RESEARCH ARTICLE

DIETARY TRANSITION AND ITS DETERMINANTS AMONG RESIDENTS OF SKARDU CITY

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ABSTRACT

Objective: *To assess the dietary transition among residents of Skardu city, its association with sociodemographic variables and the determinants of dietary transition.*

Study Design: *A cross-sectional study*

Place and duration of study: *Study was carried out on residents of Skardu city during a period of six months from March 2022-August 2022.*

Patients and Methods: *A total of 362 respondents, were randomly selected for the purpose of the study. Data on dietary transition was collected using Food Frequency questionnaire (FFQ) scale. Independent sample t-test and One Way ANOVA test were applied to check the association of dietary transition with sociodemographic factors.*

Results: *Majority were male (n=182, 50.3%) and were 18-25 years of age (n=168, 46.4%). There was significant association of dietary transition with some variables of sociodemographic characteristics (p value=<0.05). There was a significant association between modern food with sociodemographic characteristics of gender, age, marital status, other residency, education, job nature, family income, perceived health status and weight status (p value=<0.05). Association between traditional food with sociodemographic characteristics of age, gender, marital status, family structure, education, perceived health status and weight status (p value=<0.05). The mean score for modern food was 40.54±10.64 and traditional food was 37.24±8.43. The difference between two groups was significantly associated that p value is 0.0001.*

Conclusion: *The study concluded that majority of the respondents were undergoing food transition from modern to traditional and there was significant association with sociodemographic characteristics. Majority of the respondents started modern food before 10 years ago and come to know regarding modern food through community.*

Key words: *Dietary transition, Migration, Non-communicable diseases, Urbanization.*

INTRODUCTION

The increasing migration of individuals to cities and rapid demographic changes are transforming people's food environments and dietary habits. As a result of economic development, energy-dense processed foods have become more readily available in food markets.[1] This shift has contributed to the rising prevalence of nutrition-related non-communicable diseases, particularly obesity and overweight, alongside existing communicable diseases, creating a double burden of diseases due to dietary transition. For example, studies in Africa show that the prevalence of obesity and overweight in children was 8.5% in 2010 and increased to 12.7% in 2020.[2]

Over the past three to four decades, many countries and regions have rapidly entered a phase of nutrition transition, marked by an increased intake of ultra-processed foods (UPFs) and a significant decline in physical activity. This phase has been accompanied by a sharp rise in the prevalence of obesity, along with other nutrition-related health issues, non-communicable diseases (NCDs), including diabetes, hypertension,

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coronary heart disease, and major cancers.[3] Changes in food consumption patterns, greater dietary diversity, and shifts in eating behaviors have significantly transformed traditional diets, which were primarily based on cereals and vegetables with limited animal-based foods. As these traditional diets evolved, cereals and low-fat mixed dishes were gradually replaced by a more Westernized diet. This shift led to a decline in cereal and vegetable intake, while consumption of animal products, processed foods, sweetened beverages, and ultra-processed foods high in energy, fat, sugar, and salt (HEFSS) increased. As a result, the macronutrient profile of the diet shifted from being carbohydrate-heavy to being higher in fats, contributing to adverse health outcomes, including both undernutrition and over nutrition, as well as diet-related non-communicable diseases. While undernutrition and nutrient deficiencies remain issues, the focus is increasingly shifting to diet-related non-communicable diseases, with obesity prevalence rising rapidly. [4]

To develop and implement effective policies for improved health outcomes, it is crucial to understand the key factors driving the nutrition transition in the country and assess the current stage of this transition. This involves examining the nutrition transition along with relevant policies that impact food supply, diet, and behavior. The present study was conducted to evaluate the factors associated with dietary transition among the residents of Skardu.

PATIENTS AND METHODS

A quantitative research approach using a cross-sectional study design was conducted to assess dietary transition and its determinants among the residents of Skardu city over a six-month period, from March 2022 to August 2022, following Institutional Review Board (letter no. MSPH-IRB/13-09 dated: 24-03-2022). The sample size was calculated using the WHO sample size calculator, with a required precision of 5% and a 95% confidence interval. [5]A total of 362 respondents (aged >18 years), who met the inclusion criteria, were randomly selected for the study. Respondents with mental or physical challenges were excluded. The study included individuals aged 18 and above, both male and female, who were permanent residents of Skardu city. Data were collected using an interview-based questionnaire, which was divided into three parts. The first part gathered sociodemographic information, the second part assessed modern food consumption using a Food Frequency Questionnaire (FFQ), and the third part evaluated traditional food using an adopted traditional tool.[5,6]

Data analysis was performed using SPSS version 26. Descriptive analysis was conducted using frequencies and percentages, while the independent t-test and one-way ANOVA were used to examine the association between modern and traditional food consumption and sociodemographic variables.

RESULTS

A total of 362 respondents participated in this study. The majority were male (50.3%) and belonged to the 18-25 age group. Most respondents were educated, with 48.6% holding a bachelor's degree or higher, 36.7% being intermediate-level students, and 8.3% having a primary education. Approximately 46% of respondents were from urban areas. In terms of employment, 58% were students, 25% were private employees, 11.3% were public servants, and 5.5% were business professionals.

Table I: Sociodemographic Characteristics

S. No.	Variable	Frequency (n)	Percentage (%)
1.	**Gender**		
	Male	182	50.3
	Female	180	49.7
2.	**Age**		
	18-25 years	168	46.4
	26-35 years	123	34.0
	36-45 years	38	10.5
	Above 45 years	33	9.1
3.	**Marital status**		
	Single	200	55.2
	Married	162	44.2
4.	**Family size**		
	Less than 5	52	14.4
	5-10	200	55.2
	Above 10	110	30.4
5.	**Place of residence**		
	Urban	166	45.9
	Rural	104	28.7
	Peri urban	92	25.4
6.	**Job nature**		
	Public	41	11.3
	Private	91	25.1
	Own business	20	5.5
	Student	210	58.0

Most respondents lived in joint families (53.3%), while 46.7% lived in nuclear families. Regarding perceived health status, the majority (76.8%) rated their health as good. The demographic characteristics of the respondents are shown in Table I.

Descriptive summary of Outcome Variables:

Out of the total 362 respondents, the majority frequently consumed modern foods such as milkshakes (28.2%), mineral water (16.3%), and juices (16.3%). Other commonly consumed modern foods included cookies and cakes (14.9%), various fruits (24.0%), branded butter and margarine (24.3%), and cafeteria foods like samosas, pakoras, sandwiches, and rolls (27.3%). Most respondents had started eating modern foods within the past 10 years, and the majority learned about modern food through their community.

Among the 362 respondents, branded cooking oil was the most frequently used modern food (74.9%), followed by chapatti (72.9%), candy (35.1%), milkshakes (28.2%), cafeteria food (27.3%), fruits (24.0%), and bread (43.45%). Branded cooking oil was the most commonly used item in modern food preparations. Figure 1 illustrates the rarely used modern foods among the residents of Skardu city.

Descriptive Result for Respondents started to eat Modern Food:

Among the 362 respondents, 19.9% began eating modern food from birth, 46.1% started consuming modern food before the age of 10, 27% began at ages 10-20, and 7% started eating modern food after the age of 20. The descriptive results of how respondents learned about modern food are shown in Figure 2.

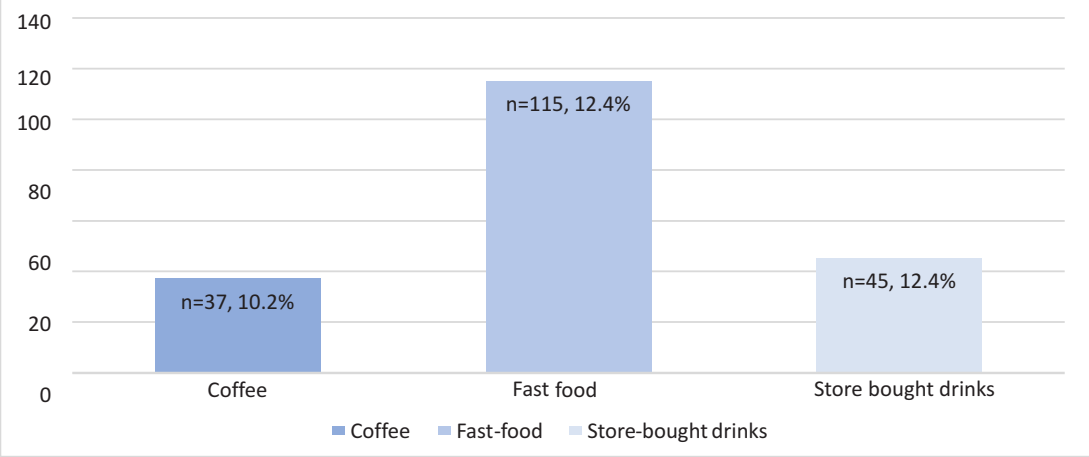

Figure 1: Rarely used Modern Food

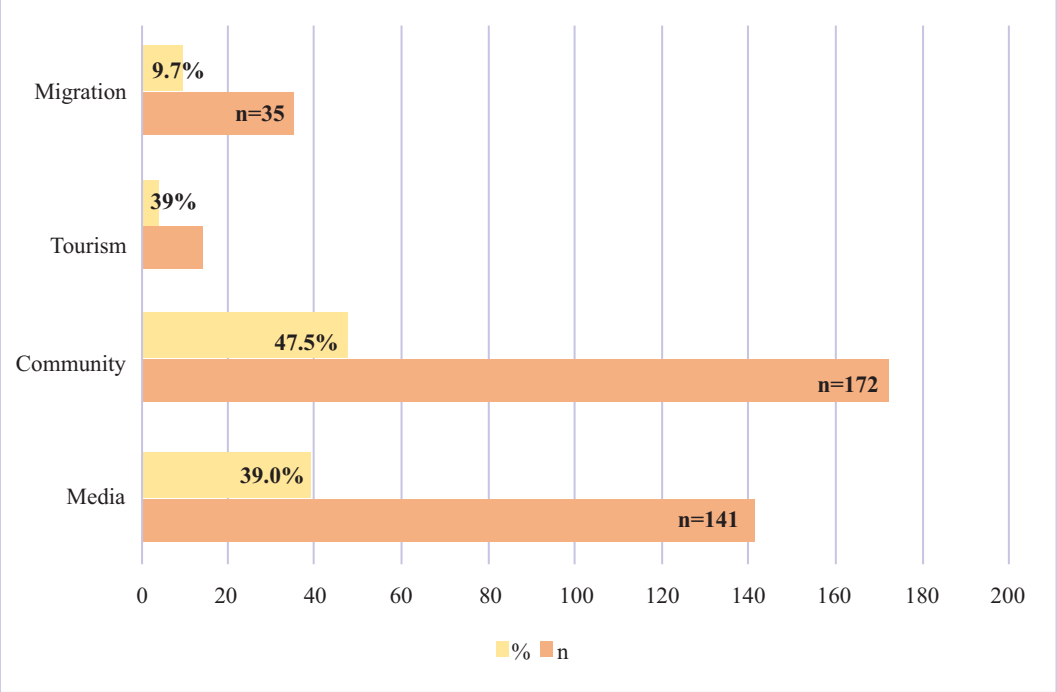

Figure 2: Respondent's source of knowledge regarding Modern Food

Table II. Descriptive Result for Traditional Food:

S. No.	Type of Traditional Food	Frequency (n)	Percentage (%)
1.	**Bro kiseer**		
	Never	191	52.8
	Monthly	105	29.0
	Weekly	48	13.3
	Daily	18	5.0
2.	**Prapo**		
	Never	73	20.2
	Monthly	214	59.1
	Weekly	70	19.3
	Daily	5	1.4
3.	**Marzan**		
	Never	129	35.6
	Monthly	182	50.3
	Weekly	46	12.7
	Daily	5	1.4
4.	**Tuskor**		
	Never	189	52.2
	Monthly	128	35.4
	Weekly	30	8.3
	Daily	15	4.1
5.	**Strabkhor**		
	Never	187	51.7
	Monthly	152	42.0
	Weekly	15	4.1
	Daily	5	2.2
6.	**Kulaq**		
	Never	107	29.6
	Monthly	94	26.0
	Weekly	123	34.0
	Daily	38	10.5
7.	**Soup**	40	11.0
	Never	105	29.0
	Monthly	186	51.4
	Weekly	31	8.6
	Daily		
8.	**Leafy vegetables**		
	Never	13	3.6
	Monthly	52	14.4
	Weekly	203	56.1
	Daily	94	26.0
9.	**Dried beans, Legume**		
	Never	96	26.5
	Monthly	129	35.6
	Weekly	127	35.1
	Daily	10	2.8
10.	**Chabato (Aloo salan+chah)**		
	Never	236	65.2
	Monthly	73	20.2
	Weekly	46	12.7
	Daily	7	1.9
11.	**Brozan**		
	Never	261	72.1
	Monthly	82	22.7
	Weekly	18	5.0
	Daily	1	0.3
12.	**Strub salan**		
	Never	225	62.2
	Monthly	101	27.9
	Weekly	34	9.4
	Daily	2	0.6
13.	**Phurfur**		
	Never	156	43.1
	Monthly	176	48.6
	Weekly	29	8.0
	Daily	1	0.3
14.	**Strub balay**		
	Never	197	54.5
	Monthly	133	36.7
	Weekly	31	8.6
	Daily	1	0.3
15.	**Chahbalay**		
	Never	208	57.5
	Monthly	128	35.5
	Weekly	24	6.6
	Daily	2	6
16.	**Trubalay**		
	Never	60	16.6
	Monthly	255	70.4
	Weekly	44	12.2
	Daily	3	8
17.	**Traspibalay**		
	Never	68	18.8
	Monthly	228	63.0
	Weekly	59	16.3
	Daily	7	1.9
18.	**Azok**		
	Never	22	6.1
	Monthly	145	40.1
	Weekly	149	41.2
	Daily	46	12.7

Table III: Association of Modern and Traditional Food with Sociodemographic characteristics

				Modern Food			Traditional Food		
S. No.	**Variables**		**n**	**Mean±SD**	**t test (df)**	***P*-value**	**Mean±SD**	**t test (df)**	**P-value**
1.	**Gender**	Male	182	39.40±10.38	2.069(360)	**0.039**	38.86±9.12	3.740(360)	**0.0001**
		Female	180	41.70±10.80			35.61±7.33		
2.	**Marital status**	Single	200	41.81±9.41	2.529(360)	**0.012**	39.17±8.40	4.989(360)	**0.0001**
		Married	162	38.98±11.83			34.86±7.85		
3.	**Age**	18-25 years	168	41.99±8.91			39.35±8.22		
		26-35 years	123	42.05±10.94	17.193(3)	**0.0001**	36.41±8.17	9.074	**0.0001**
		36-45 years	38	39.37±10.23			34.76±8.49		
		Above 45	33	28.91±11.16			32.48±7.34		
4.	**Education**	Illiterate	23	25.26±9.21			31.48±7.44		
		Primary	30	34.33±10.45	27.694(3)	**0.0001**	32.50±7.94	8.582	**0.0001**
		Intermediate	133	41.27±9.26			37.73±8.13		
		Bachelor & above	176	43.05±9.79			38.44±8.33		
5.	**Job nature**	Public	41	41.39±11.99			36.56±8.76		
		Private	91	44.87±7.76	7.915(3)	**0.0001**	37.88±8.32	0.490(3)	0.689
		Own business	20	37.95±11.35			38.55±10.44		
		Student	210	38.75±10.87			36.98±8.23		
6.	**Family income**	Less than 30000	158	37.41±10.41			37.65±8.96		
		30000-50000	109	40.88±10.22	18.288(2)	**0.0001**	37.27±7.79	0.518(2)	0.596
		Above 50000	95	45.37±9.66			36.54±8.25		
7.	**Perceived health status**	Good	278	41.50±10.13			38.08±8.25		
		Fair	76	37.87±11.34	5.894(2)	**0.003**	34.79±8.40	6.742	**0.001**
		Poor	08	32.63±14.50			31.38±8.86		
8.	**Weight status**	Underweight	35	39.11±11.71			35.91±7.75		
		Normal	309	41.10±10.29	4.455(2)	**0.012**	37.77±8.41	6.630(2)	**0.001**
		Overweight	362	33.78±12.33			30.72±7.26		

DISCUSSION

The present study examined dietary transition and its determinants among residents of Skardu city. The results revealed that females (41.70±10.80) consumed modern food more frequently than males (39.40±10.38). A significant association was found between gender and both modern food ($p = 0.039$) and traditional food ($p = 0.0001$). A previous study indicated no significant gender-based differences ($p > 0.05$) in the frequency of snacking, with more males snacking frequently than females.[7] Another study conducted in China found that males had a higher intake of modern foods like rice, red meat, fat, and oils, which were positively associated with abdominal obesity compared to females.[8]

The study also found a significant association between marital status and food choices ($p < 0.05$). Single individuals (41.81±9.41) consumed modern food more frequently than married individuals (38.98±11.83). A 2016 study highlighted the connection between living arrangements and dietary behaviors, showing that non-married men had a lower intake of fruits and vegetables than non-married women.[9]

Additionally, the study revealed a significant association between age and food choices ($p = 0.0001$). Individuals under 45 years of age used modern food more frequently than traditional food, with the 26-35 age group (42.05±10.94) being the most frequent consumers of modern food. A previous study noted that adolescents in China between 1991 and 2000 consumed more meals and snacks outside the home.[10] Similarly, a study by the French Public Health Agency in 2006-2007 found a direct association between urban residence and an inverse relationship between age and consumption of ultra-processed food.[11]

The study also found that modern food consumption increased with lower educational levels. Illiterate individuals (25.26±9.21), those with primary education (34.33±10.45), intermediate education (41.27±9.26),

and those with a bachelor's degree or higher (43.05±9.79) consumed modern food more frequently than traditional food. A 2022 study showed a significant association between education and increased consumption of sugary beverages and unhealthy foods.[12]

Regarding place of residence, the study found no significant association between modern and traditional food consumption ($p > 0.05$). However, a previous study in Pakistan indicated that ultra-processed packaged foods and fast food were more readily available and convenient in urban areas than in peri-urban and rural areas.[13]

In terms of family income, individuals with incomes between Rs 30,000-50,000 and above Rs 50,000 consumed modern food more frequently than traditional food. A study in Mexico showed that family income influenced dietary transition, with higher income in developing countries associated with the consumption of healthier, more expensive food.[14]

Finally, the study found a significant association between food choices and weight status, with previous research also indicating the same and that males were at higher risk of obesity.[15]

CONCLUSION

This study revealed a significant association between modern and traditional food choices and sociodemographic characteristics. The majority of respondents were transitioning from modern to traditional foods and had started consuming modern food over 10 years ago. Most respondents learned about modern food through their community, including people, the market, family, friends, and health professionals.

Limitations:

Few limitations of the study are that it was a time bound research and was done in a specific area of Skardu City.

Future Recommendations:

Based on the current findings, it is recommended that awareness programs be implemented to help the local public understand the dynamics of food transition and address this public health issue. Prioritizing homemade modern food over commercially available modern food, increasing awareness among urban populations about the risks associated with modern food, encouraging gradual reductions in modern food intake and promoting physical activity to prevent long-term weight gain is of pivotal importance.

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Authors' Contributions:

Siddiqa Batoo1: Manuscript Writing, Analysis / Interpretation / Discussion, Experimentation / Study Conduction

Khizar Nabeel Ali: Conception of study / Designing / Planning, Critical Review

Sadaqat Hussain: Facilitated for Reagents / Material Analysis, Experimentation / Study Conduction

Suzzana Akbar Khan: Analysis / Interpretation / Discussion, Experimentation / Study Conduction

Sadaf Javed: Facilitated for Reagents / Material Analysis, Analysis / Interpretation / Discussion

Najam-us-Sabah: Experimentation / Study Conduction, Facilitated for Reagents / Material Analysis

Yusra Fatima Kiyani: Experimentation / Study Conduction, Analysis / Interpretation / Discussion

Muhammad Ibrahim: Facilitated for Reagents / Material Analysis, Analysis / Interpretation / Discussion

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