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Original Article

Public Health Section

Fast Food Consumption, Overweight and Obesity among Working Age Persons in Cambodia

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ABSTRACT

Introduction: Overweight and obesity is an emerging public health concern in developing countries. Some studies reported fast food consumption as one of the major risk factors of overweight and obesity.

Aim: This study aimed to determine the prevalence of fast food consumption and its association with overweight and obesity among working age persons in Phnom Penh capital city of Cambodia.

Materials and Methods: A cross-sectional study was conducted among 749 working age persons aged 18-59 years who were selected from 12 communes from 5 districts in Phnom Penh capital city of Cambodia by applying multistage random sampling method. Then, the respondents were requested to response to a structured questionnaire interview and anthropometric measurement. Overweight, Body Mass Index (BMI ≥23.00-24.99 kg/m^2) and obesity (BMI≥25.00 kg/m^2), the main outcome variables was determined by using World Health Organisation (WHO, 2000) for Asian cut-off points. Multiple logistic regressions was performed to determine the association between fast food consumption and overweight as well as obesity status while controlling other covariates and presenting adjusted odds ratio (OR adj.) with 95% Confident Interval (CI) and p-value.

Results: Of the total 749 respondents, 50.20% were female with a mean age of 32.26±11.12 years. As high as 62.75%; 95% CI: (59.28%-66.22%) consumed fast food during the past one month. The prevalence of overweight and obese population was 38.72% (95% CI: 35.22%-42.21%). Fast food consumption was significantly associated with overweight and obesity (OR adj.=2.00; 95% CI: 1.39-2.88; p<0.001). Other significant covariates were; male gender (OR adj.=1.53; 95% CI: 1.06-2.20; p=0.020, adults aged 31-59 years (OR adj.=3.02; 95%CI: 1.98-4.62; p<0.001, married (OR adj.=1.69; 95% CI: 1.12-2.54; p=0.012, had family history of overweight and obesity (OR adj.=1.50; 95% CI: 1.01-2.22; p=0.043, drank alcohol (OR adj.=1.60; 95% CI: 1.10-2.31; p=0.013) and had hypertension (OR adj.=2.14; 95% CI: 1.45-3.19; p<0.001).

Conclusion: Fast food consumption and over-nutrition are significant problem in Cambodia. Majority of adults aged 31-59 years are overweight as well as obese. So, identifying factors influencing fast food consumption and over-nutrition as well as developing evidence-based approaches to address these problems will help in advancing prevention and management of fast food consumption. It will also reduce over-nutrition in an appropriate manner.

Keywords: Cross-sectional study, Multiple logistic regression, Over-nutrition

INTRODUCTION

Overweight and obesity is an abnormal fat accumulation that put human health at risk since it is associated with chronic non-communicable diseases such as Cardiovascular Disease (CVD), hypertension, type-II diabetes and certain types of cancer such as Colorectal Cancer (CRC), stomach cancer, liver and post menopausal breast cancers and even lung cancer also [1-3]. It is a major public health concern [3-6] in both developed and developing countries [3,7]. In 2016, 39% of adults aged 18 years and above were overweight and 13% were obese worldwide [8].

There is no single cause associated with overweight and obesity. Multi-factorial problems have been found including socioeconomic, lifestyle, social factors, cultural factors, physical inactivity, family history of obesity, sedentary activities, stress and dietary behaviour [5,9-11]. Among the inappropriate dietary behaviours, fast food consumption was found to have the largest influence on overweight and obesity [12-15]. Fast food is convenient and preferred by most people [16]. Moreover, fast food contains large portion of sugar, salt, highfat contents, high calorie densities, low micronutrients and fiber [17] and provides more energy than the requirements of the daily energy, in addition, the entire menu of fast food has double energy density compared to that of a healthy menu [18,19].

Over the past decades, fast food has been one of the most quickly appearing food categories [20] and increasing dramatically in the world [21,22]. Rice, fruits, vegetables and low fatty food are the main traditional dietary patterns in Asia; currently, the situation has been dramatically changed to more westernised diets which contain more sugar, saturated fat and high energy densities [5]. No exceptions for Cambodia, fast food and soft drink become socially acceptable and affordable in Cambodian society because it can be seen across the country, especially the drastic growth of fast food outlets in the urban areas [23].

In Cambodia, 82.7% of the population was working age persons and previous studies indicated that 10.5% of men and 16.3% of women among working age persons in Cambodia were classified as overweight and obesity [24]. With the continuous economic development, fast food has bloomed with socially acceptable and affordable in Cambodia society. However, very little has been known about fast food consumption behaviours, there association between fast food consumption, overweight and obesity among working age persons (18-59 years) in Cambodia [25].

Therefore, this study aimed to determine the association between fast food, overweight and obesity among working age persons in Phnom Penh capital city of Cambodia to yield important information for public health professionals and policymakers to initiate the intervention in policy making.

MATERIALS AND METHODS

A cross-sectional analytical study was conducted between March-July 2018. The study population was working age

persons in Phnom Penh capital city of Cambodia. This research project and tool got approval from the Khon Kean University Ethics Committee in Human research (HE582071). The sample size was calculated by using the formula required for determination of sample size for estimating single proportion by taking a previous study done on fast food consumption and overweight and obesity in South Africa, which showed 49.7% proportion of fast food consumption in the previous seven days, 95% confidence interval and a margin error of 5% [17,26]. Therefore, the total number of samples was 749. The samples were selected by applying a multi-stage random sampling technique. A simple random sampling was used to select 12 communes from 5 districts in Phnom Penh capital city of Cambodia. Then, 749 households were selected from the total 44,436 households by applying systematic random sampling technique among those 12 communes in proportional to size of the population. Finally, one member of each household aged 18-59 years was selected or randomly selected if the household had more than one member of the mentioned age group. The inclusion criteria of the respondents were the residents living in Phnom Penh capital city for at least one year, willing to participate in the study, having no communication problems with the researcher. The exclusion criteria were those who were unable to move, or suffering from the debilitating disease. The participants were requested to respond to a structure questionnaire interview in their own house and anthropometric measurements were also performed.

Research Instruments

A structure questionnaire was developed based on the research questions and relevant literatures. The questionnaire consisted of four parts:

Part 1: Demographic and Socioeconomic Characteristics: gender, age, marital status, educational attainment, occupation sectors, family members, personal monthly incomes, personal monthly expense, family monthly incomes and family monthly expenditures. Part 2: Health Status and History: family history of overweight and obesity, chronic disease (diabetes, hypertension) any treatment or advice, understanding on nutrition fact label of food. Part 3: Lifestyle and Behaviours: tobacco uses, alcohol consumption, food habits, physical activities and sedentary behaviour. Part 4: Situations of fast food consumption, questions were assessed in this part including: Have you ever consumed fast food in the past one month? What types of fast food do you consume? How often do you consume fast food? On what occasions do you consume fast food? What do you consume fast food for? Whom do you consume fast food with? How much do you spend on fast food consumption? Where do you consume fast food from? How do you get the information about fast food?

Measurement of Outcome: Body height in centimeters (cm) and weight in kilograms (kg) were measured to the nearest 0.1 cm and 0.1 kg by using metering object and digital weighing instrument. Overweight and obesity defined as BMI ≥23 kg/m^2 by WHO [27] for Asian cut-off points was the main outcome of the study. The questionnaire has been verified for content validation by 5 experts and revised to improve its validity. Moreover, the questionnaire was tested for reliability by calculating Cronbach's alpha among 30 participants in other districts of Phnom Penh capital city. The Cronbach's alpha coefficient was 0.857.

Data Collection

The respondents were asked to sign the written consent form if they were willing to participate in the study after Ethical clearance and approval was obtained from the office of the KhonKaen University ethics committee in human research. All confidentiality of data was fully assured. A structured questionnaire interview was conducted to collect the data from 3 interviewers who were trained and standardisation for data collection skills.

STATISTICAL ANALYSIS

Descriptive analysis were conducted using a frequency distribution for the categorical variables and mean with Standard Deviation (SD) for continuous variables. Both bivariate and multiple logistic regression were applied to identify the association between fast food, overweight and obesity by adjusting other covariates. All statistically significant variables in bivariate logistic regression having p-value less than 0.25 were added to the multiple logistic regressions. Crude Odds Ratio (ORs) and Adjusted Odds Ratios (AORs) were calculated and reported with 95% confident intervals. All statistical tests were two-sides and p-value less than 0.05 were considered statistically significant. Stata version 13 (College Station, Texas, USA) was used for analysis.

RESULTS

The baseline characteristics of the 749 respondents in the study showed that half of them were female (50.20%) with the mean age 32.26±11.12 years ranging from 18 to 59-year-old. Most of respondents were married (53.94%), high school (31.91%) and private company staff (28.97%). The median family size was 4 persons. As many as 47.93% of respondents lived with their spouses. The median monthly income and expense were 300 USD and 200 USD respectively; however, the lowest earning was only 40 USD. Less than a quarter (24.57%) of respondents had family history of overweight, obesity and diabetics (18.96%). About a quarter (25.77%) had hypertension. Only (10.41%) smoked; however, more than half (54.34%) drank in the last 12 months [Table/Fig-1].

Almost one third of the working age persons consumed fast food during the past one month (62.75%: 95% CI: 59.28%-66.22%). The most common fast food consumed were sweetened soft drinks such as coffee with milk, fruit Juice, energy drinks, cocoa brewed (36.65%), followed by carbonated soft drinks (17.76%), Meat (roast/toast/grill/fried chicken, bacon, pork, steak, meat ball, sausage and ham) 16.15%, Pasta (pizza, spaghetti, macaroni) 14.15%, meat with bread (hamburger, sandwiches, hot dog) 10.15% and Bakery (cake, doughnuts, cookies, biscuits, cracker) 4.54% [Table/Fig-2].

Nearly half (42.55%) of the respondents consuming fast food drank sweetened soft drink 7 times per week. Carbonated soft drink was consumed almost equally from 1 to 7 times per week. However, Pasta, Meat with bread and Bakery were the types of fast food which were consumed the least [Table/Fig-3].

The overall prevalence of overweight and obesity were 38.72% (95% CI: 35.22-42.21). The bivariate analysis indicated that fast food consumption, sex, age, marital status, occupation, family size, whom you live with, income, family history of overweight and obesity, hypertension, diabetes, smoke, drinking alcohol, fruit consumption, exercises, screen time, sleeping time and soft drink consumption were significantly associated with overweight and obesity [Table/Fig-4].

The final model after adjusting for other covariates in the multiple logistic regression analysis showed that fast food consumption was significantly associated with overweight and obesity (OR adj=2.00; 95% CI: 1.39-2.88; p<0.001). Other significant covariates were; male gender (OR adj=1.53; 95%CI: 1.06-2.20; p=0.020, adults age 31-59 years (OR adj=3.02; 95% CI: 1.98-4.62; p<0.001, married (OR adj=1.69; 95% CI: 1.12-2.54; p=0.012, had family history of overweight and obesity (OR adj=1.50; 95% CI: 1.01-2.22; p=0.043, drank alcohol (OR adj= 1.60; 95% CI: 1.10-2.31; p=0.013) and had hypertension (OR adj=2.14; 95% CI: 1.45-3.19; p<0.001) [Table/Fig-5].

Characteristics	Number	Percentage (%)
Overall	**749**	
Sex		
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
NGO employee	11	1.47
Unemployed	7	0.93
Farmer	5	0.67
Family member (persons)		
<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)	
Whom you live with		
Spouse	359	47.93
Parents	190	25.37
Relatives	97	12.95
Alone	50	6.68
Friend	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)	
Family history of overweight and obesity		
Yes	184	24.57
No	565	75.43
Hypertension		
Yes	193	25.77
No	556	74.23
Diabetes		
Yes	142	18.96
No	607	81.04
Smoking		
Non-smoker	78	10.41
Smoker	671	89.59
Drinking alcohol		
Non-drinker	407	54.34
Drinker	342	45.66
Vegetable eaten in spoon/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 portion/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)	
Times for exercise per 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 per day		
<2	198	26.44
≥2	551	73.56
Mean±SD	3.5±2.8	
Median (Min: Max)	3 (0:18)	
Hours of sleeping per day		
<8	421	56.21
≥8	328	43.79
Mean±SD	7±1.3	
Median (Min: Max)	7 (3:13)	

[Table/Fig-1]: Baseline characteristics of study population.

DISCUSSION

In the current study, the overall combined prevalence of overweight and obesity (BMI ≥23 kg/m^2) was 38.72% with the classification of overweight (BMI ≥23.0-24.99 kg/m^2) was 16.69% and obesity (BMI ≥25 kg/m^2) was 22.03%, respectively. The prevalence of current study is higher if compared to the previous study conducted by Ministry of Health of Cambodia because it was conducted in the whole country and used different cut-off point [24]. Comparing the study with the result of the national Thai food consumption showed that the prevalent of overweight and obesity in Thai population was similar to the current study (40.9%) [28]. In addition, a study in Malaysia [29] found that the prevalence of overweight and obesity

Fast food consumption and types of fast food	Number	Percentage (%)
Fast food consumption		
No	279	37.25
Yes	470	62.75
Types of fast food		
Sweetened drinks (Coffee with milk, Fruit juice, Energy drinks, Cocoa brewed)	282	36.65
Carbonated soft drink (Coca cola, Pepsi, Fanta)	133	17.76
Meat (Roast/Toast/Grill/Fried Chicken, Bacon, Pork, Steak, Meat Ball, Sausage, Ham)	121	16.15
Pasta (Pizza, Spaghetti, Macaroni)	106	14.15
Meat with bread (Hamburger, Sandwiches, hot dog)	76	10.15
Bakery (Doughnuts, Cookies, Biscuits, Crackers)	34	4.54

[Table/Fig-2]: Fast food consumption and types of fast food.

Types of fast food	Frequency of those consuming fast food per week (%)						
	1 time	2 times	3 times	4 times	5 times	6 times	7 times
Sweetened soft drinks	44 (15.60)	36 (12.77)	33 (11.70)	25 (8.87)	22 (7.80)	2 (0.71)	120 (42.55)
Carbonated soft drink	27 (20.30)	30 (22.56)	23 (17.29)	11 (8.27)	12 (9.02)	3 (2.26)	27 (20.30)
Meat	61 (50.41)	32 (26.45)	15 (12.40)	7 (5.79)	0 (00.00)	0 (00.00)	61 (4.96)
Pasta	61 (50.41)	19 (17.92)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)	0 (00.00)
Meat with bread	39 (50.32)	25 (32.89)	8 (10.53)	1 (1.32)	2 (2.63)	0 (00.00)	1 (1.32)
Bakery	17 (50.00)	7 (20.59)	5 (14.71)	0 (00.00)	3 (8.82)	0 (00.00)	2 (5.88)

[Table/Fig-3]: Frequency of those consuming fast food per week.

Characteristics	Number	Overweight and Obesity (%)	Crude OR	95% CI	p-value
Overall	749	38.72	N/A	35.22-42.21	N/A
Fast food consumption					0.001
Non-Consumer	279	31.54	1		
Consumer	470	42.98	1.63	1.19-2.23	
Sex					<0.001
Female	376	31.65	1		
Male	373	45.84	1.82	1.35-2.46	
Age (years)					<0.001
18-30	359	21.45	1		
31-59	390	54.62	4.40	3.19-6.07	
Marital status					
Unmarried	345	24.64	1		<0.001
Married	404	50.74	3.15	2.30-4.30	
Educational attainment					0.400
>High school	471	37.58	1		
≤High school	278	40.65	1.13	0.83-1.54	
Occupation					<0.001
Unemployed	206	24.27	1		
Employed	543	44.20	2.47	1.72- 3.54	
Family member (persons)					0.012
≥5	319	33.54	1		
<5	430	42.56	1.46	1.08- 1.98	
Whom you live with					0.004
Without family	103	26.21	1		
With family	646	40.71	1.93	1.21-3.08	
Income (US Dollar/Month)					0.785
<300	526	38.40	1		
≥300	223	39.46	1.05	0.76-1.44	
Expenditure (US Dollar/Month)					0.939
<500	123	39.02	1		
≥500	626	38.66	0.98	0.66-1.46	
Family history of overweight and obesity					<0.001
No	565	35.22	1		
Yes	184	49.46	1.79	1.28-2.51	
Hypertension					<0.001
No	556	30.58	1		
Yes	193	62.18	3.73	2.65-5.25	
Diabetes					<0.001
No	607	33.61	1		
Yes	142	60.56	3.03	2.08- 4.42	
Smoking					<0.001
Non-smoker	671	35.92	1		
Smoker	78	62.82	3.01	1.85-4.89	
Drinking alcohol					<0.001
Non-drinker	342	28.65	1		
Drinker	407	47.17	2.22	1.63-3.01	
Vegetable eaten in spoons per day					0.547
<4	92	35.87	1		
≥4	657	39.12	1.14	0.72-1.80	
Fruit eaten in portions per day					0.080
<3	332	35.24	1		
≥3	417	41.49	1.30	0.96-1.75	
Times for exercise per week					
<3	463	35.21	1		0.012
≥3	286	44.41	1.47	1.08-1.98	
Hours of screen time per day					
≥2	198	42.93	1		0.157
<2	551	37.21	1.27	0.91-1.77	
Hours of sleeping per day					
≥8	421	42.76	1		0.010
<8	328	33.54	1.48	1.09-1.99	
Carbonated soft drink time per week					0.822
≥3	106	37.74	1		
<3	643	38.88	1.05	0.69-1.60	
Soft drink					
<3 times/week	547	34.73	1		0.001
≥3 times/week	202	49.50	1.84	1.32-2.55	
Meat time per week					0.397
<3	721	38.42	1		
≥3	28	46.43	1.39	0.65-2.96	
Pasta time per week					
≥1	106	34.91	1		0.381
<1	643	39.35	1.21	0.79-1.86	
Meat with bread time per week					0.504
<3	737	37.99	1		
≥3	12	83.33	8.16	0.78-37.51	
Bakery time per week					0.933
<3	739	35.29	1		
≥3	10	38.80	1.06	0.30-3.77	

[Table/Fig-4]: Crude odds ratios of having (O/B) and their 95% confidence intervals for each factor.

were 33.6% (95% CI= 32.2, 35.0) and 19.5% (95% CI= 18.3, 20.7) respectively. The prevalence of overweight and obesity among adults in Northeast India by using the same WPRO for ASEAN standard cut-off point was similar in total, but lower for obesity, as

Characteristics	Number	% O/B	Crude OR	Adjusted OR	95% CI	p-value
Overall	749	38.72	N/A	N/A	35.22-42.21	N/A
Fast food consumption						<0.001
Non-consumer	279	31.54	1	1		
Consumer	470	42.98	1.63	2.00	1.39-2.88	
Sex						0.020
Female	376	31.65	1	1		
Male	373	45.84	1.82	1.53	1.06-2.20	
Age (years)						<0.001
18-30	359	21.45	1	1		
31-59	390	54.62	4.40	3.02	1.98-4.62	
Marital status						0.012
Unmarried	345	24.64	1	1		
Married	404	50.74	3.15	1.69	1.12-2.54	
Family history of overweight and obesity						0.043
No	565	35.22	1	1		
Yes	184	49.46	1.79	1.50	1.01-2.22	
Hypertension						<0.001
No	556	30.58	1	1		
Yes	193	62.18	3.73	2.14	1.45-3.19	
Drinking alcohol						0.013
Non-drinker	342	28.65	1	1		
Drinker	407	47.17	2.22	1.60	1.10-2.31	

[Table/Fig-5]: Adjusted Odds ratios (ORadj) of having Overweight/Obesity (O/B) and their 95% confidence intervals for each factor adjusted for all other factors presented in the table using multiple logistic regression.

for overweight it was 32,57% and obesity was 10.77% [30]. In urban Srilankan adults overweight was 32.7% and obesity was 18.5% [31]. Over-nutrition prevalence was very high in Accra Metropolis, Ghana of which there were17.8% obese and 37.8% overweight [32]. Previous studies indicated that fast food consumption was strongly associated with overweight and obesity [33-36].

The multivariable analysis of this study confirmed that fast food consumption was significantly associated with overweight and obesity among working age persons in Phnom Penh city, Cambodia. Those who consumed fast food were 2.00 times more likely to be overweight and obese. The possible explanation is that fast food contains high calories, sugar, salt, high fat contents, but low of micronutrients and fiber that could provoke the changes of appetite controlling in human organism [18,37].

Some studies indicated the higher prevalence of overweight and obesity in male compare to female [13,38,39], in this study, male gender was 1.54 times higher odds of being overweight and obesity when compared to female. In contrast to this finding, other studies found that there was higher prevalence among female than male [29,40-42]. The reasons that male has higher prevalence of overweight and obesity compared to female may be related to body image and beauty concern of women. Most of women in present study engaged in some types of weight control including physical activities and consumed less. Furthermore, due to societal traditions, women play an important role in family, community life and economy, even though women were busy in their job or work, women still had shared time with their household chores that burn out the calories.

Participants whose age was 31-59 years were 2.89 times more likely to be overweight and obese when compared to those whose age was 18-30 years. As a result, it can be seen that overweight and obesity increases significantly with age. It might be due to the fact that with the increase in age, the engagement in physical activities decreases which contributed to overweight and obesity [31,42,43].

Those who were married were 1.74 times more likely to be overweight and obese than those who were unmarried. Reasons might be explained, that people who were married become more comfortable with their lifestyle and appearance and let themselves go whereas single person may spend more effort to keep fit in order to be attractive [30,32,45].

Participants who had family history of overweight and obesity were 1.51 times more likely to be overweight and obesity. In term of environmental factors in family, family lifestyle and poor dietary pattern especially wrong perception of parents viewing overweight and obesity was not potential risk factors of subsequent health complications that might affect behaviours of their offspring which related to overweight and obesity. Concerning biological nature, the genetic might influence offspring to develop this condition [40,43].

Those who had hypertension were 2.19 times more likely to be overweight and obese compared to those who had no hypertension. The reason may be, our study involve comparatively older age respondents, therefore, it might have more chances to get greater adiposity [29,45,46].

Finally in the present study, it was found that those who drank alcohol were 2.19 times more likely to be overweight and obese compared to those who did not drink alcohol. This could be due to more calories without right mix of nutrients are consumed. Furthermore, drinking alcohol might change the lifestyle, not engaged in physical activities [32].

LIMITATION

This study had some limitations. First, currunt study is focused and carried out in the capital city, therefore it could not represent the whole population of Cambodia. Second, as the current study was a cross-sectional analytical study, it could not infer causality; therefore, further study with operational research or longitudinal cohort study design is recommended to provide the better understanding of the causal relationship between fast food consumption and overweight and obesity among working age persons in Cambodia.

CONCLUSION

This study revealed that the majority of fast food consumer was overweight and obese among working age population in Cambodia. Since Cambodia economy has been increasing in the last decade therefore the lifestyles of the people have been changed. It shows that Cambodian has a significant problem of fast food consumption and overweight. Therefore, findings of this study will develop evidence-based approaches to address these problems which will help in advancing prevention and management of fast food consumption and will reduce over-nutrition.

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