Journal of Cambodian Health
Volume. 2, Issue. 2, 2024, v2202
https://doi.org/10.70243/jch2024.2202

OPEN ACCESS

Unhealthy food consumption among women at reproductive age in Cambodia: Analysis of Cambodia Demographic and Health Survey 2021–2022

Research Article

Samnang Um[1*], Sokhoeun Eat[2], Somany Mok[3], Pall Chamroen[1,4], Chantrea Sieng[5], and Sovandara Heng[6]

[1] National Institute of Public Health (NIPH), Phnom Penh, Cambodia
[2] Foundation Year Department, Faculty of Health Science and Biotechnology, University of Puthisastra, Phnom Penh 12211, Cambodia
[3] Public Health Freelancer Consultant, Phnom Penh, Cambodia
[4] KHANA Center for Population Health Research, Phnom Penh, Cambodia
[5] Outpatient Department, Calmette Hospital, Phnom Penh, Cambodia
[6] Department of Mental Health and Substance Abuse, Khmer Soviet Friendship Hospital, Phnom Penh, Cambodia

Article history
Received: 21 August 2024
Revised: 27 September 2024
Accepted: 5 November 2024
Published: 7 November 2024

Keywords
Unhealthy food consumption
Women at reproductive age
CDHS
Cambodia

Abstract: Noncommunicable diseases (NCDs) are significant global health issues; we examined the prevalence of unhealthy food consumption and used logistic regression to analyze its association with socio-demographic characteristics using data from the 2021-2022 Cambodia Demographic and Health Survey (CDHS), which included 19,496 women aged 15–49. Overall, 33.0% (95%CI: 31.9–34.2) of women consumed unhealthy foods within 24 hours, 21.1% (95%CI: 20.1–22.1) consumed sweet foods, 18.2% (95%CI: 17.4–19.1) consumed salty foods, 58.3% (95%CI: 57.1–59.5) consumed sweet beverages, and 16.3% (95%CI: 15.3–17.3) consumed alcohol in the last month. Only 1.5% (95%CI: 1.3–1.7) of women smoked cigarettes. Factors associated with increased odds of consuming unhealthy food included aged 15–19 years (AOR = 1.7; 95% CI: 1.5–2.1), 20–29 years (AOR = 1.3; 95% CI: 1.1–1.5), and 30–39 years (AOR = 1.3; 95% CI: 1.2–1.5), higher education (AOR = 1.6; 95% CI: 1.3–2.0), and wealthier households (AOR = 1.1; 95% CI: 0.9–1.2), residing in capital city (AOR = 2.4; 95% CI: 1.9–3.1). The study found a high prevalence of unhealthy food consumption among Cambodian women. Younger age, higher education, wealthier households, and residing in the capital city were associated with consuming unhealthy food. Public health interventions should prioritize mitigating the risk of NCDs among Cambodian women by promoting healthier lifestyles.

1. Introduction

Noncommunicable diseases (NCDs) encompass a wide range of conditions, many of which are linked to the consumption of unhealthy food, and have emerged as a significant global health challenge, disproportionately affecting older adults and individuals with higher socioeconomic status, as indicated by factors such as income, education, and occupation (Kang et al., 2021; WHO, 2023a). Currently, NCDs are increasing in developing countries, becoming the leading cause of mortality, as well as a financial burden (WHO, 2023b). By 2023, the World Health Organization (WHO) estimated that NCDs contributed to about 77% of the total deaths (or 31.4 million) annually worldwide, while 77% of deaths

***Corresponding author**: Samnang Um, umsamnang56@gmail.com

occurred in low- and middle-income nations. In addition, about 17 million people die from NCDs before the age of 70 years old annually, with 86% of these premature deaths occurring in low- and middle-income countries (WHO, 2023a).

Chronic diseases (NCDs) are long-lasting conditions caused by behavioral, physiological, environmental, and genetic variables (Calcaterra & Zuccotti, 2022). Within 17.9 million people die from cardiovascular diseases, 9.3 million from cancers, 4.1 million from chronic respiratory diseases, and 2.0 million from diabetes, including kidney disease deaths caused by diabetes (WHO, 2023a). WHO informed that using tobacco, including secondhand smoke, consuming unhealthy food, harmful use of alcohol, and physical inactivity were associated with increased risk of NCDs (WHO, 2023a). As a result, tobacco use accounts for over 8 million deaths every year (including secondhand smoke) (IHME., 2020), with 1.8 million deaths attributed to excess salt/sodium intake (IHME., 2020). More than half of the 3 million annual deaths are attributable to alcohol use, and 830,000 deaths annually can be attributed to insufficient physical activity (IHME., 2020). Since 2010, to prevent NCDs, the WHO has recommended reducing the significant risk factors to promote health risk behavior by raising awareness and intervention to avoid tobacco use, unhealthy diet, the harmful use of alcohol, and performing physical activity (WHO, 2010).

The rapid growth of the Cambodian economy, an average of 7% per year, has also led to increased life expectancy at birth, from 58.6 years in 2000 to 70.7 years in 2019 and 76.1 years in 2020 to 82.8 years by 2033 (United Nations, 2022). Consequently, the proportion of the population older than 35 is estimated to increase from 26.1% in 2000 to 43.7% in 2033 (United Nations, 2022). In 2018, NCDs accounted for 64% of all deaths in Cambodia (WHO, 2018), with one in every four Cambodians (23%) dying prematurely, before the age of 70 years, from one of the four main NCDs: cardiovascular disease (heart disease), diabetes, chronic respiratory disease, and cancer. Addressing this issue is essential to achieving the Sustainable Development Goal, target 3.4, which is newly targeted at countries aimed at reducing premature mortality from NCDs by one-third by 2030.

In Cambodia, the prevalence of hypertension (HTN) and Type 2 Diabetes (T2DM) among adults aged 30–79 years has been a persistent issue, mainly due to a lack of awareness about these conditions (Te et al., 2023; WHO, 2018), and limited availability of HTN and T2DM services in Cambodian primary care facilities (Chham et al., 2022; Chhim et al., 2023; MoH, 2019a; Te et al., 2023; Te et al., 2022). The burden of T2DM and HTN has dramatically increased in recent years. In 2010, the proportion was 2.9% and 11.2% among the population aged 25–64, respectively, rising to 9.6% and 14.2% among those aged 18–69 by 2019 (MoH, 2019a) and up to 23.5% among adults aged 40–69 in 2022 (Chham et al., 2022). By 2020, the prevalence had increased to 35.2% for HTN and 37.2% for T2DM among adults aged 40 and older, with 34.7% having both T2DM and HTN (Chham et al., 2022; Chhim et al., 2023).

In Cambodia, they are limited and less likely to focus on NCD prevention in women, including risk factors of NCDs, particularly unhealthy food consumption (MoH, 2019a; Te et al., 2022; WHO, 2018). Unhealthy foods and sweet beverages should be limited because they are associated with overweight, obesity, and noncommunicable diseases (MoH, 2019a; Te et al., 2023; Um & Yom, 2024; Um et al., 2023). The burden of overweight and obesity among non-pregnant women of reproductive age increased from 18% (15.2% overweight and 2.8% obese) in 2014 to 33% (26% overweight and 6% obese) in 2021–2022 (Um & Yom, 2024; Um et al., 2023). Additionally, 16.6% of women reported consuming alcohol in the past months (Um & Yom, 2024), while the prevalence of smoking was only 2% (Um & Yom, 2024). Similarly, data from 2021-2022 CDHS show that 63% of women consumed sweet beverages, and 33% consumed unhealthy foods the previous day (NIS, 2022). According to the 2016 Cambodia STEPS survey, 46.4% of respondents reported consistently or often adding salt when cooking or preparing food at home, and 13% had low physical activity in 2016 (UHS, 2016). In 2019, the International Diabetes

Federation (IDF) reported that 1 in 16 Cambodian adults had diabetes (IDF Diabetes Atlas, 2021). In 2021, almost 600,000 Cambodians were living with this disease. This number will increase to 1 million by 2045 (IDF Diabetes Atlas, 2021). The rise in diabetes cases is closely related to changes in people's diet habits and the country's urbanization (IHME., 2020; MoH, 2019a; WHO, 2023b). To address these issues, the Cambodian Ministry of Health has implemented various public health strategies through multiple intervention channels, such as raising awareness campaigns, media leaflets, posters, videos, and health education. These efforts aim to promote healthier behaviors and reduce the burden of NCDs by encouraging healthier dietary choices, reducing the consumption of high-sugar food, salty food, and lipids, limiting tobacco and alcohol use, promoting physical activity, providing adequate screening and treatment, and palliative care and promotion (MoH, 2019b).

A study on unhealthy food consumption and its determinants among women has yet to be explored in Cambodia. Understanding the prevalence and predictors of risk factors among women of reproductive age (15–49 years) is essential for designing effective health interventions to reduce the burden and impact of NCDs. Therefore, we aimed to determine the prevalence and examine socio-demographic and behavioral factors associated with unhealthy food consumption among women in Cambodia.

2. Methods

2.1. Data source

We analyzed existing data on women from the Cambodia Demographic and Health Survey (CDHS), a nationally representative population-based household survey collected from September 15, 2021, to February 15, 2022 (NIS, 2022). CDHS was employed by a two-stage stratified cluster sampling by probability proportional to size selection in the chosen sampling frame from the Cambodia General Population Census 2019 (NIS, 2020). In the initial stage, 709 enumeration areas (EAs) (241 urban and 468 rural areas) were selected. In the second stage, an equal systematic sample of 25–30 households was selected from the 21,270 family clusters. A total of 19,496 women aged 15–49 were interviewed, achieving a response rate of 98.2%. Trained interviewers collected data through face-to-face interviews using a standardized survey instrument that included sociodemographic characteristics, household assets, women's behaviors (e.g., alcohol consumption, tobacco use, diet), nutritional status, and health services utilization. The detailed protocol and methods of CDHS 2021-2022 were published previously (NIS, 2022). A final sample included in this analysis was 19,496 women of reproductive age (WRA) 15–49 years.

2.2. Measure variables

The outcome variable of this study was the consumption of unhealthy foods by women of reproductive age (WRA) 15-49 during the previous day or night, defined as a binary variable (coded as **1** = Consumed unhealthy foods vs coded as **0** = Did not consume unhealthy foods).

Unhealthy food consumption was determined based on the questions asked of women who consumed the following:

v472r 'Woman had sweet foods, chocolates, candies, pastries, cakes, ice cream, etc';

v472t 'Woman had chips, crisps, french fries, fried dough, instant noodles?';

v472w 'Woman had common sentinel sweet food.

Then, consumption of unhealthy foods was coded as **1** if the women had reported consuming any of the following (v472r = 1 or v472t = 1 or v472w = 1). Otherwise, the women had not reported consuming coded as **0**. (NIS, 2022).

Independent variables comprised sociodemographic factors and age groups (15–19, 20–29, 30–39, and 40–49 years). Marital status (single, married, and ever-married), educational level (no education, primary education, secondary education, and higher education), employment status (not working, and working), smoking (non-smoker and smoker). Household wealth status was represented by a wealth index, calculated using principal component analysis (PCA) and variables for household assets and dwelling characteristics. Weighted scores are divided into five wealth quintiles (poorest, poorer, medium, more prosperous, and richest), each comprising 20% of the population (NIS, 2020). The original variable was combined into three categories: richer/richest, middle, and poorer/poorest (Um et al., 2023). Five geographical regions: Phnom Penh, the capital; Plains, Tonle Sap, Coastal/sea, and Mountainous; place of residence (rural and urban); and religion (Buddhist, Muslim/Christian) (NIS, 2020).

2.3. Statistical analysis

Women's data were analyzed using STATA SE V18. Using the survey package in our descriptive and logistic regression analyses, we accounted for standard DHS sampling weight and complex survey design. Descriptive statistical analyses were carried out to estimate the overall prevalence of unhealthy food consumption among women and critical socio-demographic and behavioral factors. Results were described in weighted frequency and percentage. Bivariate analysis with chi-square tests assessed associations between socio-demographic and behavioral factors with unhealthy food consumption. Variables associated with outcome variables at p-value ≤ 0.10 (Um et al., 2023) and potential confounders, including ages, wealth index, education, and place of residence, were accounted for in the final multiple logistic regression analyses (Um & Yom, 2024). Simple logistic regression was used to determine the magnitude of the effect of the association between unhealthy food consumption and socio-demographic factors. Then, multiple logistics regression was used to assess independent factors associated with unhealthy food consumption after adjusting for potential confounding factors presented as adjusted odds ratios (AOR) with 95% CI.

2.4. Ethics statement

The CDHS datasets are publicly accessible and were made available to us upon request through the DHS website at (URL: https://dhsprogram.com/data/available-datasets.cfm), with all personal identifiers of study participants removed. The written informed consent was obtained from the parent or guardian of each participant under 18. The original CHDS 2021–2022 protocol was approved by the Cambodia National Ethics Committee for Health Research on 10 May 2021 (Ref: 083 NECHR) and the Institutional Review Board (IRB) of ICF in Rockville, Maryland, USA.

3. Results

3.1. Socio-demographic characteristics of the study participants

Table 1 describes women's socio-demographic characteristics. The mean age of women was slightly close to 31 years old (SD = 9.5 years); the 15-19 age group accounted for 15.3%, and the 20-29 age group was 28.6%. More than 69.2% were married. About 11.6% had no education, while only 7.2% of the

women completed higher education. Close to 33.9% of women were unemployed. Of the total women sample, 35.5% were from poor households. And 57.7% of women resided in urban areas.

Table 1. Socio-demographic characteristics of women aged 15–49 years in Cambodia 2021-2022 (N=19,496 women)

Variables	Freq.	Percent
Mean age in years (± SD)	31(± 9.5)	
15-19	2,981	15.3
20-29	5,575	28.6
30-39	6,639	34.1
40-49	4,301	22.1
Marital status		
Single	4,788	24.6
Married	13,492	69.2
Widowed/Divorced	1,216	6.2
Education		
No education	2,265	11.6
Primary	7,554	38.7
Secondary	8,278	42.5
Higher	1,399	7.2
Employment		
Not Working	6,615	33.9
Working	12,881	66.1
Wealth Index		
Poor	6,922	35.5
Middle	3,831	19.7
Rich	8,743	44.8
Religion		
Buddhist	18,980	97.40
Moslem/Christian	516	2.60
Place of residence		
Rural	8,239	42.3
Urban	11,257	57.7
Geographical region		
Phnom Penh	3,160	16.2
Plain	6,589	33.8
Tonle Sap	5,922	30.4
Coastal	1,222	6.3
Plateau/Mountain	2,603	13.4

3.2. Prevalence of unhealthy food consumption

Only 1.5% (95%CI: 1.3-1.7) of women were smoking cigarettes, and 16.3% (95%CI: 15.3-17.3) consumed alcohol in the last month, although only 1.5% reported daily or almost daily alcohol consumption. Regarding food consumption patterns recalled within the previous 24 hours, 21.1% (95%CI: 20.1-22.1) reported consuming sweet foods, 18.2% (95%CI: 17.4-19.1) reported consuming salty foods, 58.3% (95%CI: 57.1-59.5) reported consuming sweet beverages, and 33.0% (95%CI: 31.9-34.2) reported consuming unhealthy foods (Table 2).

Table 2. Smoking, drinking, and unhealthy food consumption among women aged 15–49 years (N=19,496 women)

Variables	Freq.	Percent (95%CI)
Smokes cigarettes		
Non-Smoker	19,208	98.5 (98.3-98.7)
Smoker	288	1.5 (1.3-1.7)
Alcohol consumption in the last month		
Non-drinker	16,323	83.7 (82.7-84.7)
Drinker	3,173	16.3 (15.3-17.3)
Frequency of consumption of alcohol		
Not drink	16,323	83.7
1-5d	2,701	13.9
6-10d	107	0.5
11-24d	68	0.4
Every day/Almost daily	297	1.5
Consumed sweet foods day/night before the survey		
No	15,387	78.9 (77.9-79.9)
Yes	4,109	21.1 (20.1-22.1)
Consumed salty foods day/night before the survey		
No	15,945	81.8 (80.9-82.6)
Yes	3,551	18.2 (17.4-19.1)
Consumed fruit juice in day/night before the survey		
No	13,633	69.9 (68.9-70.9)
Yes	5,863	30.1 (29.1-31.1)
Consumed soda, sports, or energy drinks day/night before the survey		
No	11,846	60.8 (59.5-62.0)
Yes	7,650	39.2 (38.0-40.5)
Consumed tea, coffee, or herbal drink day/night before the survey		
No	19,496	100.0
Consumed sweet beverages the day/night before the survey[1]		
No	8,132	41.7 (40.5-42.9)
Yes	11,364	58.3 (57.1-59.5)
Consumed unhealthy foods the day/night before the survey[2]		
No	13,063	67.0 (65.8-68.1)
Yes	6,433	33.0 (31.9-34.2)

Noted: 1) Sweet beverages include fruit juice, fruit drinks, sugarcane juice (tuk ampov), fruit shakes, Coca-Cola, Fanta, Sprite, Pepsi, Bacchus, M-150, sweet tea, sweetened coffee, frappes, chocolate frappes, green tea, and other sweetened liquids. 2) Unhealthy foods include sweet foods such as cake, dessert soup, cookies, sweet popcorn, candy (skar krop), chocolate, ice cream, fried and salty foods such as chips, french fries, and dried noodles such as Mama.

3.3. Factors associated with unhealthy food consumption in Chi-Square

The bivariable analysis result showed that all independent variables were related to unhealthy food consumption (p-value <0.001), except the employment status, religion, and alcohol consumption status variables (Table 3). Women had a higher prevalence of consuming unhealthy foods if they were aged 15-19 years (43.4%) compared to older age groups (p-value <0.001), never in union women (41.8%) compared to widowed/divorced groups (p-value <0.001), had higher education (43.6%) compared to no formal education (p-value <0.001); women belong to rich households (35.5%) compared to poor households (p-value <0.001). However, women reported non-smokers (33.1%), compared to smokers (p-value = 0.007). Geographic regions of residence were likewise associated with women consuming unhealthy foods. Women living in rural areas had a higher prevalence of unhealthy food than those living in urban areas (35.1% vs 31.5%, p-value = 0.004). Women living in Phnom Penh's capital region were positively associated with consuming unhealthy foods (42.4%) compared to the other areas (p-value <0.001).

Table 3. Factors associated with unhealthy food consumption among women aged 15–49 years in Chi^2 analysis (N=19,496 women)

Variables	**Consumed Unhealthy Food**				**P value**
	No (N=13,063)		**Yes (N=6,433)**		
	Freq.	Percent	Freq.	Percent	
Age					
15-19	1,688	56.6	1,293	43.4	<0.001
20-29	3,675	65.9	1,899	34.1	
30-39	4,488	67.6	2,151	32.4	
40-49	3,212	74.7	1,089	25.3	
Marital status					
Single	2,785	58.2	2,002	41.8	<0.001
Married	9,422	69.8	4,070	30.2	
Widowed/Divorced	855	70.3	361	29.7	
Education					
No education	1,658	73.2	606	26.8	<0.001
Primary	5,324	70.5	2,230	29.5	
Secondary	5,292	63.9	2,986	36.1	
Higher	789	56.4	610	43.6	
Employment					
Not Working	4,450	67.3	2,165	32.7	0.684
Working	8,613	66.9	4,269	33.1	
Wealth Index					
Poor	4,806	69.4	2,116	30.6	<0.001
Middle	2,618	68.3	1,214	31.7	
Rich	5,639	64.5	3,104	35.5	

Religion					
Buddhist	12,742	67.1	6,238	32.9	0.217
Moslem/Christian	321	62.2	195	37.8	
Place of residence					
Rural	5,352	65.0	2,888	35.1	0.004
Urban	7,711	68.5	3,546	31.5	
Geographical region					
Phnom Penh	1,820	57.6	1,339	42.4	<0.001
Plain	4,853	73.7	1,736	26.3	
Tonle Sap	3,519	59.4	2,402	40.6	
Coastal	846	69.2	376	30.8	
Plateau/Mountain	2,024	77.8	579	22.2	
Smokes cigarettes					
Non-Smoker	12,847	66.9	6,361	33.1	0.007
Smoker	216	75.0	72	25.0	
Alcohol consumption in the last month					
Non-drinker	10,933	67.0	5,389	33.0	0.912
Drinker	2,129	67.1	1,044	32.9	

3.4. Factors associated with unhealthy food consumption in adjusted logistic regression

As shown in Table 4, several factors were independently associated with increased odds of consuming unhealthy food among women. These factors included age groups 15–19 years (AOR = 1.7; 95% CI: 1.5–2.1), 20–29 years (AOR = 1.3; 95% CI: 1.1–1.5), and 30–39 years (AOR = 1.3; 95% CI: 1.2–1.5), women with higher education (AOR = 1.6; 95% CI: 1.3–2.0), and those from richer households or wealth quintile (AOR = 1.1; 95% CI: 0.9–1.2). Additionally, women residing in Phnom Penh (AOR = 2.4; 95% CI: 1.9–3.1) and Tonle Sap (AOR = 2.4; 95% CI: 2.1–2.7) had higher odds of unhealthy food consumption.

Table 4. Factors associated with consumed unhealthy foods in unadjusted and adjusted logistic regression analysis

Variables	**Unadjusted (N=19,496)**		**Adjusted (N=19,496)**	
	OR	**95%CI**	**AOR**	**95%CI**
Age				
15-19	2.3***	(2.0–2.6)	1.7***	(1.5–2.1)
20-29	1.5***	(1.4–1.7)	1.3***	(1.1–1.5)
30-39	1.4***	(1.3–1.6)	1.3***	(1.2–1.5)
40-49	Ref.		Ref.	
Marital status				
Single	1.7***	(1.4–2.1)	1.2	(1.0–1.5)
Married	1.0	(0.9–1.2)	1.0	(0.8–1.2)
Widowed/Divorced	Ref.		Ref.	

Education				
No education	Ref.		Ref.	
Primary	1.1*	(1.0–1.3)	1.1	(1.0–1.3)
Secondary	1.5***	(1.3–1.8)	1.2*	(1.0–1.4)
Higher	2.1***	(1.7–2.6)	1.6***	(1.3–2.0)
Employment				
Not Working	Ref.			
Working	1.0	(0.9–1.1)		
Wealth Index				
Poor	Ref.		Ref.	
Middle	1.1	(0.9–1.2)	1.1	(1.0–1.2)
Rich	1.3***	(1.1–1.4)	1.1	(0.9–1.2)
Religion				
Buddhist	Ref.			
Moslem/Christian	1.2	(0.9–1.8)		
Place of residence				
Rural	Ref.		Ref.	
Urban	0.9**	(0.8–1.0)	1.1	(1.0–1.2)
Geographical region				
Phnom Penh	2.6***	(2.1–3.2)	2.4***	(1.9–3.1)
Plain	1.2**	(1.1–1.5)	1.2*	(1.0–1.4)
Tonle Sap	2.4***	(2.1–2.7)	2.4***	(2.1–2.7)
Coastal	1.6***	(1.3–1.8)	1.5***	(1.2–1.8)
Plateau/Mountain	Ref.		Ref.	
Smokes cigarettes				
Non-Smoker	Ref.		Ref.	
Smoker	0.7**	(0.5–0.9)	1.0	(0.7–1.3)
Alcohol consumption in the last month				
Non-drinker	Ref.			
Drinker	1.0	(0.9–1.1)		

Noted: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

4. Discussion

The overall prevalence of unhealthy food consumption among women in Cambodia was 33.0%, with sweet beverages at 58.3%, sweet foods at 21.1%, and salty foods at 18.2%. Additionally, 16.3% of women reported consuming alcohol in the last month, while only 1.5% smoked cigarettes. These are becoming a public health problem in the country (Um & Yom, 2024). Globally, in 2019, dietary risks were responsible for 188 million DALYs and 7.94 million deaths among adults aged 25 and older (IHME., 2020). These dietary and lifestyle patterns need to be reduced as we know they may be attributed to the prevalence of NCDs in Cambodians, such as overweight and obesity (Um & Yom, 2024), hypertension, and people with type 2 diabetes (Chham et al., 2022; Chhim et al., 2023; MoH, 2019a; Te et al., 2023). Frequent consumption of unhealthy foods may be driven by the increased availability and affordability

of processed foods and changing dietary preferences influenced by urbanization and globalization (Vermeulen et al., 2020).

Our study found that younger women aged (15-19 years) were more likely to consume unhealthy foods. A study by Lee et al. (Lee & Allen, 2022) indicated that younger women are more likely to consume unhealthy food. This could be explained by greater exposure to unhealthy food marketing, peer influences, and lifestyle choices prioritizing convenience over nutritional value. With its fast-paced lifestyle, the transition to urban living might also contribute to these dietary patterns (Um & Yom, 2024; Um et al., 2023). Furthermore, women with higher levels of education are more likely to frequently consume unhealthy foods, which is consistent with the study by Lee et al. (Lee & Allen, 2022), which showed that fast food consumption was related to higher levels of depression among younger women.

Similarly, a study in Italy indicated that academic stress increased unhealthy food consumption in Italian students (Caso et al., 2020). This finding may reflect the influence of higher disposable income, increased access to processed and fast foods, and greater engagement in social activities where unhealthy foods are commonly consumed (Vermeulen et al., 2020). It suggests that education alone does not necessarily lead to healthier eating habits, highlighting the need for targeted nutritional education that specifically addresses the risks of unhealthy food consumption. Lastly, we found that women living in Phnom Penh, the capital city, were likelier to consume unhealthy foods. This is consistent with several global studies (IHME., 2020). They were busy working and taking care of their families. In addition, easy accessibility of unhealthy food options among wealthier individuals, combined with lifestyle factors.

5. Limitations and strengths

This study has several limitations. First, our findings need to be revised to determine the direction of the association between socio-demographic characteristics and unhealthy food consumption. The CDHS was collected as a cross-sectional study, we could not analyze unhealthy food consumption over time. Second, the reliance on self-reported data from 24-hour recall without specific inquiries about consumption amount and frequency may have led to reporting bias and underestimation due to social desirability. Despite the limitations, our results contribute to the literature on the prevalence and association between socio-demographic and behavioral variables and unhealthy food consumption among Cambodian women. This study is the first to indicate a high prevalence of unhealthy food consumption and to identify associated factors using nationally representative, high-quality data with a high response rate (98%) among women. The data from the DHS program were collected using a global, validated survey design, and highly trained data collectors administered questionnaires. Finally, our analysis accounted for the complex survey design and sampling weights, enabling us to generalize our findings to Cambodia's general adult female population.

6. Conclusion

In conclusion, the present study revealed a high prevalence of unhealthy food consumption, particularly salty foods, sweet beverages, and alcohol consumption, within the past month (2021-2022). Younger, higher-educated women who resided in Phnom Penh were significantly more likely to consume unhealthy foods. These findings underscore the urgent need for targeted public health interventions, including educational campaigns, policy measures, and integrated nutritional counseling within health services, to promote healthier eating habits and reduce the risk of NCDs among Cambodian women. Future research should focus on longitudinal studies to elucidate causal pathways and evaluate the effectiveness of interventions to reduce unhealthy food consumption in this population.

Author contributions

Um S., Eat S., Chantrea S., and Sovandara H. contributed to conceptualizing, searching the literature, and writing the draft manuscript. Um S. Eat S. and Sovandara H. contributed to project administration: Um S. software, methodology, data analysis, interpretation, and visualization. Um S. Somany M., Chamroen P., and Sovandara H. are writing, reviewing, and editing. All authors contributed to the final manuscript and approved the version submitted.

Acknowledgment

The authors are grateful to DHS-ICF for gathering, cleaning, and providing the data used for this paper. We thank Mr. Im Piseth, Public Health Officer, Preventive Medicine Department, Ministry of Health, who provided helpful comments.

Conflicts of interest

The authors declare no conflict of interest. The research was conducted without any financial support.

Data availability statement

The CDHS 2022 datasets are publicly available from the website at (https://www.dhsprogram.com/data/available-datasets.cfm).

Abbreviations

AOR, Adjusted odds ratio; CDHS, Cambodia Demographic Health Survey; CI, confidence intervals; EA, Enumeration areas; NCDs, Noncommunicable diseases; PPS, Probability proportional to size; WHO, World Health Organization.

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