	57.81
Mean (SD)	495 (686.7)	
Median (Min: Max)	300 (40:5100)	
Expenditure (USD/ Month)		
<200	353	47.13
200–300	173	23.10
>300	223	29.77
Mean (SD)	288.5 (394.1)	
Median (Min: Max)	200 (20:3750)	

SD, standard deviation; USD, United States Dollars.

meat per day. With respect to physical exercise and sedentary behavior, 50.07% of the respondents exercised at least weekly. In addition, 73.56% of respondents had at least two hours of screen time a day and 56.21% of the sample slept more than eight hours each night (Table 2).

Fast food knowledge

In their responses to seven questions related to knowledge about fast food consumption, there were four questions which respondents answered correctly at least half the time, and the remaining three questions were answered correctly less than half the time. For example, the question "Milk tea such as pearl tea is good for health because it contains both carbohydrate and dairy milk" was answered correctly as false 38.72% of the time; "Cola drinks containing high carbohydrates could help digestion" was answered correctly as false 45.66% of the time, and "Fast food such as hamburgers and pizza contain fiber which is good for your digestive system" was answered correctly as false 49.93% of the time. Descriptive statistics for all questions are given in Table 3.

Based on respondents' answers to the questions in Table 3, a level of knowledge was assigned as one of three levels; good, fair, and poor, according to Bloom's cut-off point. The range of possible scores was from 0 to 7, and the mean sample score was 4.20 (±1.70). Boundary criteria used were a score of less than 60% signified poor knowledge, a score of between 60 and 79% signified fair knowledge, and a score of 80% or higher signified good knowledge. In the sample of respondents, 52.07% had poor knowledge, 22.70% had fair knowledge, and 25.23% had good knowledge (Table 4).

Factors associated with unsatisfactory knowledge of fast food consumption

Knowledge levels poor and fair were deemed unsatisfactory for the purpose of performing logistic regression to determine the predictive factors of knowledge level. The overall prevalence of poor and fair knowledge of fast food consumption was 74.76% (95%CI: 71.64-77.88%). In a simple bivariate logistic regression, the factors gender, marital status, weekly exercise and nightly hours of sleep were found to be associated with having poor or fair knowledge of fast food consumption ($p<0.25$) and were taken forward as factors in the final model (Table 5).

The final model using a multiple logistic regression, found only two factors to be associated with poor and fair knowledge of fast food consumption. These were weekly exercise and nightly hours of sleep. Those who did not exercise at least once a week (AOR: 1.53, 95%CI: 1.15-2.25; p <0.001) and

Table 2. Lifestyle characteristics of respondents.

Characteristics	Number	Percentage (%)
Smoking		
Non-smoker	78	10.41
Smoker	671	89.59
Alcohol consumption		
Non-drinker	407	54.34
Drinker	342	45.66
Vegetables eaten in portions/day		
<4	92	12.28
4–6	163	21.76
≥6	494	65.95
Mean (SD)	7.29 (7.29)	
Median (Min: Max)	2.9 (0:10)	
Fruit eaten in portions/day		
<3	332	44.33
3–5	150	20.03
≥5	267	35.65
Mean (SD)	3.65 (2.95)	
Median (Min: Max)	3 (0:10)	
Frequency of exercise/week		
<3	89	23.73
≥3	286	76.27
Mean (SD)	4.44 (2.18)	
Median (Min: Max)	4 (1:7)	
Hours of screen time/day		
<2	198	26.44
≥2	551	73.56
Mean (SD)	3.5 (2.8)	
Median (Min: Max)	3 (0:18)	
Hours of sleep/night		
<8	421	56.21
≥8	328	43.79
Mean (SD)	7 (1.3)	
Median (Min: Max)	7 (3:13)	

SD, standard deviation.

Table 3. Knowledge characteristics of fast food.

No	Characteristic	Correct	
		Number	Percentage
1	Bread and baked goods are not good for hypertension patients because they contain high salt levels from the yeast. (True)	507	67.69
2	Fast food such as pizza and fried chicken could cause constipation because of their low vegetable content. (True)	444	59.28
3	Fast food such as hamburgers and pizza contain much fiber which is good for your digestive system. (False)	374	49.93
4	Milk tea such as pearl tea is good for health because it contains both carbohydrate and dairy milk. (False)	290	38.72
5	Fried chicken and French fries are filled with trans fats which could cause cardiovascular disease (True)	595	79.44
6	Cola drinks containing high carbohydrates could help digestion. (False)	342	45.66
7	Carbohydrate drinks such as Coca Cola, Pepsi and Fanta contain large amounts of sugar which could cause weight gain and obesity. (True)	613	81.84

Table 4. Level of knowledge on fast food consumption (n=749).

Characteristics	Number	Percentage (%)	95% CI
Level of knowledge on fast food			
Poor (0.0–4.1) <60%	390	52.07	48.48-55.66
Fair (4.2–5.5) 60-79%	170	22.70	19.69-25.70
Good (5.6–7.0) ≥80%	189	25.23	22.12-28.35
Mean ±SD	4.2 ±1.7		
Median (Min : Max)	4 (0 : 7)		

SD, standard deviation; CI, confidence interval.

those who slept for less than eight hours per night (AOR: 1.45, 95%CI: 1.09-2.12; p =0.014) were more likely to have poor or fair ("unsatisfactory") knowledge of fast food consumption (Table 6).

Discussion

In a random sample of 749 participants across Phnom Penh, the prevalence of unsatisfactory knowledge of fast food consumption was 74.76% (95% CI: 71.64%-77.88%). 52.07% of the sample (95% CI: 48.48%-55.66%) had poor knowledge, 22.70% (95% CI: 19.69%-25.70%) had fair knowledge and 25.54% had good knowledge (95% CI: 25.23%-28.35%). This result is contradictory to the findings of a previous study on the knowledge of fast food consumption in Jakarta, Indonesia[24], which showed 73.2% of the sample to have a good level of knowledge, 25.3% moderate and only 1.6% low. The two samples represent two different geographical areas and target populations; and further used different methodologies (i.e. different thresholds for discrete knowledge levels). However, the findings of the present study are in agreement with those of a study conducted in Karnataka, India, which reported 31.9% of respondents as having inadequate levels of knowledge around fast food, 41.9% moderate knowledge and only 26.2% to be adequate[25].

In the present study, the two factors found to be associated with unsatisfactory levels of knowledge about fast food consumption were not taking weekly exercise and sleeping less than eight hours a night. Individuals who did not do any exercise were 1.53 times more likely to have unsatisfactory knowledge of fast food consumption compared to those who did (95% CI: 1.15-2.25, p<0.001). It is likely that having a poor general understanding of health and wellbeing would be associated with low levels of exercise, and with having

Table 5. Association of socioeconomic and lifestyle characteristics with knowledge of fast food consumption (KFF) using simple logistic regression (n=749).

Characteristics	Number	%KFF	OR	95%CI	p-value
Overall	**749**	74.76	N/A	71.64-77.88	N/A
Gender					
Female	376	72.87	1		0.230
Male	373	76.68	1.22	1.35 - 2.46	
Age (years)					0.050
31–59	390	71.79	1		
18–30	359	77.99	1.39	1.00-1.95	
Marital status					
Married	404	73.02	1		0.023
Unmarried	345	76.81	1.22	0.87- 1.70	
Educational attainment					0.979
>High school	471	37.58	1		
≤High school	278	40.65	1.00	0.71-1.41	
Occupation					0.572
Employed	543	74.22	1		
Unemployed	206	76.21	1.11	0.76- 1.62	
Number of family members					0.349
≥5	319	73.04	1		
<5	430	76.05	1.17	0.84- 1.63	
Persons sharing accommodation with					0.998
Not Family	103	74.76	1		
Family	646	74.77	1.00	0.62-1.61	
Income (US Dollar/Month)					0.418
≥300	429	73.66	1		
<300	320	76.25	1.05	0.76- 1.44	
Expenditure (US Dollar/Month)					0.641
<300	525	74.29	1		
≥300	224	75.89	1.08	0.75-1.56	
Smoking					0.453
Non-Smoker	671	74.37	1		
Smoker	78	78.21	1.23	0.70- 2.17	
Alcohol consumption					0.336
Non-Drinker	342	73.10	1		
Drinker	407	76.17	1.17	0.63-3.01	

Characteristics	Number	%KFF	OR	95%CI	p-value
Vegetables eaten in portions/day					0.754
≥4	657	74.58	1		
<4	92	76.09	1.08	0.65-1.80	
Fruit eaten in portions/day					0.418
≥3	417	73.62	1		
<3	332	76.20	1.15	0.82-1.60	
Meat eaten in portions/day					0.267
<6	406	73.15	1		
>=6	343	76.68	1.20	0.86-1.68	
Frequency of exercise/week					
No	375	70.67	1		<0.001
Yes	374	78.88	1.47	1.08-1.98	
Hours of screen time/day					
<2	198	74.75	1		0.994
≥2	551	74.77	1.00	0.68-1.45	
Hours of sleep/night					
≥8	328	70.73	1		0.025
<8	421	77.91	1.45	1.04-2.03	

OR, odds ratio; CI, confidence interval.

Table 6. Association of socioeconomic and lifestyle characteristics with knowledge of fast food consumption (KFF) using multiple logistic regression (n=749).

Characteristics	Number	%KFF	Crude OR	Adjusted OR	95%CI	p-value
Overall	749	74.76	N/A	N/A	71.64-77.88	N/A
Exercise						<0.001
Yes	375	70.67	1	1		
No	374	78.88	1.47	1.53	1.15-2.25	
Hours of sleeping/night						0.014
≥8	328	70.73	1	1		
<8	421	77.91	1.45	1.64	1.09-2.12	

OR, odds ratio; CI, confidence interval.

the wrong perceptions and assumptions about fast food consumption[26]. Finally, those who slept less than eight hours per night were 1.64 times more likely to have unsatisfactory knowledge of fast food compared to those who slept at least eight hours per night (95% CI: 1.09-2.12, p=0.014). This further reinforces the argument that general understanding of health and wellbeing reflects strongly on individual factors. It is likely that for those who did not understand the impact of fast food on a person's health also did not understand the risk factors of getting insufficient amounts of sleep[27].

Limitations of the study

Firstly, the participants in this investigation were from a capital city and these results may not be representative of the whole population of Cambodia; if other provinces or cities were included, the results might be different. Secondly, as the current study was a cross-sectional analytical study, we could not infer causality. Lastly, all information collected in the study was based on self-reporting; there might be methodological bias due to under- and over-reporting of certain behaviors.

Conclusion

The prevalence of poor and fair knowledge of fast food consumption in Cambodia has become a recent concern for public health. This study found that insufficient levels of exercise and not getting enough sleep were both predictors of inadequate understanding around the impact of fast food on health, in a sample of 749 individuals in Phnom Penh. Based on these research findings, we recommend taking measures to improve public understanding of the impact of fast food consumption on health. Cooperation from all stakeholders within each Cambodian government ministry is needed to promote and raise awareness of fast food consumption within the population.

Data availability

Underlying data

Figshare: Socio-demographic and Lifestyle factors associated with Understanding Fast Food Consumption among Adults in Cambodia. https://doi.org/10.6084/m9.figshare.12894740.v1[23]

This project contains the following underlying data:

- Knowledge of fast food consumption.xlsx
- Code Book (Knowledge of fast food consumption).docx

Extended data

Figshare: Socio-demographic and Lifestyle factors associated with Understanding Fast Food Consumption among Adults in Cambodia. https://doi.org/10.6084/m9.figshare.12894644.v1[22]

This project contains the following extended data:

- Questionnaire in English.docx
- Questionnaire in khmer.docx

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