Original Article

Exploring Food Practices and Predictive Factors of Specific Ethnic People of Bangladesh: A Cross-sectional Study

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Abstract

Background: Bangladesh has a diversified ethnic minority with their own diverse food practice. This seems to be a cause of poor health status of these ethnic groups.This study aimed to assess the food practices and predictive factors of the specific ethnic people of Bangladesh.

Methods: A cross-sectional study was conducted among 350 adult Rakhain people of Cox's Bazar district of Bangladesh. Data were collected through face-to-face interviews.Food practice score was calculated based on healthy and unhealthy intake, categorized as 'good' or 'poor' based on a mid-point cut-off of 50%.

Results: This study revealed that the majority (66%) of participants exhibited poor dietary habits significantly ($p<0.01$) associated with increased consumption of fast food and soft drinks, low intake of fruits and meat, cultural food choice, food preparation techniques, sources and purification procedure of drinking water. Poor dietary habits were significantly associated with higher odds among individuals categorized as businessmen (aOR=3.43), those with >6 family members (aOR=4.53), those with >3 children (aOR=4.89) and non-standard sleeping status (aOR=3.45).

Conclusions: Many Rakhain people in Bangladesh have poor dietary habits influenced by demographics. This study identifies factors shaping ethnic food practices and recommends culturally tailored nutrition programs to improve health in these communities.

Keywords: food practices; predictive factors; ethnic people; Bangladesh

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Introduction

Bangladesh is home to diverse ethnic groups, primarily residing in the Chattogram Hill Tracts. These communities, including Marma, Chakma, and Mro, have distinct cultures, socio-economic backgrounds, literacy rates, and nutritional habits, differing significantly from Bengali people.[1]

Ethnic minorities in Bangladesh face discrimination, poverty, and neglect due to isolation, unrecognized status, limited opportunities, and land loss. [2-3] As they are underprivileged, they usually do need to survive on the natural resources of fooddue to limited resources. Sometimes, they are not very healthy and the food management procedure is not up to the mark. [4] Research on ethnic groups' dietary habits in Bangladesh, the UK, and the USA has revealed their food patterns to inform health education promoting nutrition and well-being. [5-7]

Bangladesh's tribes have unique food practices shaped by culture, religion, and geography, often resulting in unsafe and poor nutrition. [4, 8] A study of the Mro in Bandarban found traditional diets, including wildlife and plants, perceived as nutritionally and medicinally beneficial.[5] Another research was carried out among the ethnic population of Bandarban district, revealing deficiencies in nutritional status and inadequate hygiene practices.[1] Studies in ethnic children found significant effect between source of water, immunization, sanitation status, and monthly family income with their nutritional status. [9] All the studies in Bangladesh indicate a great vulnerability of the ethnic population towards different negative health outcomes due to their poor food habit and livelihood patterns.

Research on UK, USA, and Indian ethnic groups highlights the need for nutrition studies, though implementing health education strategies remains challenging. [5-7]

Many studies explore Bangladeshi ethnic minorities' diets, but comprehensive nutrition-focused assessments are lacking, especially for the Rakhain in Chattogram Hill Tracts. Their unique culture, isolation, and healthcare access challenges underscore this study's focus.[10]

This study aims to examine how underlying characteristics affect dietary behavior among specific Bangladeshi ethnic groups, using a rigorous scientific approach. Insights from this research may guide culturally tailored policy interventions to enhance nutrition and health outcomes. The findings could inform additional intervention plans addressing poor dietary practices, leading to substantial health improvements for these overlooked populations.

Methods

Study design

This cross-sectional study, conducted in Cox's Bazar with the Rakhain community, collected quantitative data from July-December 2023.

Study participants, sample size and sampling

Bangladesh has 45 ethnic communities, [11] totaling 1.65 million people,[12] with 60.05% in Chattogram. The Rakhain, representing 0.68% (over 11,000 individuals), were chosen as the focus group for this study.

This study focused on 350 adult Rakhain individuals, aged 18-64, residing in Teknaf, Cox's Bazar, within the Chattogram division. Participants, designated as household heads, consented to participate. A standard sample size of 384 was calculated using the formula "$n= Z^2pq/d^2$," with $Z=1.96$, $p=0.50$, and a margin of error of 0.05. The final sample size was 350, with a 91% response rate. Households were randomly selected from 992 provided by the local government.

Data collection

Data from Rakhain people were collected using a pre-tested, semi-structured questionnaire covering socio-demographics, lifestyle, food practices, and clinical conditions through the interviewer administrative method.

Ethical considerations

The study was approved by Northern University Bangladesh's Ethical Review Committee (NUB/DPH/EC/2023/25-a), following the Declaration of Helsinki. Participation was anonymous, voluntary, and included informed consent, ensuring participant autonomy.

Data analysis

Data were quality-checked, entered, and analyzed using SPSS. Continuous variables were presented as mean ± SD, categorical variables as percentages with 95% confidence intervals (CI).

An overall food practice was calculated considering the scores getting from the intake of seven types of foods which was categorized by more intake (always/ more times) & low intake (few times/ never). More intake of healthy foods like fish, fruits, meat and vegetables got a score of '1' and more intake unhealthy food like fast food, soft drinks and tea/ coffee got a score of '0'. The total score was categorized as 'good' or 'poor,' using the 50th percentile of the distribution as the cutoff. The mean and SD of the percentage score were 55 and 17, respectively, with a minimum of 14 and a maximum of 100.

Binary logistic regression with backward elimination analyzed food practices as the dependent variable, calculating odds ratios with 95% confidence intervals.

Results

Participant characteristics: A total of 350 Rakhain people were enrolled in this study with 53.1% of men and 49.7% of illiterate. Majority of the respondents were young adults (54.9%), married (76.0%) and housewives (30.3%). Most of the individuals lived in the extended family (77.1%), with <6 family members (88.95) and with <3 children (78.9%).

Overall food practices including food preparation pattern with traditional food consumption practice: It is unveiled that the majority (66%) of Bangladesh's ethnic group (Rakhain) practiced poor eating habits; whereas 34% of them had good food practices (Mean ±SD, 55.63± 17.32).

The study's cross-tabulation analysis identified the significant types of food intake associated with the respondents' overall food practices. Moreover, the overall food practices of the respondents were found to be significantly (p≤0.05)associated with intake of fast food, soft drinks, fish, fruits, vegetables, meatand tea/coffee of the respondents. (Table 1)

Table 1: Insights of overall food practices (n=350)

Types of food intake		Overall food practices						p
		Total		Good		Poor		
		Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	
Fast food	More	170	48.6	32	9.1	138	39.4	0.01
	Low	180	51.4	86	24.6	94	26.9	
Fish	More	269	76.9	86	24.6	183	52.3	0.20
	Low	81	23.1	32	9.1	49	14.0	
Fruits	More	82	23.4	17	4.9	65	18.6	0.01
	Low	268	76.6	101	28.9	167	47.7	
Meat	More	134	38.3	23	6.6	111	31.7	0.01
	Low	216	61.7	95	27.1	121	34.6	
Vegetables	More	335	95.7	105	30.0	230	65.7	0.01
	Low	15	4.3	13	3.7	2	0.6	
Soft drinks	More	203	58.0	18	5.1	185	52.9	0.01
	Low	147	42.0	100	28.6	47	13.4	
Tea/Coffee	More	170	48.6	15	4.3	155	44.3	0.01
	Low	180	51.4	103	29.4	77	22.0	

Data are presented as frequency (n) and percentage (%);Individual food intake was categorized by more (always/ more times) & low (few times/ never).

The food preparation and traditional eating habits of a specific ethnic people (Rakhain), the study also identified several important factors related to overall food practices. For example, it was discovered that the respondents' cultural food, sources of food collection, food preparation techniques, sources of drinking water, and purification procedure of drinking water were significantly ($p \leq 0.05$) correlated with their overall food practices. (Table 2)

Table 2: Pattern of food preparation and traditional food consumption practice (n=350)

Food preparation and traditional food consumption practice		Overall food practices						p
		Total		Good		Poor		
		Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	Frequency (n)	Percent (%)	
Cultural food	Only Nappi	193	55.1	75	21.4	118	33.7	0.02
	Nappi with other foods	157	44.9	43	12.3	114	32.6	
Sources of food collection	Market	316	90.3	99	28.3	217	62.0	0.01
	Market & Sea	27	7.7	18	5.1	9	2.6	
	Market & forest	7	2.0	1	0.3	6	1.7	
Food preparation techniques	Normal cooked	124	35.4	44	12.6	80	22.9	0.01
	Over cooked	20	5.7	15	4.3	5	1,4	
	Both	206	58.9	59	16.9	147	42.0	
Fuel for food cooking	Supplied gas	124	35.4	41	11.7	83	23.7	0.32
	Wood	165	47.1	62	17.7	103	29.4	
	Supplied gas & wood	22	6.3	5	1.4	17	4.9	
	Wood & green energy	39	11.1	10	2.9	29	8.3	
Sources of drinking water	Deep tube well	261	74.6	96	27.4	165	47.1	0.03
	Water fall	89	25.4	22	6.3	67	19.1	
Purification procedure of drinking water	Filter	14	4.0	5	1.4	9	2.6	0.03
	Fitkiri/ Alum powder	8	2.3	1	0.3	7	2.0	
	Halogen tablet	31	8.9	4	1.1	27	7.7	
	Nothing	297	84.9	108	30.9	189	54.0	

Data are presented as frequency (n) and percentage (%)

Background characteristics associated with overall food practices: The study's regression analysis identified important factors linked to the overall food practices of specific ethnic people (Rakhain). The analysis of overall eating habits showed that significant ($p \leq 0.05$) poor food practices was found among the age group [Middle-aged adult (40-59 years): cOR=2.16; Older adult (60-64 years): cOR=9.13], education [<Primary: cOR=0.49], occupation [Business: cOR=3.92; Housewife: cOR=1.90; Others (student, unemployed etc.): cOR=3.38], family size [>6 members: cOR=7.04], number of children [≥3: cOR=6.43], sleeping status [Not standard (<5/>9 hours per night: cOR=5.26], medicine use [cOR=2.24], comorbidity [cOR=2.57] and for systolic blood pressure [cOR=3.16]. (Table-3)

Table 3: Background characteristics associated with the overall food practices (n=350)

Background characteristics	Overall food practices			p-value	COR (95% CI)	AOR (95% CI)
	Total n (%)	Good n (%)	Poor n (%)			
Age (years)						
Young adult (18-39)	192 (54.9)	85 (24.3)	107 (30.6)	0.01	Reference	
Middle-aged adult (40-59)	108 (30.9)	29 (8.3%)	79 (22.6)		2.16 (1.29-3.61) *	-
Older adult (60 -64 years)	50 (14.3)	4 (1.1)	46 (13.1)		9.13 (3.16-26.38) *	-
Education						
Illiterate	174 (49.7)	46 (13.1)	128 (36.6)	0.01	Reference	
<Primary	138 (39.4)	58 (16.6)	80 (22.9)		0.49 (0.30-0.79) *	-
Secondary≤	38 (10.9)	14 (4.0)	24 (6.9)		0.61 (0.29-1.29) *	-
Occupation						
Service	105 (30.0)	52 (14.9)	53 (15.1)	0.01	Reference	
Business	50 (14.3)	10 (2.9)	40 (11.4)		3.92 (1.77-8.66) *	3.43 (1.52-7.73)*
Housewife	106 (30.3)	36 (10.3)	70 (20.0)		1.90 (1.09-3.32) *	1.42 (0.79-2.57)*
Others (student, unemployed etc.)	89 (25.4)	20 (5.7)	69 (19.7)		3.38 (1.80-6.34) *	1.91 (0.97-3.75)*
Family type						
Nuclear	80 (22.9)	34 (9.7)	46 (13.1)	0.05	Reference	
Extended	270 (77.1)	84 (24.0)	186 (53.1)		1.63 (0.98-2.73) *	-
Family size						
<6 members	311 (88.9)	115 (32.9)	196 (56.0)	0.01	Reference	
>6 members	39 (11.1)	3 (0.9)	36 (10.3)		7.04 (2.12-23.37) *	4.53 (1.31-15.67)*
Number of children						
<3	276 (78.9)	111 (31.7)	165 (47.1)	0.01	Reference	
>3	74 (21.1)	7 (2.0)	67 (19.1)		6.43 (2.85-14.54) *	4.89 (2.06-11.47)*
Sleeping status						
Standard (6-8 hours per night)	319 (91.1)	115 (32.9)	204 (58.3)	0.01	Reference	
Not standard (<5/ >9 hours per night	31 (8.9)	3 (0.9)	28 (8.0)		5.26 (1.56-17.68) *	3.45 (0.96-12.43)*
Tobacco use						
Yes	310 (88.6)	99 (28.3)	211 (60.3)	0.05	1.92 (0.99-3.74) *	-
No	40 (11.4)	19 (5.4)	21 (6.0)		Reference	
Medicine use						
Yes	59 (16.9)	12 (3.4)	47 (13.4)	0.01	2.24 (1.14-4.41) *	-
No	291 (83.1)	106 (30.3)	185 (52.9)		Reference	
Comorbidity						
Had	69 (19.7)	13 (3.7)	56 (16.0)	0.01	2.57 (1.34-4.92) *	-
Didn't have	281 (80.3)	105 (30.0)	176 (50.3)		Reference	
Systolic blood pressure						
Normal (<120 mmHg)	257 (73.4)	102 (29.1)	155 (44.3)	0.01	Reference	
High (>120 mmHg)	93 (26.6)	16 (4.6)	77 (22.0)		3.16 (1.74-5.73) *	-

*Data are presented as frequency (n) and percentage (%); mmHg indicates millimeters of mercury. p-value was set as ≤0.05 and is indicated by *.*

Predictors associated with the poor food practices: After the adjusted modeling was completed and confounders were removed using the backward elimination process, the final significant($p \leq 0.05$) predictors were identified. The study revealed that occupation (Business: aOR=3.43), family size (>6 members: aOR=4.53), number of children (≥3: aOR=4.89) and sleeping status (not standard (<5/ >9 hours per night: aOR=3.45) showed higher odds of poor food practices of specific ethnic people (Rakhain). (Table 3)

Discussion

This study found that Rakhain people with poor eating habits consumed significantly ($p \leq 0.05$) fewer fruits, vegetables, and meat but more fast food and soft drinks. Limited research exists on ethnic groups, including the Rakhain population. Bangladesh, home to over 70 ethnic groups, showcases diverse dietary patterns influenced by culture, religion, socioeconomic, and geographical factors. These patterns often lie beyond the scope of food technologists. Ethnic minorities, such as the Rakhain, remain underrepresented in research and public health initiatives.[2, 13] In this study, we aimed to observe food practices and predictive factors from the perspectives of special ethnic group Rakhain.

Since ancient times,[1] Bangladeshi ethnic groups thrived on plant-based diets, with Monipuris and Khasis favoring rice as their staple. [4,5] In contrast, modern respondents predominantly consumed soft drinks and junk food, differing from earlier plant-based dietary preferences.

The study revealed 66% of Rakhains had poor food practices, with 55.1% consuming traditional Nappi, which recent research shows has significant market demand among local ethnic communities in Bangladesh.[13]The study revealed that 62% of Rakhain people with poor food habits collected food from the market, 42% used both normal and overcooked methods, and 29.4% used wood for cooking. Comparatively, Manipuri and Khasi communities preferred raw, flavored food and clay furnaces.[4] Moving to another component i.e. water for cooking, our study found that 47.1% Rakhain people used deep well water for cooking and didn't use any process for water purification. This finding matches with Manipuri and Khasi studies. [4]

Regression analysis revealed poor food habits among older adults (60-64 years), less educated Rakhains, large families, non-standard sleepers, tobacco users, individuals with comorbidities, high blood pressure, or frequent medication intake, highlighting unique findings previously unexplored. However, a systematic review showed that the food choice of ethnic groups is significantly associated with their socioeconomic status and food availability.[14] Adjusted modeling in regression analysis eliminated the confounders and showed that higher odds of poor food habits among individuals categorized as businessmen, those with >6 family members, and those with ≥3 children. No studies reported this finding, but others showed education and income significantly influenced healthier food behaviors.[15-18]

Effective solutions for healthy food practices in ethnic groups require comprehensive dietary assessments. This study recommends further research incorporating educational interventions to promote healthier food choices among Bangladesh's ethnic minorities.[19] In addition, another study highlighted the Rakhine community's geographic isolation, socio-political marginalization, and daily challenges, offering insights for policymakers to develop targeted support for this minority group. [20]

This study focused on Rakhains in Teknaf Upazila, limiting generalization due to resource and time constraints. Despite this, the data provides valuable insights, guiding future large-scale research on this significant indigenous population.

Conclusion

A significant proportion of Rakhain individuals in Bangladesh demonstrated poor dietary habits were linked to increased fast food and soft drink consumption, low intake of fruits, vegetables, and meat, cultural food choices, food preparation methods, and drinking water purification. Poor habits were more common among businessmen, individuals with >6 family members, >3 children, and non-standard sleeping patterns. Government and NGOs should implement health education and behavioral change programs to address the shift in Rakhain food habits from traditional plant-based to

modern processed foods, requiring further awareness and research to mitigate health impacts.

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Ethical Clearance: Ethical approval was taken from the Ethical Review Committee of the Northern University Bangladesh, Dhaka, Bangladesh (NUB/DPH/EC/2023/25-a). Informed written consent was collected from the participants before inclusion in the study.

Conflicts of interest statement: The authors declare that they have no competing interests.

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