CONSUMPTION OF PROCESSED FOOD AMONG CHILDREN (0 -6 YEARS) IN URBAN VADODARA

APRIL, 2023

VISHWA KALSARIYA

B.SC. (FCSC) PHN

CONSUMPTION OF PROCESSED FOOD AMONG CHILDREN (0 -6 YEARS) IN URBAN VADODARA

A dissertation in partial fulfilment of the requirement for the degree of Master of Science

Family and Community Sciences
Foods and Nutrition
(PUBLIC HEALTH NUTRITION)

By
Vishwa Kalsariya

Department of Foods and Nutrition
Faculty of Family and Community Sciences
The Maharaja Sayajirao University of Baroda
Vadodara, Gujarat, India

APRIL 2023

CERTIFICATE

This is to certify that the research work present in this thesis has been carried out independently by Miss Vishwa Kalsariya, under the guidance of Dr. Shruti Kantawala in pursuit of degree of Master of Science (Family and Community Sciences) with major in Foods and Nutrition (Public Health Nutrition) and this is her original work.

DR. SHRUTI KANTAWALA

(Research Guide)

PROF. MINI SETH

I/c Head, Department of Foods and Nutrition
Faculty of Family and Community Sciences
The Maharaja Sayajirao University of Baroda
Vadodara, Gujarat, India

Professor & Head
Dept. of Foods & Nutrition
Faculty of Family & Community Sciences
The M. S. University of Baroda
Vadodara - 390 002.

Dated: 17th APRIL 2023

ACKNOWLEDGEMENT

I would like to express my sincere gratitude to God for His blessings, good health, guidance, and strength throughout this research.

With immense appreciation and gratitude, I would like to extend my heartfelt acknowledgement to the people who helped me bring this research to reality.

I would like to express my deepest gratitude to my guide, Dr. Shruti Kantawala, for her guidance and support throughout the research and writing process. I am grateful to have had the opportunity to work under her guidance and get from her, the immense expertise of the field and encouragement to give in my best.

I would like to acknowledge Prof Mini Sheth, I/c Head, Department of Foods and Nutrition for providing necessary facilities to carry out the research.

I would like to express my gratitude towards Prof. Uma Iyer, Dean, Faculty of Family and Community Sciences, for always encouraging us to carry out research and being a facilitator.

I am also grateful to the all Anganwadi Workers and Helpers for their support and corporation throughout the data collection phase.

I would extend a special thanks to Dr. Swati Dhruv and Miss. Shweta Patel for encouragement and helping me with all my doubts patiently.

I would like to acknowledge the countless individuals who have contributed to my research in ways large and small, including all the participants and all the Department members for their help and support, your contributions have been invaluable.

I would like to thank my hostel mates for their constant support.

I am grateful to the people who have always believed in me and encouraged through this journey from day one, to all my dearest friends, a special thanks to them for always being there.

Finally, I am deeply grateful to my family for their emotional support and encouragement during this journey. I consider myself extremely lucky to have parents who have always been my moral support and courage and helped me be the best version of myself.

Vishwa Kalsariya

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AWC	Aanganwadi Centre
BAZ	Body Mass Index for age Z-score
BPNI	Breastfeeding Promotion Network Of India
CF	Complementary feeding
DDS	Dietary diversity score
DLHS	District Level Household Survey
DQQ	Diet Quality Questionnaire
EBF	Exclusive breast feeding
FANTA	Food and nutrition technical assistance
FAO	Food and Agriculture Organization
FFQ	Food Frequency Questionnaire
GOI	Government Of India
HAZ	Height for age Z-score
ICDS	Integrated child development services
IYCF	Infant and young child feeding practices
MAD	Minimum acceptable diet
MAM	Moderate acute malnutrition
MDD	Minimum dietary diversity
MMF	Minimum meal frequency
NFHS	National Family Health Survey
SAM	Severe acute malnutrition
THR	Take home ration
UNICEF	United nations children's fund
WAZ	Weight for age Z-score
WHO	World health organization
WHZ	Weight for height Z-score

ABSTRACT

ABSTRACT

Nutrition is a crucial aspect of a child's development and a nation's success, as it can have both immediate and long-term effects. The first few years of a child's life are especially critical, and inadequate nutrition during this period can lead to irreversible damage to their brain and overall health. This can hinder their ability to succeed academically and financially, perpetuating the cycle of poverty. Neglecting investments in child welfare during this period can also result in significant economic losses for a country. Unfortunately in developing nations, particularly in urban slum regions, childhood malnutrition remains a pressing public health issue due to exposure to various health hazards, including insufficient nutrition. The consumption of processed foods is a major factor contributing to unhealthy eating patterns and has been associated with a range of health issues, including obesity, diabetes, and cardiovascular diseases (1000 days)(UNICEF, 2019).

Thus, the present study was carried out with the objective to study the consumption of processed foods among children 0-6years of age in Urban Vadodara.

The present cross sectional study was conducted in urban Vadodara's slums with the aid of the government's Integrated Child Development Services program. Four Anganwadi Centers (AWCs) were chosen from each of the program's four zones using computer-generated random sampling, with 100 children from each AWC included in the study. Data was collected using a detailed questionnaire, and factors such as socio-economic status, anthropometric measurements of children, obstetric details of mothers, and diet diversity and frequency were examined. The study received prior approval to conduct research at the AWCs, and mothers provided consent for their children to participate.

The major results of the study reveals that among 400 children, 47.5% had a normal nutritional status, 33.75% were at risk, 9.5% had moderate acute malnutrition, and 4.75% had severe acute malnutrition, 3% were overweight, and 1.5% were obese. Biscuits and namkeen/sev mumra are the most commonly consumed market products across all age groups and genders. Processed foods, such as confectionery and beverages, were popular across all age groups. Only 23.8% of children aged 6-72 months met the criteria for MDD. Male children were more likely to meet

the criteria for MDD than female children, and older children were more likely to meet the criteria than younger children. A significant proportion of children are suffering from malnutrition, with less than half (47.5%) exhibiting a normal nutritional status.

Based on the NOVA classification of food groups, the study found that green leafy vegetables and vitamin A-rich fruits and vegetables are rarely consumed, with only 1.5% of participants eating them 4-5 times per week. The most frequently consumed sweet beverage was tea, with 62% of participants drinking it daily. A considerable proportion of participants regularly consumed chips/kurkure, papdi/gathiya, and namkeen/chavanu, with 34%, 42.5%, and 20.5% respectively eating them 4-5 times per week. Choda fadi/mathi was consumed rarely by most children. The majority of children, about 70.7%, consumed processed foods more than four times a week, with biscuits/toast/khari and tea being the most commonly consumed items by both males and females. As age increases, a higher percentage of children tend to consume biscuits/toast/khari, tea, and papdi/gathiya. Males were found to consume bhungla and sev more frequently than females, with 64.5% of males consuming bhungla thrice or once a week, compared to 58.7% of females, and 56.3% of males consuming sev, compared to 54.7% of females.

The study reveals a concerning reality about the state of children's nutrition, with less than half exhibiting normal nutritional status, indicating a widespread problem that needs urgent attention. There is a high prevalence of both under nutrition and over nutrition, pointing towards the presence of a dual burden of malnutrition. The high consumption of processed foods in daily life is one of the contributing factors to poor nutritional status, making it crucial to promote a balanced and healthy diet, public education, awareness campaigns, and regulating the production and marketing of processed foods to improve the nutritional status and overall health of children.

INTRODUCTION

The importance of nutrition cannot be overstated, as it plays a fundamental role in both a child's development and a nation's ability to thrive. Insufficient nutrition during the first 1,000 days can cause irreversible harm to a child's growing brain, negatively impacting their academic performance and future earning potential, and hindering their ability to break free from poverty. Additionally, it can increase the likelihood of developing chronic conditions like obesity, diabetes, and other health problems that persist throughout their lives (1000 days).

Research has revealed that nations that neglect to invest in the well-being of women and children during this critical period suffer significant financial losses in terms of reduced economic productivity and higher healthcare expenses. This is why leading economists worldwide are advocating for greater investments in the nutrition and overall welfare of mothers, infants, and toddlers as a means of creating a brighter and more prosperous future for all of us (1000 days).

Inadequate nourishment is affecting a significant number of children worldwide, with a minimum of one in three not receiving the nutrition required for proper growth. This is particularly concerning during the critical first 1,000 days, spanning from conception to a child's second birthday, and sometimes beyond. Although more children and adolescents are surviving, malnutrition remains a significant obstacle to thriving (UNICEF, 2019).

Burden and Prevalence of Malnutrition

The burden of malnutrition has become a significant challenge in many low- and middle-income countries. These countries face the dual problem of under nutrition, which has been a long-standing issue, and the rapid rise of non-communicable diseases, particularly obesity and overweight, especially in urban areas. In other words, while they still deal with infectious diseases and under nutrition, they also have to cope with the increasing prevalence of obesity and its associated health risks. It is not uncommon to see under nutrition and obesity coexisting within the same country, community, and even household. The problem is exacerbated for children in these countries, as they are more vulnerable to inadequate pre-natal, infant, and young child nutrition. Additionally, processed foods which are often high in fat, sugar, salt, and low in nutrients, tend to be cheaper and more easily accessible, leading to unhealthy diets among children from low-income families. Coupled with low levels of physical activity, these dietary patterns lead to a sharp increase in childhood obesity. The situation is particularly worrisome as under nutrition and obesity can have

long-term effects on a child's growth and development, leading to poor cognitive development, stunted growth, and an increased risk of chronic diseases later in life (WHO, 2021).

The UNICEF 2021 Child Nutrition Report reveals that stunting affected 22.0% of children under the age of five globally in 2020, while wasting affected 6.9% of children in the same age group. The prevalence of overweight and obesity among young children was also found to be high, with an estimated 38.9 million children affected worldwide. While the prevalence of overweight and obesity is still highest in high-income countries, it is rapidly increasing in low- and middle-income countries as well (UNICEF, 2021).

The National Family Health Survey (NFHS) 5 data for India highlights a worrying prevalence of under nutrition among children under the age of five. Stunting affects a massive 34.7% of this age group, while wasting impacts 17.3%, revealing a significant challenge in providing adequate nutrition to India's young population. However, over nutrition is also on the rise among children, with 9.4% of under-fives suffering from overweight or obesity. The coexistence of both under- and over nutrition, known as the dual burden of malnutrition, is a growing concern in the country and poses severe health risks to children (NFHS 5, 2021c).

The NFHS 5 data for Gujarat shows a similar trend, with stunting prevalence at 35.5% and wasting at 21.2% among children under five. Underweight prevalence is high at 35.8%, highlighting a considerable burden of under nutrition in the state. Overweight and obesity also affect 7.3% of children under the age of five (NFHS 5, 2021b). In Vadodara, the situation is slightly better, with stunting prevalence at 30.9% and wasting at 17.8%. However, the prevalence of underweight children is still high at 33.8%, and overweight and obesity affect 7.8% of children under five, slightly higher than the state average (NFHS 5, 2021a).

Trends in Quality of Children’s Diet

The state of children's diets has remained consistently poor over the past decade due to inadequate intake of nutritious foods at the appropriate times. Unfortunately, little progress has been made in improving the quality of children's diets during this time, and disparities in nutritional intake continue to exist within countries. Many families are challenged in accessing and affording healthy food options for their young children, while social, cultural, and gender-related constraints further limit the diversity of foods consumed. Meanwhile, unhealthy processed foods are easily accessible and heavily promoted, exacerbating the situation (UNICEF, 2021).

Prevalence and Indicators of Infant and Young Child Feeding Practices

Improving infant and young child feeding practices is crucial for promoting their nutrition, health, and development, which, in turn, has a direct impact on their survival. However, the current indicators used in population-based surveys to assess feeding practices have mostly focused on breastfeeding. This has led to a lack of data and agreement on simple indicators for assessing acceptable feeding practices in children aged 6 to 23 months. This lack of consensus has impeded progress in improving feeding practices and, consequently, limited improvements in the nutritional outcomes of infants and young children (UNICEF, 2021).

Minimum dietary diversity:

A proportion of children 6–23 months of age receive food from 5 or more food groups.

Worldwide data shows that insufficient dietary diversity is prevalent among young children, with only 44% of children aged 6-23 months meeting the minimum dietary diversity score of 4 out of 10 food groups worldwide. In India, the situation is even more alarming, with only 23.7% of children in this age group meeting the minimum dietary diversity score. As per the NFHS-5 and CNNS data, Meghalaya exhibits the highest proportion of children aged 6-23 months with minimum dietary diversity, while Rajasthan has the lowest. In Gujarat, the minimum dietary diversity among children stands at 16.5 percent (CNNS, 2019).

Understanding Processed Foods

Ultra-processed foods and drinks are products made from industrial formulations using ingredients derived from foods or synthesized from organic sources. These food items are a creation of modern food science and technology and usually require minimal preparation or are ready-to-consume. They are designed to be convenient and require little cooking or preparation time. The NOVA classification system categorizes food into four groups based on their level of processing (Monteiro et al., 2019).

GROUP 1: Unprocessed and minimally processed foods

Unprocessed or natural foods refer to the edible parts of plants, animals, fungi, algae, and water after being separated from nature. These include fruits, leaves, stems, seeds, roots, muscle, offal, eggs, milk, and other unaltered natural sources. Minimally processed foods are natural foods that have been altered by methods such as removing inedible parts, drying, crushing, grinding,

powdering, fractioning, filtering, roasting, boiling, non-alcoholic fermentation, pasteurization, chilling, freezing, placing in containers, or vacuum packaging.

GROUP 2: Processed culinary ingredients

Culinary ingredients that have undergone processing include oils, butter, lard, sugar, and salt.

GROUP 3: Processed foods

Different types of preserved vegetables and legumes that come in canned or bottled form, stored in brine solution. Additionally, it includes whole fruits that are preserved in syrup, tinned fish that is preserved in oil, and certain processed animal foods such as ham, bacon, pastrami, and smoked fish. It also covers freshly baked bread and basic cheeses that contain added salt.

GROUP 4: Ultra-processed foods

Ultra-processed foods refer to products composed of various ingredients, primarily intended for industrial use and typically manufactured using a range of complex industrial techniques and processes, which is why they are referred to as "ultra-processed."

There is a variety of commonly consumed ultra-processed products, which include carbonated beverages, packaged snacks that are high in sugar, fat, or salt, confectionery items such as candy, commercially produced bread, cookies, pastries, cakes, and cake mixes. Additionally, margarine and other spreads, sweetened breakfast cereals, fruit yogurts, and energy drinks fall under this category. Pre-made meat, cheese, pasta, and pizza dishes, as well as fish and poultry "nuggets" and "sticks," sausages, burgers, hot dogs, and other meat-based products made from reconstituted meat are also classified as ultra-processed. Powdered and packaged "instant" soups, noodles, and desserts, as well as baby formula and various other types of products, are also included.

Rationale of the Study

Over time, there has been a significant shift in the dietary habits of children. In the past, traditional and locally available nutrient-dense foods were the mainstay of their diets. However, with the increasing modernization of people's lives, there has been a gradual shift towards more processed and cheaper ready-to-eat foods. The convenience of these foods makes them easily accessible to families, and they require less time and effort to prepare, which is especially appealing to busy parents.

Moreover, there is a growing influence of marketing that promotes these processed foods as a desirable option for children. The packaging and branding of these products are designed to attract children's attention, and their taste and texture are often designed to be highly palatable. The result of these marketing strategies is that children are more likely to request and consume these foods, which may not be as nutritional.

Another factor contributing to the change in children's diets is the impact of globalization. With an increasing number of multinational food companies operating in different parts of the world, the availability of processed foods has increased significantly. Overall, the shift towards more processed foods has significant implications for children's health. While these foods may be convenient and affordable, they may not provide the essential nutrients that children need for optimal growth and development.

Additionally, there is insufficient data available to support the consumption of processed foods, particularly in children who are under 6 years old.

Thus, the primary aim of this study was to investigate the usage of processed foods among children aged between 0-6 years living in Urban Vadodara. The specific objectives included examining the consumption rates of processed foods based on the child's age and gender, as well as assessing the feeding practices related to Infant and Young Child Feeding (IYCF) among these children.

REVIEW OF LITERATURE

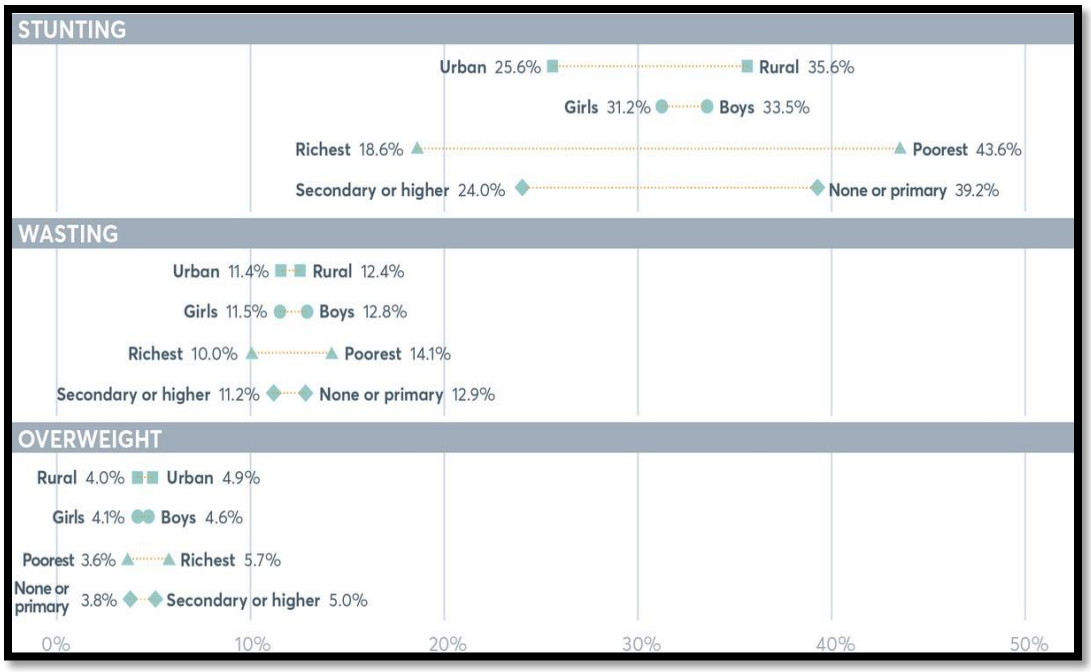
To grow and develop to their greatest potential, children require proper nutrition at the appropriate times. The 1,000-day window, from conception to a child's second birthday, is a crucial time for proper nutrition. The World Health Organization (WHO) and UNICEF recommend that infants begin breastfeeding within an hour after birth and continue exclusively for the first six months and continue for at least two years. Breastfeeding during the first two years of life promotes health, brain development, and provides children with a safe and nutritious food source. Children should start consuming solid foods at around 6 months of age and should be provided with frequent and nutritious meals throughout the day. The determinants of young children's diets include adequate foods, practices, and services (UNICEF, 2021).

Prevalence

As seen in Figure 2.1, location and education exhibit distinct inequalities for stunting and wasting versus overweight. The incidence of stunting and wasting is higher among children in rural regions and among mothers with lower levels of education, whereas the prevalence of overweight is higher among children in urban areas and among mothers with higher levels of education. Even in situations that are mostly low- and lower-middle income, such wealth, location, and education inequalities are noticeable. (GNR, 2020).

Globally, there is a lack of exclusive breastfeeding for the first 48 hours after birth, with only 65% of children adhering to this practice. South Asia has similar rates, indicating that almost 35% of children are fed substances other than breast milk. Despite national data indicating exclusive breastfeeding for children up to 5 months, other substances are often fed to them due to various reasons, including lack of knowledge, cultural beliefs, and poor breastfeeding practices. In addition, processed and ultra-processed foods are increasingly provided to infants, with fruit juices and processed bread being the most common foods (UNICEF, 2021).

Figure 2.1: Inequalities in stunting, wasting and overweight in children under 5, by urban-rural location, sex, wealth and education



(Source : Global Nutrition Report, 2020)

Globally, there is a lack of exclusive breastfeeding for the first 48 hours after birth, with only 65% of children adhering to this practice. South Asia has similar rates, indicating that almost 35% of children are fed substances other than breast milk. Despite national data indicating exclusive breastfeeding for children up to 5 months, other substances are often fed to them due to various reasons, including lack of knowledge, cultural beliefs, and poor breastfeeding practices. In addition, processed and ultra-processed foods are increasingly provided to infants, with fruit juices and processed bread being the most common foods (UNICEF, 2021).

According to 2021 UNICEF data, the quality of diets for children aged 6-23 months globally is poor, with low dietary diversity and a lack of consumption of fruits and vegetables. While continued breastfeeding rates are high, minimum meal frequency and consumption of foods like eggs, fish, and meat are lacking. There is also a growing trend

of consuming unhealthy processed foods, including sweets, soft drinks, noodles, and biscuits, particularly among children aged 6-23 months in India.

Furthermore, according to NFHS-5, less than 50% of children in India are introduced to complementary foods at the appropriate age, and the prevalence of minimum acceptable diets among children between 6-23 months is low, particularly in Gujarat where it is the lowest among all states. The prevalence rate in Vadodara is even lower.

Processed Foods in Children's Diets

A study conducted on early consumption of ultra-processed foods among children under 2 years old in Brazil found that children aged from 6 to 12 and from 12 to 24 months consumed 2393 and 4054 kJ/d, respectively, and processed and UPF represented one-third of dietary energy intake. Children are being exposed early to process and UPF and their share affect the diet's nutritional quality (Spaniol et al., 2021). As such another study on ultra-processed food consumption among preschoolers is associated with diets promoting non-communicable diseases among preschoolers shows UPF constituted 49% of the total energy intake. In contrast, UPF intake was negatively associated with the consumption of proteins, polyunsaturated fats, fiber, zinc, vitamin A, and sodium ($p < 0.05$) (Araya et al., 2021). Results of a longitudinal study during childhood shows that on an average, the percentage of daily energy provided by ultra-processed foods was 41.8 at preschool age and 47.8 at school age, suggesting that early ultra-processed food consumption played a role in increasing abdominal obesity in children (Costa et al., 2019).

A cross–sectional study aimed to assess the relationship between exclusive breastfeeding (EB) duration and dietary habits in Brazilian children aged 4-7 years. Food intake was categorized based on processing level, and a longer duration of EB was associated with reduced energy intake from ultra-processed foods. Children breastfed for less than four months had higher ultra-processed food intake and lower fruit and vegetable intake. The study emphasizes the importance of EB in promoting healthy

eating habits, including a higher intake of fruits and vegetables and lower consumption of ultra-processed foods during childhood. (Fonseca et al., 2019).

A cross-sectional study among infants and toddlers from Urban Settings in Malaysia shows that cereals are consumed as rice, porridge, noodles, bread, and breakfast cereals. The subjects also derived protein from "western foods" such as nuggets, frankfurters, and hot-dogs. 79.4% of 6–11.9 months, 75.6% of 12–17.9 months and 84.1% of 18–23.9 months were consuming formulas (Khor & Lee, 2021). An article on consumption of ultra-processed foods by children under 24 months of age and associated factors shows that 74.3% consumed some kind of ultra-processed food. The factors most strongly associated with this consumption were children older than six months, infants who were not breastfed, households with up to three residents, and the main caregiver of the child being someone other than the mother (de Almeida et al., 2020). The prevalence of formula feeding and prelacteal feeding practice was 46.2 and 34.4%, respectively. Prelacteal feeding practice, and delayed initiation of breastfeeding, breastfeeding after 1 day to 3 days, and after 3 days were significantly associated with formula feeding practice (Taye et al., 2021).

Also, in a study it was found that overall, the mean dietary diversity score was low, and the prevalence of ADDI was only 23%. Maternal education was more strongly associated with consumption of essential food groups (Agrawal et al., 2019). A community based cross sectional study was conducted in urban and rural area of Mangalore shows that the most common food preferred as complementary food was combination of rice and dal together. And commonly preferred snacks were Biscuits both in urban and rural areas (Javalkar & Aras, 2018). In India a study results shows 53% of children consumed packaged food or beverages at least once a day. 53% consumed salted packaged food such as chips and instant noodles twice a week. 56% consumed sweet, packaged food such as chocolates and ice creams. 49% consumed sugar-sweetened packaged beverages. Boys consumed packaged food and beverages

more frequently than girls. Older children consumed packaged food and beverages more frequently than younger children (Bhushan et al., 2017).

A study examined the consumption of ultra-processed foods (UPFs) in a large population of children, adolescents, and adults from eight European countries, and its association with the nutritional quality of their diet. UPFs were found to contribute almost half of the daily energy intake for the 7073 participants, with this trend decreasing as age increased. UPFs also contributed more than 50% of the daily intake of total and saturated fat, carbohydrates, and about 70% of sugars intake in children and adolescents. Higher consumption of UPFs was associated with a lower quality of the diet, as assessed by the Healthy Dietary Adherence Score (HDAS) and the frequency of consumption of fruit and vegetable, fish, and fiber-rich foods was low. The study suggests that the consumption of UPFs negatively affects the nutritional quality of the diet, particularly in children and adolescents (Lauria et al., 2021).

The relationship between consuming ultra-processed foods and the nutritional content of diets linked to obesity in children and adolescents from Argentina, Australia, Brazil, Chile, Colombia, Mexico, the United Kingdom, and the United States was assessed. National data collected between 2004 and 2014 were analyzed using linear regression models to assess how the proportion of ultra-processed foods in diets (measured in quintiles and 10% increments) affected the energy density, free sugar content, and fiber content. The study found that ultra-processed foods (as defined by the NOVA system) accounted for 18% to 68% of total energy intake among preschoolers and adolescents in different countries. Across all countries and age groups, higher consumption of ultra-processed foods was associated with higher energy density and free sugar intake, and lower fiber intake. This indicates that ultra-processed food consumption may contribute to childhood obesity.

The study by Rodríguez-Artalejo assessed the relationship between bakery products, sweetened soft drinks, and yogurt consumption and overall diet quality among Spanish children. 1,112 children aged 6.0-7.0 years from four Spanish cities participated in the cross-sectional study. Food intake and nutrient consumption were evaluated using a

food-frequency questionnaire, while overall diet quality was calculated using the healthy-eating index (HEI). The results indicated that higher consumption of bakery products, sweetened soft drinks, and yogurt was associated with higher energy intake. However, the impact on diet quality was modest. The study recommends the moderation of bakery products and sweetened soft drinks, while prioritizing low-fat, low-sugar yogurt consumption to improve diet quality in Spanish children (Rodríguez-Artalejo et al., 2003).

A study by Jain & Mathur aimed to evaluate how much ultra-processed foods contribute to the macronutrient intake of adolescents from low- and middle-income families in Delhi. The researchers interviewed 1030 adolescents aged 12-16 from four private and four government schools using a 24-hour recall and a food frequency questionnaire. The results showed that the mean energy intake from ultra-processed foods was 16.2% of the total energy intake, which amounted to 371 kcal. The mean intake of macronutrients from ultra-processed foods was 16.3% fat, 18.6% carbohydrate, and 10.9% protein. Adolescents from middle-income families consumed significantly higher amounts of macronutrients from ultra-processed foods than those from low-income families. The study also found that the adolescents reported regularly consuming a variety of ultra-processed foods (JAIN A & MATHUR P, 2020).

Infant Feeding Pattern (IYCF)

At a global level there is some increases in exclusive and any breastfeeding at age 6 months in various regions and income groups, while formula consumption increased in upper-middle-income countries (Neves et al., 2021). Breastfeeding falls sharply as children become older, especially in wealthier families in upper-middle-income countries; this same group also consumes more BMS at any age. Country-level factors play an important role in explaining BMS consumption by all family wealth groups, suggesting that BMS marketing at national level might be partly responsible for the observed differences (Neves et al., 2022).

The period of 6-23 months in infants is crucial for child development, and complementary feeding practices must be optimized to ensure optimal growth and development. This study aimed to analyze the complementary feeding practices and nutritional status of children aged 6-23 months. A cross-sectional study was conducted with 392 children selected using stratified random sampling. Data on socio-demographic indicators, complementary feeding practices, and nutritional status were collected through interviews and repeated 24-hour food recall methods. The results showed that suboptimal complementary feeding practices and a high prevalence of underweight, wasting, and stunting were found among children aged 6-23 months in Aceh. The study identified factors associated with these outcomes, such as age, birth order, birth weight, parents' education level, family size, and incidence of fever and Diarrhea. The findings suggest the need to improve complementary feeding practices and nutritional status in this population (Ahmad et al., 2018).

Childhood obesity is a serious global problem that is increasing and poses a significant risk of chronic diseases from an early age. The causes of obesity are complex, but nutrition and metabolism play essential roles. There are several risk factors that contribute to childhood obesity, particularly within the first 1000 days of life. These risk factors are influenced by three stages of human feeding environment: the prenatal period, breast vs. formula feeding, and complementary diet. It is important to understand the nutritional challenges in each phase to develop effective preventive strategies (Mameli et al., 2016).

Statistics reveal that globally, only 52% of children aged 6-23 months consume the minimum number of solid, semi-solid, or soft foods required per day, while less than one third (29%) consume foods from at least four of the seven food groups daily. This is further worsened by significant disparities within and between regions. The situation is even more concerning for children aged 6-11 months, with only 46.3% meeting the minimum meal frequency, and a mere 17% meeting the minimum dietary diversity. Additionally, low intake of fruits, vegetables, and foods of animal origin, such as dairy, meat, fish, and eggs, is a widespread issue across all regions (Bégin & Aguayo, 2017).

Influential Factors in Children's Processed Food Consumption

Mothers in low-income countries are primarily responsible for childcare and feeding. Understanding their experiences is crucial to improving children's nutrition. However, information on this topic is lacking in Sub-Saharan Africa. To address this, 36 in-depth interviews were conducted with urban mothers of children under five. Thematic analysis identified four major themes: child-driven diet, quick-fix vs. planning, food safety and nutrition awareness, and social and cultural influences. The findings suggest that child feeding practices are influenced by interconnected social and environmental factors (Berhane et al., 2018).

This study analyzed the consumption of processed foods among 376 children aged 6 months to 2 years in Guarapuava, Brazil. Eight out of the 15 most frequently consumed industrialized foods were correlated. These foods were consumed an average of 10 days per month. Factors associated with increased consumption included maternal age under 25 years, low maternal education, large households, presence of other children, and low household income. Socioeconomic, demographic, and environmental factors influenced the early introduction of processed foods among young children (Francisca Cavassim et al., 2016).

Departmental studies

Kantawala S and Hardikar A conducted a study in Surat among children aged 0-24 months which found that chocolates (94%), sev mumara (87%), chips (84%), kurkure, sev (54%), and cookies (33%) were the most commonly consumed foods. The study also reported that children had insufficient dietary diversity in complementary foods and a high frequency of ultra-processed food consumption (Kantawala S and Hardikar A, 2022).

A study on children aged 6-23 months in Jamusar found that 99 percent of children consumed unhealthy foods, particularly packaged foods, with a higher consumption of processed foods among older children. About 51% and 34% of children had minimum dietary diversity (MDD) and minimum acceptable diet (MAD), respectively. The study also revealed an increase in the prevalence of MAD and MDD as children grew older (Gandhi H and Thakur B, 2021).

In a study of school-aged children, out of 319 participants, 5.3% were categorized as underweight, 61.1% as normal, 26% as overweight, and 7.5% as obese. The children reported consuming high fat, salt, and sugar (HFSS) foods within the last 24 hours (Venugopal S and Shinde V, 2020).

In a study conducted in the rural block of Vadodara, assessed the diets of 285 children between 7-59 months old. They found that only 29 children met the minimum dietary diversity (MDD) score by consuming more than 5 food groups, while 256 children consumed less than 5 food groups (Chandodkar S. and Shah P, 2017).

In a study conducted by Kantawala S and Pathak R in Baroda, it was observed that 86% of children aged between 0-12 months consumed high-fat, salt, and sugar (HFSS) foods. The consumption of such foods was found to be consistent across all age groups of children. Additionally, one-third of the children were able to meet the minimum dietary diversity (MDD) requirements, and there was no significant difference observed between the consumption patterns of organized and unorganized sectors (Kantawala S and Pathak R, 2020).

The study on adolescents found that sweet biscuits, salty biscuits (83%), ketchups and sauces (74%), butter and cheese (72%), noodles, pasta, and macaroni (72%), papads (67%), namkeens and savouries (64%), soups (61%), chips (58%), cakes (58%), and pickles (58%) were the most popular foods among adolescents (51%). Additionally, sweet biscuits, papads, salty biscuits, namkeens, pickles, ketchups and sauces, butter and cheese, soups, chips, jam, marmalades and jellies, noodles, pasta and macaroni, juices, cornflakes, oats and muesli, soft drinks, popcorn, spreads and dips, cakes and

sweet cream wafers were the most frequently consumed foods (five times a month) (Chnadorkar S and Singh M, 2015).

According to a study conducted by Kantawala S and Shah E in Baroda among children aged 6-23 months, milk and biscuits (44%) were the most commonly consumed ultra-processed foods (UPFs). This was followed by fruit-based beverages (10%), processed foods such as cerelac (6%), and fried foods like papadi and ghatiya (2%) (Kantawala S and Shah E, 2020).

A study among 25-50 years of individuals was conducted and the data revealed that the most frequently consumed HFSS foods were wafers, puff, samosa, ice cream, papad, soft drinks, bun etc. The consumption of foods high in fat, salt and sugar was significantly more frequent among overweight and obese as compared to normal subjects (Dhruv S and Gohil U, 2018).

In a study on school-aged children, it was found that the prevalence of overweight was 19.65%, obesity was 9.95%, thinness was 29.61%, and stunting was 26.37%. Obese children had higher blood pressure measurements and were less physically active than normal weight children. Commonly consumed HFSS foods were puff, vadapav, wafers, ice-cream, chocolates, and the frequency of eating outside the home was once every ten days by 30% of the subjects. The most frequently brought food items in students' tiffins were roti, sabzi, thepla, bhakri, followed by dry snacks like chevda, mathri, khakhara, and papadpoha. The school canteen management was found to maintain food safety and hygiene, but the students preferred HFSS foods like pizza, burger, and soft drinks (Dhruv S, Iyer U and Gosavi S, 2019).

METHODS AND MATERIALS

In developing nations, particularly in urban slum regions, childhood malnutrition remains a pressing public health issue due to exposure to various health hazards, including insufficient nutrition. The consumption of processed foods is a major factor contributing to unhealthy eating patterns and has been associated with a range of health issues, including obesity, diabetes, and cardiovascular diseases.

OBJECTIVES OF THE STUDY

BROAD OBJECTIVE: To study the consumption of processed foods among children 0-6years of age in Urban Vadodara

SPECIFIC OBJECTIVE:

1. Age Specific: Assessing consumption rates of processed foods according to age of the child.
2. Gender Specific: Assessing consumption rates of processed foods according to the gender of the child.
3. IYCF Practices: Assessing IYCF consumption patterns among the children.

STUDY DESIGN

A cross sectional study was undertaken to assess the consumption of processed foods among children 0-6years of age in Urban Vadodara, Gujarat using the simple random sampling method the study plan is indicated in Figure 3.1.

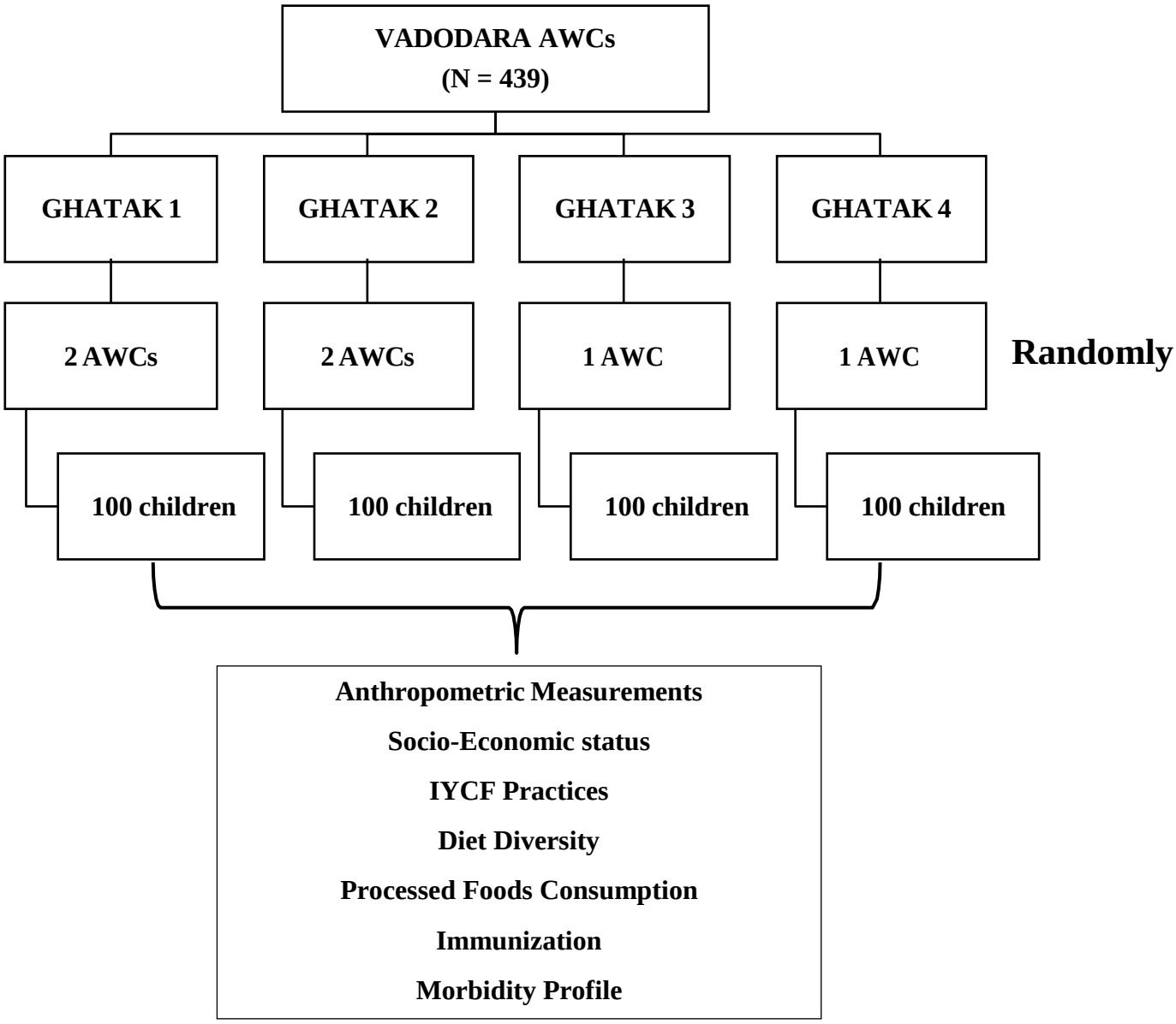
STUDY APPROVAL

Prior to the study, the Institutional Ethics Committee for Human Research (IECHR) gave their approval under protocol number IECHR/FCSc/MSc/2022/35.(Annexure 2). Permissions was taken for conducting research at AWCs (Mention Annexure no). The subjects were informed in detail about the study and written consent was also acquired from the subjects (Annexure 1).

SAMPLE SIZE

The sample size was determined based on the prevalence of ultra-processed food intake observed in a cross-sectional study conducted in urban Surat using a simple random sampling method (Kantawala S, Hardikar A 2022).

Figure 3. 1: Study Plan



The sample size of the study has been calculated by adopting the formula:

$n = Z^2 \alpha / 2 \times PQ / \sum 2$

Where, P = Prevalence rate of ultra-processed food intake (Kantawala S, Hardikar A 2022)

= 33%

Q = 1 – P,

α = level of Significance (type 1 error); 5% Allowable error

Then, n = 4 x 0.33 x 0.67 / 0.0025 **= 340**

10% non-response rate = 374 ≈ 400 children

INCLUSION CRITERIA

- Mothers whose children are < 6 years of age.
- Mothers willing to participate

EXCLUSION CRITERIA

- Mothers whose children are suffering from any chronic medical complication.

STUDY PLAN

The research was carried out in the slums of urban Vadodara with the help of the ICDS (Integrated Child Development Services) set up by the government. The ICDS is composed of four zones or Ghataks, namely East zone - Ghatak 1, West zone - Ghatak 2, North zone - Ghatak 3, and South zone - Ghatak 4. Employing computer-generated simple random sampling, four AWCs were chosen from each of the four Ghataks, and 100 children were enrolled from each zone. Prior approval was obtained for conducting research at AWCs. Following the inclusion and exclusion criteria, and after obtaining consent for participation in the study, mothers of the children from the selected AWCs were interviewed until the targeted sample size of 100 from each Ghatak was reached. The data was collected on Socio-Economic Status, Anthropometric measurements of children, Obstetric details of mothers, Diet Diversity and Food Frequency patterns of children using a detailed formulated questionnaire. The tools and techniques used to collect data are mentioned in Table 3.1.

The questionnaire comprised of the following key parameters:

Table 3. 1: Tools and Techniques for data collection

PARAMETER	TOOLS
Anthropometric measurements: Weight Height	 Infant weighing scale/ bathroom scale Infantometer/ stadiometer
Socio-economic status	Pretested semi-structured questionnaire
IYCF Practices	Pretested semi-structured questionnaire
Immunization	Pretested semi-structured questionnaire
Morbidity Profile	Pretested semi-structured questionnaire
Diet diversity	DDQ for India
Processed Foods Consumption	Food group frequency questionnaire on processed Foods according to NOVA classification

BACKGROUND INFORMATION

Socio economic profile was collected using a pretested semi-structured questionnaire related to Religion, Caste, Education & Occupation of the mother, Number of family members and children, monthly income of the family, toilet facility, mass media usage.

ANTHROPOMETRIC INFORMATION

Anthropometry refers to the process of measuring an individual's physical dimensions and comparing them to established standards that indicate growth and development. These measurements are a key aspect of determining nutritional status and can provide valuable insights into whether an individual is properly nourished or undernourished.

WEIGHT

For subjects under 2 years of age, an electronic Infant Scale was used to measure their weight by laying them on their backs in the center of the scale pan. Meanwhile, older children's body weight was measured using a Digital Bathroom Weighing scale, by standing at the center of the scale with their weight evenly distributed on both feet and without touching any other object. To ensure accurate measurements, several precautions were taken, including placing weighing scales on a level surface, checking the "zero" on the scale before weighing, having subjects wear minimal clothing, removing footwear and emptying pockets, and recording the weight once the digital display had stabilized Weight was measured using an electronic balance with 100g of accuracy and recorded in kilograms, to the nearest 100 grams.

HEIGHT

To measure the height of subjects under 2 years old, an Infantometer was employed. The mother was directed to lay the infant on their back, with their head resting against the fixed headboard, compressing their hair. The head was then quickly positioned so that an imaginary vertical line drawn from the ear canal to the lower edge of the eye socket is parallel to the board, while the child's eyes remained fixed on the ceiling. The mother was instructed to hold the head in this position during the measurement process.

Meanwhile for the older children, height was measured using a stadiometer. Participants were instructed to remove shoes, hats, and hair accessories and stand up straight with their back against

the backboard of the stadiometer, feet together, and arms at their sides. The headpiece of the stadiometer was lowered gently onto the top of the participant's head, ensuring it was level, and the measurement was read and recorded to the nearest millimeter.

IYCF PRACTICES

A questions to gather information regarding several aspects of infant nutrition including birth weight, initiation of breastfeeding, colostrum feeding, exclusive breastfeeding, quality and quantity of complementary food, frequency of complementary feeding, and utilization of supplementary nutrition, etc. were asked.

QUALITY OF CHILDREN'S DIET

To evaluate the dietary intake of children, two different questionnaires: the Diet Quality Questionnaire (DQQ) India for children aged above 35 months, and the Diet Quality Questionnaire (DQQ) IYCF India for children ≤ 35 months. The DQQ is a comprehensive tool that assesses nutrient sufficiency, dietary patterns, etc. It comprises 29 food groups (listed in the Annex), from which multiple indicators can be obtained.

FFQ

To assess the frequency of consumption of ultra-processed foods among children aged 0-6 years, a food frequency questionnaire (FFQ) was developed using the NOVA classification system for processed foods. The FFQ captured information on how frequently mothers' children consumed ultra-processed foods and included the following groups:

- minimally processed foods
- processed culinary foods
- processed foods
- ultra-processed foods
- homemade and ready to eat ultra-processed foods

The FFQ provided valuable information on the dietary intake of this vulnerable population and was a reliable tool for examining associations between processed food consumption and other factors.

STATISTICAL ANALYSIS

The data was collected cleaned and verified after which it was subjected to appropriate statistical analysis. Frequency distribution, Percentages, Mean, standard deviation, ETC were calculated for all parameters using SPSS version 29. Anthropometric data was analyzed by WHO Anthro software (V.3.2.2). Results have been presented in tabular and/or graphical form.

RESULTS AND DISCUSSION

This chapter outlines the key outcomes of the study, aligned with the primary research objectives. The study aimed to evaluate the consumption patterns of processed foods among children, taking into consideration their age, gender, and IYCF consumption practices.

Demographic Profile

The Table 4.1 provides information about the demographic characteristics and living conditions of 400 participants, 183 of whom were female children and 217 were male children. The majority of participants were Hindu (75.3%), followed by Muslim (24.5%) and Christian (0.3%). In terms of caste, OBC was the largest group (59.3%), followed by General (21.0%), ST (14.0%), and SC (5.8%). The majority of participants lived in nuclear or extended families, with 43.3% and 33.5%, respectively, while 23.3% lived in joint families. Most participants had between 5-8 family members, with 63.3% falling into this category. A similar trend was observed with the number of children, with 42.5% having two children and 24.8% having only one child. The majority of participants lived in their own houses (63.5%), while the remaining 36.5% lived in rented or government-owned housing. Toilet facilities are available in 98% of households, while only 2% of households lack access to them.

Education and Occupation of mothers

The Table 4.2 shows the educational qualifications and occupation of mothers in the study, broken down by gender. Out of the total 400 participants, 183 were female and 217 were male. The majority of mothers had a primary school certificate (35.0% female, 32.3% male, 33.5% total), followed by middle school certificate (32.2% female, 29.5% male, 30.8% total) and high school certificate (13.1% female, 18.0% male, 15.8% total). Only a small percentage of mothers had a graduate degree (3.8% female, 7.8% male, 6.0% total), while no mothers had an intermediate or diploma degree.

In terms of occupation, the majority of mothers were unemployed (88.5% female, 81.6% male, 84.8% total). The second most common occupation was elementary occupation (9.3% female, 14.7% male, 12.3% total), followed by skilled workers and shop & market sales workers (1.1% female, 3.2% male, 2.3% total). A very small percentage of mothers were either professionals, skilled agricultural & fishery workers, or had a profession or honours. Overall, the table shows that the majority of mothers in the study had low levels of education and were unemployed.

Table 4. 1 Demographic Profile by Gender and Socioeconomic Characteristics

	Female (N = 183)		Male (N = 217)		Total (N = 400)	
	N	%	N	%	N	%
Religion						
Hindu	137	74.9%	164	75.6%	301	75.3%
Muslim	45	24.6%	53	24.4%	98	24.5%
Christian	1	0.5%	0	0.0%	1	0.3%
Caste						
OBC	115	62.8%	122	56.2%	237	59.3%
General	37	20.2%	47	21.7%	84	21.0%
ST	22	12.0%	34	15.7%	56	14.0%
SC	9	4.9%	14	6.5%	23	5.8%
Type of family						
Nuclear	78	42.6%	95	43.8%	173	43.3%
Extended	62	33.9%	72	33.2%	134	33.5%
Joint	43	23.5%	50	23.0%	93	23.3%
Total number of family member						
≤4	47	25.7%	55	25.3%	102	25.5%
≥9	25	13.7%	20	9.2%	45	11.3%
5-8	111	60.7%	142	65.4%	253	63.3%
Total number of children						
≥4	24	13.1%	29	13.4%	53	13.3%
1	44	24.0%	55	25.3%	99	24.8%
2	81	44.3%	89	41.0%	170	42.5%
3	34	18.6%	44	20.3%	78	19.5%
Living in a type of house						
Own house	117	63.9%	137	63.1%	254	63.5%
Rented/Govt. house	66	36.1%	80	36.9%	146	36.5%
Toilet facility available in the household						
Yes	180	98.4%	212	97.7%	392	98.0%
No	3	1.6%	5	2.3%	8	2.0%

Table 4. 2: Education and Occupation of Mothers by Gender Classification

	Female (N = 183)		Male (N = 217)		Total (N = 400)	
	N	%	N	%	N	%
Educational Qualification						
Graduate	7	3.8%	17	7.8%	24	6.0%
High school certificate	24	13.1%	39	18.0%	63	15.8%
Illiterate	24	13.1%	22	10.1%	46	11.5%
Intermediate or diploma	0	0.0%	3	1.4%	3	0.8%
Middle school certificate	59	32.2%	64	29.5%	123	30.8%
Primary school certificate	64	35.0%	70	32.3%	134	33.5%
Profession or Honors	5	2.7%	2	0.9%	7	1.8%
Occupation						
Elementary Occupation	17	9.3%	32	14.7%	49	12.3%
Professionals	1	0.5%	0	0.0%	1	0.3%
Skilled Agricultural & Fishery Workers	1	0.5%	1	0.5%	2	0.5%
Skilled Workers and Shop & Market Sales Worker	2	1.1%	7	3.2%	9	2.3%
Unemployed	162	88.5%	177	81.6%	339	84.8%

Distribution of the children

The Table 4.3 and figure 4.1 shows the distribution of children by age group and Ghatak with gender disaggregation. Out of the 400 children, 31 (7.75%) were aged 0-6 months, 175 (43.75%) were aged 6-36 months, and 194 (48.5%) were aged 36-72 months. The highest number of children in all age groups were from Ghatak 4. In all age groups, there were more males than females. In the 0-6 months age group, 8 (25.8%) males and 3 (9.7%) females were from Ghatak 1. In the 6-36 months age group, 24 (13.7%) males and 24 (13.7%) females were from Ghatak 1. In the 36-72 months age group, 19 (9.8%) males and 22 (11.3%) females were from Ghatak 1.

Table 4. 3: Distribution of children by age group and Ghatak with gender disaggregation

		0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N = 194)	
		N	%	N	%	N	%
Total	Ghatak 1	11	35.5%	48	27.4%	41	21.1%
	Ghatak 2	6	19.4%	46	26.3%	48	24.7%
	Ghatak 3	2	6.5%	46	26.3%	52	26.8%
	Ghatak 4	12	38.7%	35	20.0%	53	27.3%
Male	Ghatak 1	8	38.1%	24	27.6%	19	17.4%
	Ghatak 2	4	19.0%	23	26.4%	29	26.6%
	Ghatak 3	1	4.8%	24	27.6%	29	26.6%
	Ghatak 4	8	38.1%	16	18.4%	32	29.4%
Female	Ghatak 1	3	30.0%	24	27.3%	22	25.9%
	Ghatak 2	2	20.0%	23	26.1%	19	22.4%
	Ghatak 3	1	10.0%	22	25.0%	23	27.1%
	Ghatak 4	4	40.0%	19	21.6%	21	24.7%

Mass Media usage by household

The table 4.4 presents the usage of different mass media by households with children in three age ranges (0-6 months, 6-36 months, and 36-72 months) and also for the total sample. The data shows that mobile phone usage is the highest among all age groups and genders, with over 93% of households using it in all categories. The usage of newspapers is low in all categories, with only around 9% of households using it in the 6-36 and 36-72 month age ranges. TV usage is also high, with around 75% of households using it in all categories. Radio usage is negligible, with only one household using it in the 0-6 month category. The percentage of households that reported not using any of these mass media is low across all categories. Gender-wise, there are some differences in media usage, but the patterns are consistent across age groups. Male-headed households have slightly lower usage of newspapers compared to female-headed households, while female-headed households have slightly higher TV and radio usage compared to male-headed households.

Figure 4. 1: Distribution of children by age group and Ghatak with gender disaggregation

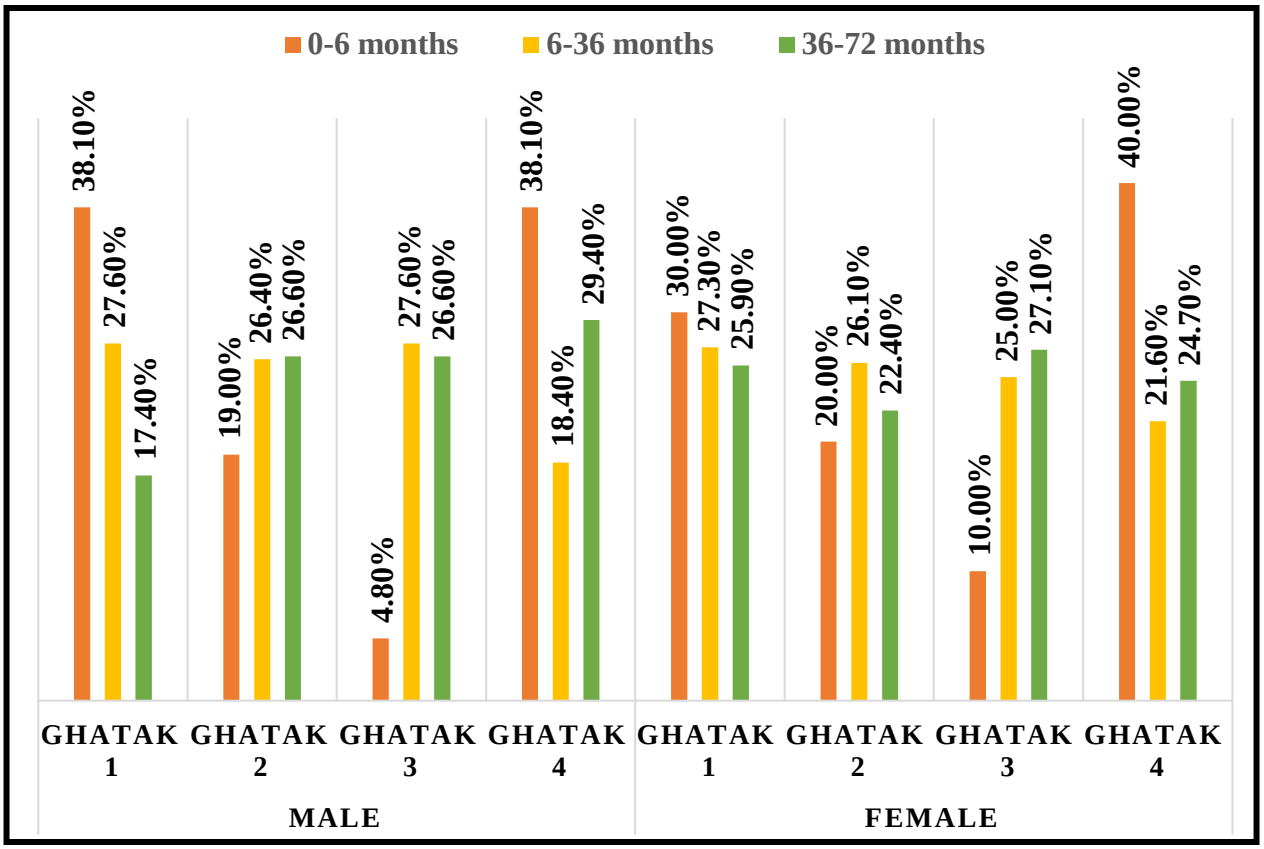


Table 4. 4: Mass Media Usage by Household

		0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N = 194)		0-6 months (N = 31)	
		N	%	N	N	%	N	N	%
Total	Mobilephone	29	93.5%	172	98.3%	190	97.9%	391	97.8%
	Newspaper	0	0.0%	17	9.7%	18	9.3%	35	8.8%
	TV	19	61.3%	132	75.4%	145	74.7%	296	74.0%
	Radio	1	3.2%	0	0.0%	0	0.0%	1	0.3%
	None	2	6.5%	3	1.7%	4	2.1%	9	2.3%
Male	Mobilephone	20	95.2%	85	97.7%	106	97.2%	211	97.2%
	Newspaper	0	0.0%	8	9.2%	11	10.1%	19	8.8%
	TV	14	66.7%	63	72.4%	78	71.6%	155	71.4%
	None	1	4.8%	2	2.3%	3	2.8%	6	2.8%
Female	Mobilephone	9	90.0%	87	98.9%	84	98.8%	180	98.4%
	Newspaper	0	0.0%	9	10.2%	7	8.2%	16	8.7%
	TV	5	50.0%	69	78.4%	67	78.8%	141	77.0%
	Radio	1	10.0%	0	0.0%	0	0.0%	1	0.5%
	None	1	10.0%	1	1.1%	1	1.2%	3	1.6%

Income Classification and Per Capita Income

From Table 4.5, it can be observed that the majority of households in all age groups fall under the income range of 9232-27648. The proportion of households in this income range is consistently high in all age groups - 67.7% in 0-6 months, 73.7% in 6-36 months, and 76.3% in 36-72 months. The proportion of households in the income range of ≤9226 is the lowest in all age groups, ranging from 5.1% to 16.1%. When looking at the gender-wise distribution in Table 4.5, the proportion of male and female-headed households in each income range is similar. However, the proportion of female-headed households in the income range of ≤9226 is slightly higher than male-headed households in the same income range.

Table 4.6 shows that the mean per capita income across all age groups is fairly consistent at around 3400. However, there are some differences between the age groups when comparing per capita income. The highest mean per capita income is observed in the 6-36 months age group, while the lowest mean per capita income is observed in the 0-6 months age group for both male and female.

Table 4. 5: Income classification of household

	Kuppuswami's Income range	0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N = 194)		Total (N = 400)	
		N	%	N	%	N	%	N	%
Total	≤9226	5	16.1%	9	5.1%	13	6.7%	27	6.8%
	27654-46089	2	6.5%	31	17.7%	26	13.4%	59	14.8%
	46095-68961	3	9.7%	6	3.4%	7	3.6%	16	4.0%
	9232-27648	21	67.7%	129	73.7%	148	76.3%	298	74.5%
Male	≤9226	3	14.3%	5	5.7%	6	5.5%	14	6.5%
	27654-46089	1	4.8%	17	19.5%	13	11.9%	31	14.3%
	46095-68961	3	14.3%	3	3.4%	4	3.7%	10	4.6%
	9232-27648	14	66.7%	62	71.3%	86	78.9%	162	74.7%
Female	≤9226	2	20.0%	4	4.5%	7	8.2%	13	7.1%
	27654-46089	1	10.0%	14	15.9%	13	15.3%	28	15.3%
	46095-68961	0	0.0%	3	3.4%	3	3.5%	6	3.3%
	9232-27648	7	70.0%	67	76.1%	62	72.9%	136	74.3%

Table 4. 6: per capita income of the household

	0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N = 194)		0-6 months (N = 31)	
	Mean	S D	Mean	S D	Mean	S D	Mean	S D
Total	3332.75	1887.41	3420.31	1894.49	3377.36	1806.09	3392.69	1847.04
Male	3386.70	2173.85	3538.85	2079.01	3360.23	1752.25	3434.41	1923.81
Female	3219.44	1162.72	3303.12	1696.36	3399.32	1883.14	3343.23	1755.63

Place of Delivery and Birth Outcomes

Table 4.7 provides information on the place of delivery, type of current delivery, outcome of current delivery, and birth weight for both male and female newborns. Out of the total 400 births, 223 (55.8%) were delivered at government hospitals, while 162 (40.5%) were delivered at private hospitals, and 15 (3.8%) were delivered at home. Caesarean delivery was done in 120 (30%) of the cases, while normal delivery was done in 280 (70%) of the cases. Among the 400 newborns, 367 (91.8%) were full-term, and 33 (8.3%) were preterm. 78 (19.5%) of the new-borns had low birth weight, while 321 (80.3%) had a normal birth weight, and only one new-borns (0.3%) had an overweight birth weight.

In terms of gender, more females were born at government hospitals (51.99%) than males (59.0%). Also, more females (31.1%) were delivered through caesarean section than males (29.0%). The majority of both male and female new-borns were full-term, with slightly more male new-borns (92.6%) being full-term than female new-borns (90.7%). Additionally, the percentage of new-borns with low birth weight was higher among females (21.3%) than males (18.0%).

Table 4. 7: Place of Delivery and Birth Outcomes

	Female (N = 183)		**Male (N = 217)**		**Total (N = 400)**	
	N	**%**	**N**	**%**	**N**	**%**
Place of delivery						
At govt. hospital	95	51.9%	128	59.0%	223	55.8%
At private hospital	78	42.6%	84	38.7%	162	40.5%
Home	10	5.5%	5	2.3%	15	3.8%
Type of current delivery						
Caesarean	57	31.1%	63	29.0%	120	30.0%
Normal	126	68.9%	154	71.0%	280	70.0%
Outcome of current delivery						
Full-term	166	90.7%	201	92.6%	367	91.8%
Preterm	17	9.3%	16	7.4%	33	8.3%
Birth Weight						
LBW	39	21.3%	39	18.0%	78	19.5%

Normal	144	78.7%	177	81.6%	321	80.3%
Overweight	0	0.0%	1	0.5%	1	0.3%

ANC and PNC visits

Table 4.8 provides information on the antenatal care (ANC) and post-natal care (PNC) visits of the participants according to gender. Out of 400 participants, 13% attained four ANC visits, 76.5% attained more than four ANC visits, and 10.5% attained less than four ANC visits. The majority of participants (90%) received counseling about feeding practices during ANC. Regarding PNC visits, 89.3% of participants received post-natal care. 88% of participants received information about proper child feeding practices during PNC. The percentage of male child mother participants who attained four or more ANC visits, received counseling about feeding practices during ANC, and received PNC was lower than that of female child mother participants. However, the percentage of male child mother participants who received information about proper child feeding practices during PNC was similar to that of female child mother participants.

Table 4. 8: ANC and PNC visits according to gender

	Female (N = 183)		**Male (N = 217)**		**Total (N = 400)**	
	N	**%**	**N**	**%**	**N**	**%**
ANC attained						
4	18	9.8%	34	15.7%	52	13.0%
More than 4	144	78.7%	162	74.7%	306	76.5%
Less than 4	21	11.5%	21	9.7%	42	10.5%
Received counselling about Feeding practices during ANC						
Yes	161	88.0%	199	91.7%	360	90.0%
No	22	12.0%	18	8.3%	40	10.0%
Received post-natal care						
Yes	160	87.4%	197	90.8%	357	89.3%
No	23	12.6%	20	9.2%	43	10.8%
Information about proper child feeding practices during PNC						
Yes	157	85.8%	195	89.9%	352	88.0%

No	26	14.2%	22	10.1%	48	12.0%

Birth order of the Children

From table 4.9, 40.5% were born as the first child, 35.5% as the second child, and 15% as the third child. As the birth order increased, the percentage decreased, with only 5.8% being fourth-born, 2.3% being fifth-born, and 0.8% being sixth-born. The least frequent birth order was the seventh-born, accounting for only 0.3%. This indicates that the majority of families in the study had one or two children, and a smaller percentage had three or more children.

Table 4. 9: Birth order of the Children

	Female (N = 183)		**Male (N = 217)**		**Total (N = 400)**	
	N	**%**	**N**	**N**	**%**	**N**
1	80	43.7%	82	37.8%	162	40.5%
2	67	36.6%	75	34.6%	142	35.5%
3	22	12.0%	38	17.5%	60	15.0%
4	9	4.9%	14	6.5%	23	5.8%
5	3	1.6%	6	2.8%	9	2.3%
6	1	0.5%	2	0.9%	3	0.8%
7	1	0.5%	0	0.0%	1	0.3%

Infant and Young Child Feeding Practices

The table 4.10 displays information on breastfeeding practices for 400 children, classified by gender. The majority of mothers did not face any difficulties while breastfeeding their child, accounting for 89.3% of participants. Additionally, the majority of mothers (72.8%) reported giving colostrum to their new born, with 14.5% of participants not doing so due to myths associated with colostrum.

As for the initiation of breastfeeding, 41.8% of mothers began within an hour of birth, while 83.0% of mothers exclusively breastfed their child up to six months. However, 17.0% of

participants gave their child feeds other than breast milk, including ghuti (honey, water), water (mostly during summer), and gripe water, formula milk, and complementary foods. The main reasons for giving feeds other than breast milk were for ritual purposes (17.0%) and due to hot weather, digestion problems, or insufficient breast milk. Notably, formula milk was given to 19.8% of infants.

The table 4.11 presents data on breastfeeding practices of children in three age groups: 0-6 months, 6-36 months, and 36-72 months. The data is further divided by gender. In the 0-6 months age group, all 31 children were still breastfed. The majority of children in the 6-36 months age group (54.3%) and only a small percentage of children in the 36-72 months age group (1.0%) were still breastfed.

The frequency of breastfeeding per day varied by age group. In the 0-6 months age group, all children were breastfed 9-12 times per day. In the 6-36 months age group, 12.6% of children were breastfed 1-3 times per day, 29.7% were breastfed 4-8 times per day, and 12.0% were breastfed 9-12 times per day. In the 36-72 months age group, only 1.0% of children were breastfed 1-3 times per day, and none were breastfed 4-8 times per day. All breastfed children in this age group were breastfed 9-12 times per day.

In terms of gender, a higher percentage of males in the 6-36 months age group (57.5%) were still breastfed compared to females in the same age group (51.1%). In the 0-6 months age group, all children were breastfed regardless of gender. The frequency of breastfeeding per day and the proportion of children receiving solid foods did not differ significantly by gender.

Table 4. 10: Breastfeeding information according to gender

	Female (N = 183)		**Male (N = 217)**		**Total (N = 400)**	
	N	**N %**	**N**	**N %**	**N**	**N %**
Faced any difficulty while breastfeeding the child						
Yes	19	10.4%	24	11.1%	43	10.8%
No	164	89.6%	193	88.9%	357	89.3%
Colostrum given to the child						
Yes	128	69.9%	163	75.1%	291	72.8%
No	55	30.1%	54	24.9%	109	27.3%
Reasons for not feeding Colostrum						

Myths	35	19.1%	23	10.6%	58	14.5%
Caesarean/Medical complications	10	5.5%	13	6.0%	23	5.8%
No milk production	10	5.5%	18	8.3%	28	7.0%
Initiation of breastfeeding after birth						
Same day within 1 hour of birth	78	42.6%	89	41.0%	167	41.8%
Same day after 1 hour	63	34.4%	73	33.6%	136	34.0%
On 2nd/3rd day	26	14.2%	42	19.4%	68	17.0%
After 3 days	16	8.7%	13	6.0%	29	7.3%
Exclusive breastfeeding (not even water)						
< 6 months	147	80.3%	185	85.3%	332	83.0%
Upto 6 months	36	19.7%	32	14.7%	68	17.0%
Feeds given to the child other than breast milk and their reason						
Ghuti (honey, water), Ritual	36	19.7%	32	14.7%	68	17.0%
Water, Summer.	101	55.2%	105	48.4%	206	51.5%
Gripe water, good for child's health (digestion).	58	31.7%	65	30.0%	123	30.8%
Formula milk, C-section	32	17.5%	47	21.7%	79	19.8%
Complementary foods, Not enough B.M.	24	13.1%	41	18.9%	65	16.3%

Table 4. 11: Breastfeeding and its frequency

		0-6 months (N = 31)		**6-36 months (N = 175)**		**36-72 months (N =194)**		**Total (N = 400)**	
		N	**N %**	**N**	**N %**	**N**	**N %**	**N**	**N %**
Total	**Still breast-fed children**	31	100.0%	95	54.3%	2	1.0%	128	32.0%
	Frequency of breastfeeding per day								
	1 to 3	0	0.0%	22	12.6%	2	1.0%	24	6.0%
	4 to 8	2	6.5%	52	29.7%	0	0.0%	54	13.5%
	9 to 12	29	93.5%	21	12.0%	0	0.0%	50	12.5%
	Children receiving solid, semi-solid or mashed foods along with breast milk								
	No	27	87.1%	4	2.3%	0	0.0%	31	7.8%

	Yes	4	12.9%	91	52.0%	2	1.0%	97	24.3%
Male	**Still breast-fed children**	21	100.0%	50	57.5%	2	1.8%	73	33.6%
	Frequency of breastfeeding per day								
	1 to 3	0	0.0%	13	14.9%	2	1.8%	15	6.9%
	4 to 8	1	4.8%	28	32.2%	0	0.0%	29	13.4%
	9 to 12	20	95.2%	9	10.3%	0	0.0%	29	13.4%
	Children receiving solid, semi-solid or mashed foods along with breast milk								
	No	18	85.7%	2	2.3%	0	0.0%	20	9.2%
	Yes	3	14.3%	48	55.2%	2	1.8%	53	24.4%
Female	**Still breast-fed children**	10	100.0%	45	51.1%	0	0.0%	55	30.1%
	Frequency of breastfeeding per day								
	1 to 3	0	0.0%	9	10.2%	0	0.0%	9	4.9%
	4 to 8	1	10.0%	24	27.3%	0	0.0%	25	13.7%
	9 to 12	9	90.0%	12	13.6%	0	0.0%	21	11.5%
	Children receiving solid, semi-solid or mashed foods along with breast milk								
	No	9	90.0%	2	2.3%	0	0.0%	11	6.0%
	Yes	1	10.0%	43	48.9%	0	0.0%	44	24.0%

The table 4.12 shows the frequency of appropriate complementary foods consumed by children of different age groups and genders. For children aged 0-6 months, 12.9% were consuming complementary foods 1 to 2 times a day, while the majority (87.1%) had not started. For children aged 6-36 months, 72% were consuming complementary foods 3-4 times a day, while only 5.1% were consuming 5-6 times a day. For children aged 36-72 months, 85.6% were consuming complementary foods 3-4 times a day, while 9.8% were consuming 5-6 times.

When analysed by gender, male children had slightly higher percentages of consuming complementary foods 3-4 times a day, while female children had slightly higher percentages of consuming complementary foods 1-2 times a day in the 6-36 months age group.

Table 4. 12: Frequency of appropriate complementary foods

	Frequency	**0-6 months (N = 31)**	**6-36 months (N = 175)**	**36-72 months (N =194)**	**Total (N = 400)**

		N	%	N	%	N	%	N	%
Total	1 to 2	4	12.9%	35	20.0%	9	4.6%	48	12.0%
	3 to 4	0	0.0%	126	72.0%	166	85.6%	292	73.0%
	5 to 6	0	0.0%	9	5.1%	19	9.8%	28	7.0%
	Not started yet	27	87.1%	5	2.9%	0	0.0%	32	8.0%
Male	1 to 2	3	14.3%	15	17.2%	3	2.8%	21	9.7%
	3 to 4	0	0.0%	62	71.3%	95	87.2%	157	72.4%
	5 to 6	0	0.0%	7	8.0%	11	10.1%	18	8.3%
	Not started yet	18	85.7%	3	3.4%	0	0.0%	21	9.7%
Female	1 to 2	1	10.0%	20	22.7%	6	7.1%	27	14.8%
	3 to 4	0	0.0%	64	72.7%	71	83.5%	135	73.8%
	5 to 6	0	0.0%	2	2.3%	8	9.4%	10	5.5%
	Not started yet	9	90.0%	2	2.3%	0	0.0%	11	6.0%

The table 4.13 shows the quantity of complementary foods (C.F.) fed to children in different age groups. In the 0-6 months age group, 12.9% of children had started on complementary foods. In the 6-36 months age group, the most commonly fed quantities were 1/4th cup (32.6%) and 1/2 cup (41.1%). In the 36-72 months age group, the most commonly fed quantity was 1 cup (56.7%). When comparing by gender, there were no significant differences in the quantities of C.F. fed. However, in the 0-6 months age group, a higher percentage of male children had started on C.F. compared to female children. In the 6-36 months age group, a higher percentage of female children were fed 1/4th cup of C.F. compared to male children.

Table 4. 13: Quantity of complementary foods fed to the child

	Quantity of C.F.	**0-6 months (N = 31)**		**6-36 months (N = 175)**		**36-72 months (N =194)**		**Total (N = 400)**	
		N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Total	1 tbsp.	4	12.9%	33	18.9%	0	0.0%	37	9.3%
	1/4th cup	0	0.0%	57	32.6%	5	2.6%	62	15.5%
	½ cup	0	0.0%	72	41.1%	79	40.7%	151	37.8%

	1 cup	0	0.0%	8	4.6%	110	56.7%	118	29.5%
	Not started yet	27	87.1%	5	2.9%	0	0.0%	32	8.0%
Male	1 tbsp.	3	14.3%	16	18.4%	0	0.0%	19	8.8%
	1/4th cup	0	0.0%	29	33.3%	4	3.7%	33	15.2%
	½ cup	0	0.0%	34	39.1%	42	38.5%	76	35.0%
	1 cup	0	0.0%	5	5.7%	63	57.8%	68	31.3%
	Not started yet	18	85.7%	3	3.4%	0	0.0%	21	9.7%
Female	1 tbsp.	1	10.0%	17	19.3%	0	0.0%	18	9.8%
	1/4th cup	0	0.0%	28	31.8%	1	1.2%	29	15.8%
	½ cup	0	0.0%	38	43.2%	37	43.5%	75	41.0%
	1 cup	0	0.0%	3	3.4%	47	55.3%	50	27.3%
	Not started yet	9	90.0%	2	2.3%	0	0.0%	11	6.0%

Table 4.14 presents data on the consistency and blending of complementary foods for children aged 0-72 months. Overall, the majority of children in the 6-36 months age group were consuming thick foods (60.6%), while the majority of children in the 36-72 months age group were consuming very thick foods (98.5%). 9.7% percentage of children in the 0-6 months age group were consuming thin foods. In regards to consuming blended foods, higher percentage of children in the 6-36 months age group were consuming blended foods (28.0%) compared to those in the 0-6 months (12.9%) and 36-72 months (1.5%) age groups. The percentage of males and females consuming blended foods was relatively similar across all age groups.

When looking at gender differences, a higher percentage of males in the 6-36 months age group were consuming medium-thick foods (33.3%) compared to females (22.7%). However, a higher percentage of females in the 6-36 months age group were consuming thick foods (65.9%) compared to males (55.2%). In the 0-6 months age group, a higher percentage of males had started complementary feeding compared to females.

Table 4. 14: Consistency and blending of Complementary Foods

		0-6 months (N = 31)	**6-36 months (N = 175)**	**36-72 months (N =194)**	**Total (N = 400)**

		N	%	N	%	N	%	N	%
Total	Thin	3	9.7%	15	8.6%	1	0.5%	19	4.8%
	Medium	1	3.2%	49	28.0%	2	1.0%	52	13.0%
	Thick	0	0.0%	106	60.6%	191	98.5%	297	74.3%
	Not started yet	27	87.1%	5	2.9%	0	0.0%	32	8.0%
	Blending of food	4	12.9%	49	28.0%	3	1.5%	56	14.0%
Male	Thin	2	9.5%	7	8.0%	0	0.0%	9	4.1%
	Medium	1	4.8%	29	33.3%	1	0.9%	31	14.3%
	Thick	0	0.0%	48	55.2%	108	99.1%	156	71.9%
	Not started yet	18	85.7%	3	3.4%	0	0.0%	21	9.7%
	Blending of food	3	14.3%	27	31.0%	2	1.8%	32	14.7%
Female	Thin	1	10.0%	8	9.1%	1	1.2%	10	5.5%
	Medium	0	0.0%	20	22.7%	1	1.2%	21	11.5%
	Thick	0	0.0%	58	65.9%	83	97.6%	141	77.0%
	Not started yet	9	90.0%	2	2.3%	0	0.0%	11	6.0%
	Blending of food	1	10.0%	22	25.0%	1	1.2%	24	13.1%

Feeding Egg as Complementary Foods

Overall from table 4.15, 61% of the families were non-vegetarian, and 39% were vegetarian. Among non-vegetarian families, 65.5% of children aged 6-36 months were fed eggs. In the 36-72 months age group, 58.3% of non-vegetarian families fed eggs to their children.

In terms of the number of eggs fed to the child, 34.5% of children were fed one egg, while 12.5% were fed half an egg, and only 3% were fed two eggs. In terms of the part of the egg fed to the child, 21.5% were fed only egg white, 1.8% were fed only egg yolk, and 26.8% were fed both egg white and yolk.

When analysing the data by gender, it was found that 60.8% of males 61.2% of female from non-vegetarian families were fed eggs.

Table 4. 15: Feeding Eggs as Complementary Foods

		0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N =194)		Total (N = 400)	
		N	%	N	%	N	%	N	%
Total	**Food type of family**								
	Non vegetarian	15	48.4%	127	65.5%	102	58.3%	244	61.0%
	Vegetarian	16	51.6%	67	34.5%	73	41.7%	156	39.0%
	Number of eggs fed to the child								

	Zero	15	48.4%	4	2.1%	25	14.3%	44	11.0%
	Half	0	0.0%	17	8.8%	33	18.9%	50	12.5%
	One	0	0.0%	98	50.5%	40	22.9%	138	34.5%
	Two	0	0.0%	8	4.1%	4	2.3%	12	3.0%
	Part of the egg fed to the child								
	Both	0	0.0%	71	36.6%	36	20.6%	107	26.8%
	Egg White	0	0.0%	50	25.8%	36	20.6%	86	21.5%
	Egg yolk	0	0.0%	2	1.0%	5	2.9%	7	1.8%
Male	**Food type of family**								
	Non vegetarian	10	47.6%	69	63.3%	53	60.9%	132	60.8%
	Vegetarian	11	52.4%	40	36.7%	34	39.1%	85	39.2%
	Number of eggs fed to the child								
	Zero	10	47.6%	2	1.8%	16	18.4%	28	12.9%
	Half	0	0.0%	10	9.2%	14	16.1%	24	11.1%
	One	0	0.0%	53	48.6%	21	24.1%	74	34.1%
	Two	0	0.0%	4	3.7%	2	2.3%	6	2.8%
	Part of the egg fed to the child								
	Both	0	0.0%	40	36.7%	19	21.8%	59	27.2%
	Egg White	0	0.0%	25	22.9%	15	17.2%	40	18.4%
	Egg yolk	0	0.0%	2	1.8%	3	3.4%	5	2.3%
Female	**Food type of family**								
	Non vegetarian	5	50.0%	58	68.2%	49	55.7%	112	61.2%
	Vegetarian	5	50.0%	27	31.8%	39	44.3%	71	38.8%
	Number of eggs fed to the child								
	Zero	5	50.0%	2	2.4%	9	10.2%	16	8.7%
	Half	0	0.0%	7	8.2%	19	21.6%	26	14.2%
	One	0	0.0%	45	52.9%	19	21.6%	64	35.0%
	Two	0	0.0%	4	4.7%	2	2.3%	6	3.3%
	Part of the egg fed to the child								
	Both	0	0.0%	31	36.5%	17	19.3%	48	26.2%
	Egg White	0	0.0%	25	29.4%	21	23.9%	46	25.1%
	Egg yolk	0	0.0%	0	0.0%	2	2.3%	2	1.1%

Consumption of Nutrient Supplements

Table 4.16 presents data on nutrient supplement consumption among children of different age groups. Out of 400 children, only 2 male (0.5%) consume ready-to-eat nutrition supplements, with iron syrup and vitamin D. The majority of children (99.5%) do not consume any such supplements.

Table 4. 16: Consumption of Nutrient Supplements

	0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N =194)		Total (N = 400)	
	N	%	N	%	N	%	N	%
Total	0	0.0%	1	0.6%	1	0.5%	2	0.5%
Male	0	0.0%	1	1.1%	1	0.9%	2	0.9%
Female	0	0.0%	0	0.0%	0	0.0%	0	0.0%

Consumption of Ready-To-Eat Market Products

Based on Table 4.17, it appears that the consumption of ready-to-eat market products is high among children aged 6-72 months, with percentages ranging from 84.8% to 99.0%. Biscuits and namkeen/sev mumra are the most commonly consumed products across all age groups and genders.

When examining consumption by gender, there are some differences. For example, males tend to consume more chips and papdi/gathiya compared to females. On the other hand, females tend to consume more biscuits and namkeen/sev mumra compared to males.

When looking at age groups, it appears that children aged 6-36 months tend to consume more of these products compared to those in the 36-72 month age group. However, the differences in consumption between these two groups are not large.

Table 4. 17: Consumption of Ready-To-Eat Market Products

	Food product	**0-6 months (N = 31)**		**6-36 months (N = 175)**		**36-72 months (N =194)**		**Total (N = 400)**	
		N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Total	Biscuits	2	6.5%	166	94.9%	192	99.0%	360	90.0%
	Chips	0	0.0%	147	84.0%	192	99.0%	339	84.8%
	Namkeen and Sev mumra	0	0.0%	155	88.6%	192	99.0%	347	86.8%
	Bhungla	0	0.0%	150	85.7%	190	97.9%	340	85.0%
	Papdi and gathiya	1	3.2%	158	90.3%	192	99.0%	351	87.8%
	Chocolates and Candies	0	0.0%	151	86.3%	191	98.5%	342	85.5%

Male	Biscuits	1	4.8%	82	94.3%	108	99.1%	191	88.0%
	Chips	0	0.0%	74	85.1%	109	100.0%	183	84.3%
	Namkeen and Sev mumra	0	0.0%	75	86.2%	109	100.0%	184	84.8%
	Bhungla	0	0.0%	76	87.4%	107	98.2%	183	84.3%
	Papdi and gathiya	0	0.0%	77	88.5%	109	100.0%	186	85.7%
	Chocolates and Candies	0	0.0%	74	85.1%	108	99.1%	182	83.9%
Female	Biscuits	1	10.0%	84	95.5%	84	98.8%	169	92.3%
	Chips	0	0.0%	73	83.0%	83	97.6%	156	85.2%
	Namkeen and Sev mumra	0	0.0%	80	90.9%	83	97.6%	163	89.1%
	Bhungla	0	0.0%	74	84.1%	83	97.6%	157	85.8%
	Papdi and gathiya	1	10.0%	81	92.0%	83	97.6%	165	90.2%
	Chocolates and Candies	0	0.0%	77	87.5%	83	97.6%	160	87.4%

Storage and handling of Complementary Foods

Table 4.18 and table 4.19 shows that in terms of storage time of cooked complementary foods, only a minority of caregivers reported storing food for 2-3 hours (16.8%) or more than 4 hours (17.5%). The majority (65.8%) reported not storing food. There were no major differences in this practice by age or gender. Regarding cutting of vegetables, the majority of mothers reported cutting vegetables both before and after washing (66.0%). This was consistent across all age and gender categories. Almost all mothers (99.8%) reported covering the salt container for their child's food, with only one caregiver (0.3%) reporting not covering it. This was also consistent across all age and gender categories. Most mothers reported soaking pulses before cooking (91.3%). There were no major differences in this practice by age or gender. In terms of adding extra fats, oils, sugar, and jaggery after preparing complementary foods, a majority of caregivers (81.3%) reported doing so. There were no major differences in this practice by age, but a higher percentage of male caregivers reported doing so compared to female caregivers (86.4% vs. 70.0%).

Table 4. 18: Storage and handling of Complementary Foods for total participants

	0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N =194)		Total (N = 400)	
	N	N %	N	N %	N	N %	N	N %

Total	**Storage time of cooked complementary foods**							
	For 2 – 3 hours	2	6.5%	27	15.4%	38	19.6%	67	16.8%
	More than 4 hours	2	6.5%	32	18.3%	36	18.6%	70	17.5%
	Not storing	27	87.1%	116	66.3%	120	61.9%	263	65.8%
	Cutting of vegetables								
	After washing	2	6.5%	19	10.9%	38	19.6%	59	14.8%
	Before washing	3	9.7%	32	18.3%	42	21.6%	77	19.3%
	Both	26	83.9%	124	70.9%	114	58.8%	264	66.0%
	Salt container storage								
	Covered	31	100.0%	174	99.4%	194	100.0%	399	99.8%
	Not covered	0	0.0%	1	0.6%	0	0.0%	1	0.3%
	Soaking pulses before cooking								
	Not soaking	2	6.5%	16	9.1%	17	8.8%	35	8.8%
	Soaking	29	93.5%	159	90.9%	177	91.2%	365	91.3%
	Adding extra fats, oils, sugar and jegarry after preparing complementary foods								
	No	7	22.6%	32	18.3%	36	18.6%	75	18.8%
	Yes	24	77.4%	143	81.7%	158	81.4%	325	81.3%

Table 4. 19: Storage and handling of Complementary Foods for male and female Children

		0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N =194)		Total (N = 400)	
		N	N %	N	N %	N	N %	N	N %
Female	**Storage time of cooked complementary foods**								
	For 2 – 3 hours	1	10.0%	14	15.9%	15	17.6%	30	16.4%
	More than 4 hours	0	0.0%	13	14.8%	19	22.4%	32	17.5%
	Not storing	9	90.0%	61	69.3%	51	60.0%	121	66.1%
	Cutting of vegetables								
	After washing	0	0.0%	12	13.6%	13	15.3%	25	13.7%
	Before washing	1	10.0%	13	14.8%	25	29.4%	39	21.3%
	Both	9	90.0%	63	71.6%	47	55.3%	119	65.0%
	Salt container storage								
	Covered	10	100.0%	87	98.9%	85	100.0%	182	99.5%
	Not covered	0	0.0%	1	1.1%	0	0.0%	1	0.5%
	Soaking pulses before cooking								
	Not soaking	0	0.0%	5	5.7%	6	7.1%	11	6.0%
	Soaking	10	100.0%	83	94.3%	79	92.9%	172	94.0%
	Adding extra fats, oils, sugar and jegarry after preparing complementary foods								
	No	3	30.0%	12	13.6%	15	17.6%	30	16.4%
	Yes	7	70.0%	76	86.4%	70	82.4%	153	83.6%
M	**Storage time of cooked complementary foods**								

	For 2 – 3 hours	1	4.8%	13	14.9%	23	21.1%	37	17.1%
	More than 4 hours	2	9.5%	19	21.8%	17	15.6%	38	17.5%
	Not storing	18	85.7%	55	63.2%	69	63.3%	142	65.4%
	Cutting of vegetables								
	After washing	2	9.5%	7	8.0%	25	22.9%	34	15.7%
	Before washing	2	9.5%	19	21.8%	17	15.6%	38	17.5%
	Both	17	81.0%	61	70.1%	67	61.5%	145	66.8%
	Salt container storage								
	Covered	21	100.0%	87	100.0%	109	100.0%	217	100.0%
	Soaking pulses before cooking								
	Not soaking	2	9.5%	11	12.6%	11	10.1%	24	11.1%
	Soaking	19	90.5%	76	87.4%	98	89.9%	193	88.9%
	Adding extra fats, oils, sugar and jegarry after preparing complementary foods								
	No	4	19.0%	20	23.0%	21	19.3%	45	20.7%
	Yes	17	81.0%	67	77.0%	88	80.7%	172	79.3%

Bottle feeding and top milk

From table 4.20 in the age group of 0-6 months, none of the 31 children were bottle fed in the last 24 hours, and top milk was given only to a single female child. Among the 175 children aged 6-36 months, 11 (6.3%) were bottle fed in the last 24 hours. The majority of children in this age group were given Gold top milk (45.7%), followed by Shakti (11.4%) and Cow's milk (17.1%). The majority of children in this age group received less than 1 cup of milk (54.9%). Among the 194 children aged 36-72 months, none were bottle fed in the last 24 hours. The majority of children in this age group were given Gold top milk (64.9%), followed by Cow's milk (14.4%) and Shakti (9.8%). The majority of children in this age group received less than 1 cup of milk (41.2%).

Looking at gender differences, we can see that among male children in the 6-36 months age group, 47.1% were given Gold top milk, and 55.2% were given less than one cup of milk. For female children in the same age group, 44.3% were given Gold milk, and 54.5% were given less than one cup of milk. Overall, Gold top milk was the most commonly given type of top milk, with the highest percentage in the 36-72 months age group. Additionally, we can see that the majority of children in all age and gender groups were given less than one cup of milk.

Supplementary Nutrition (Bal Shakti)

Table 4.21 and 4.22 presents data on supplementary nutrition (Bal Shakti) consumption among children of different age groups and gender. 81.1% of children aged 6-36 months received it

regularly, whereas only 6.7% of children aged 36-72 months received it regularly. In terms of consumption patterns, the majority of children (79.4%) who received Bal Shakti regularly consumed it regularly. Sole consumption by the child was reported by 30.9% of respondents, whereas shared consumption with siblings and other family members was reported by 31.4% and 18.3% of respondents, respectively. The most common form of Bal Shakti consumption was Siro/Halva, which was consumed by 73.7% of children aged 6-36 months. Mothers of 65.1% of children who consumed Bal Shakti regularly reported finding benefits from its consumption, whereas 5.1% reported no benefits and 10.9% were unsure. There was no significant difference found between males and females with respect to any of the factors.

Table 4. 20: Bottle feeding and top milk

		0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N =194)		Total (N = 400)	
		N	%	N	%	N	%	N	%
Total	**Children bottle fed in last 24 hours**	0	0.0%	11	6.3%	0	0.0%	11	2.8%
	Type of top milk is given to the child								
	Buffalo's milk	0	0.0%	15	8.6%	18	9.3%	33	8.3%
	Cow's milk	1	3.2%	30	17.1%	28	14.4%	59	14.8%
	Gold	0	0.0%	80	45.7%	126	64.9%	206	51.5%
	Shakti	0	0.0%	20	11.4%	19	9.8%	39	9.8%
	Not given	30	96.8%	30	17.1%	3	1.5%	63	15.8%
	Amount of milk given to the child								
	‹ 1 cup	1	3.2%	96	54.9%	80	41.2%	177	44.3%
	1 cup	0	0.0%	49	28.0%	111	57.2%	160	40.0%
Male	**Children bottle fed in last 24 hours**	0	0.0%	5	5.7%	0	0.0%	5	2.3%
	Type of top milk is given to the child								
	Buffalo's milk	0	0.0%	11	12.6%	11	10.1%	22	10.1%
	Cow's milk	0	0.0%	13	14.9%	17	15.6%	30	13.8%
	Gold	0	0.0%	41	47.1%	71	65.1%	112	51.6%
	Shakti	0	0.0%	8	9.2%	8	7.3%	16	7.4%
	Not given	21	100.0%	14	16.1%	2	1.8%	37	17.1%
	Amount of milk given to the child								
	‹ 1 cup	0	0.0%	48	55.2%	43	39.4%	91	41.9%

	1 cup	0	0.0%	25	28.7%	64	58.7%	89	41.0%
Female	**Children bottle fed in last 24 hours**	0	0.0%	6	6.8%	0	0.0%	6	3.3%
	Type of top milk is given to the child								
	Buffalo's milk	0	0.0%	4	4.5%	7	8.2%	11	6.0%
	Cow's milk	1	10.0%	17	19.3%	11	12.9%	29	15.8%
	Gold	0	0.0%	39	44.3%	55	64.7%	94	51.4%
	Shakti	0	0.0%	12	13.6%	11	12.9%	23	12.6%
	Not given	9	90.0%	16	18.2%	1	1.2%	26	14.2%
	Amount of milk given to the child								
	< 1 cup	1	10.0%	48	54.5%	37	43.5%	86	47.0%
	1 cup	0	0.0%	24	27.3%	47	55.3%	71	38.8%

Table 4. 21: Supplementary Nutrition (Bal Shakti) according to age

	0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N =194)		Total (N = 400)	
	N	%	N	%	N	%	N	%
Receiving Bal Shakti								
Yes	0	0.0%	142	81.1%	13	6.7%	155	38.8%
No	31	100.0%	6	3.4%	175	90.2%	212	53.0%
Receiving but not consuming	0	0.0%	27	15.4%	6	3.1%	33	8.3%
Frequency of getting Bal Shakti								
Once a month	0	0.0%	142	81.1%	13	6.7%	155	38.8%
Number of packets receiving in a month								
7	0	0.0%	142	81.1%	4	2.1%	146	36.5%
1	0	0.0%	0	0.0%	1	11.1%	1	11.1%
2	0	0.0%	0	0.0%	7	77.8%	7	77.8%
3	0	0.0%	0	0.0%	1	11.1%	1	11.1%
Regularly receiving	0	0.0%	140	80.0%	12	6.2%	152	38.0%
Regular consumption	0	0.0%	139	79.4%	12	6.2%	151	37.8%
Packet consumption								
Solely by child	0	0.0%	54	30.9%	7	3.6%	61	15.3%
Shared by other family members	0	0.0%	32	18.3%	3	1.5%	35	8.8%

Shared by siblings	0	0.0%	55	31.4%	3	1.5%	58	14.5%
Children's liking the taste	0	0.0%	139	79.4%	13	6.7%	152	38.0%
Forms of Bal Shakti consumption								
Raw	0	0.0%	24	13.7%	1	0.5%	25	6.3%
Siro/ Halva	0	0.0%	129	73.7%	13	6.7%	142	35.5%
Roti, paratha, bhakhri	0	0.0%	5	2.9%	2	1.0%	7	1.8%
Mothers finding any benefits by consumption of Bal Shakti								
Yes	0	0.0%	114	65.1%	12	6.2%	126	31.5%
No	0	0.0%	9	5.1%	0	0.0%	9	2.3%
Don't Know	0	0.0%	19	10.9%	1	0.5%	20	5.0%

Table 4. 22: Supplementary Nutrition (Bal Shakti) according to gender

	Female (N = 183)		Male (N = 217)		Total (N = 400)	
	N	%	N	%	N	%
Receiving Bal Shakti						
Yes	70	38.3%	85	39.2%	155	38.8%
No	92	50.3%	120	55.3%	212	53.0%
Receiving but not taking	21	11.5%	12	5.5%	33	8.3%
Frequency of getting Bal Shakti						
Once a month	70	38.3%	85	39.2%	155	38.8%
Number of packets receiving in a month						
7	68	37.2%	78	35.9%	146	36.5%
1	0	0.0%	1	14.3%	1	11.1%
2	2	100.0%	5	71.4%	7	77.8%
3	0	0.0%	1	14.3%	1	11.1%
Regularly receiving	70	38.3%	82	37.8%	152	38.0%
Regular consumption	69	37.7%	82	37.8%	151	37.8%
Packet consumption						
Solely by child	32	17.5%	29	13.4%	61	15.3%
Shared by other family members	11	6.0%	24	11.1%	35	8.8%
Shared by siblings	27	14.8%	31	14.3%	58	14.5%

Children's liking the taste	69	37.7%	83	38.2%	152	38.0%
Forms of Bal Shakti consumption						
Raw	12	6.6%	13	6.0%	25	6.3%
Siro/ Halva	65	35.5%	77	35.5%	142	35.5%
Roti, paratha, bhakhri	0	0.0%	7	3.2%	7	1.8%
Mothers finding any benefits by consumption of Bal Shakti						
Yes	61	33.3%	65	30.0%	126	31.5%
No	3	1.6%	6	2.8%	9	2.3%
Don't Know	6	3.3%	14	6.5%	20	5.0%

Quality of Diet in Children

The table 4.23 presents the percentage and number of different food types consumed by children of different age groups. In the 0-6 months age group, all infants were exclusively breastfed, as shown by the 100% proportion of breast milk in their diet. In the 6-36 months age group, breast milk was still the most common food source, but only for 55.2% of children. Grains, white roots and tubers, and plantains were the most frequently consumed food type, with 88.8% of children consuming them. Other common food types in this group were pulses, dairy, and confectionery, with 15.2%, 32.5%, and 79.6% of children consuming them, respectively. In the 36-72 months age group, breast milk was no longer consumed. Grains, white roots and tubers, and plantains remained the most commonly consumed food type, with 98.5% of children consuming them. Other common food types in this group were other vegetables, beverages, and dairy, with 43.8%, 69.1%, and 53.1% of children consuming them, respectively. Processed foods, such as confectionery and beverages, were popular across all age groups, with 80.4% and 63.9% of children consuming them, respectively**.**

According to gender, in the 0-6 months age group, all males were exclusively breastfed, while 10 out of 10 females were exclusively breastfed. In the 6-36 months age group, a majority of both males (57.0%) and females (53.5%) were still receiving breast milk. The most commonly consumed food group for both genders was grains, white roots and tubers, and plantains (87.5% for males and 90.0% for females). Pulses were also commonly consumed by both genders (14.1% for males and 16.3% for females). Dairy products were consumed by a significant percentage of children in this age group (36.3% for males and 28.8% for females). In the 36-72 months age group, only a small percentage of males (0.9%) were still receiving breast milk. Grains, white

roots and tubers, and plantains remained the most commonly consumed food group for both genders (98.2% for males and 98.8% for females). Pulses continued to be commonly consumed by both genders (84.4% for males and 81.2% for females). Other vegetables and other fruits became more commonly consumed in this age group. Overall, both genders commonly consume grains, white roots and tubers, and plantains, and pulses. Dairy products are also commonly consumed. The consumption of other food groups such as dark green leafy vegetables, other vitamin A-rich fruits and vegetables, meat, poultry, and fish is relatively low across all age groups.

Table 4. 23 Food group consumed by Children in last 24 hours

		0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N =194)		Total (N = 400)	
		N	%	N	%	N	%	N	%
Total	Breast Milk	31	100.0%	95	55.2%	1	0.5%	127	31.75%
	Grains, white roots and tubers, and plantains	1	100.0%	142	88.8%	191	98.5%	334	94.1%
	Pulses (beans, peas and lentils)	0	0.0%	24	15.2%	161	83.0%	185	52.6%
	Nuts and seeds	0	0.0%	5	3.2%	13	6.7%	18	5.1%
	Dairy	2	100.0%	52	32.5%	103	53.1%	157	44.1%
	Meat, poultry and fish	0	0.0%	7	4.5%	12	6.2%	19	5.4%
	Eggs	0	0.0%	4	2.6%	6	3.1%	10	2.9%
	Dark green leafy vegetables	0	0.0%	3	1.9%	39	20.1%	42	12.0%
	Other vitamin A-rich fruits and vegetables	0	0.0%	7	4.5%	5	2.6%	12	3.4%
	Other vegetables	0	0.0%	15	9.6%	85	43.8%	100	28.6%
	Other fruits	0	0.0%	41	26.3%	54	27.8%	95	27.1%
	Confectionery	1	100.0%	129	79.6%	157	80.9%	287	80.4%
	Beverages	0	0.0%	91	57.6%	134	69.1%	225	63.9%

		0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N =194)		Total (N = 400)	
		N	%	N	%	N	%	N	%
Male	Breast Milk	21	100.0%	49	57.0%	1	0.9%	71	32.72%
	Grains, white roots and tubers, and plantains	0	0.0%	70	87.5%	107	98.2%	177	93.7%
	Pulses (beans, peas and lentils)	0	0.0%	11	14.1%	92	84.4%	103	55.1%
	Nuts and seeds	0	0.0%	4	5.1%	7	6.4%	11	5.9%
	Dairy	1	100.0%	29	36.3%	60	55.0%	90	47.4%
	Meat, poultry and fish	0	0.0%	6	7.6%	7	6.4%	13	6.9%
	Eggs	0	0.0%	3	3.8%	2	1.8%	5	2.7%
	Dark green leafy vegetables	0	0.0%	2	2.6%	21	19.3%	23	12.3%
	Other vitamin A-rich fruits and vegetables	0	0.0%	5	6.4%	4	3.7%	9	4.8%
	Other vegetables	0	0.0%	5	6.4%	52	47.7%	57	30.5%
	Other fruits	0	0.0%	20	25.6%	34	31.2%	54	28.9%
	Confectionery	0	0.0%	60	74.1%	92	84.4%	152	80.0%
	Beverages	0	0.0%	40	51.3%	75	68.8%	115	61.5%
	Processed foods	0	0.0%	42	52.5%	82	75.2%	124	65.6%
	Bal shakti	0	0.0%	6	7.6%	0	0.0%	6	3.2%
	Processed foods	0	0.0%	97	59.9%	143	73.7%	240	67.4%
	Bal shakti	0	0.0%	8	5.1%	0	0.0%	8	2.3%
Female	Breast Milk	10	100.0%	46	53.5%	0	0.0%	56	30.6%
	Grains, white roots and tubers, and plantains	1	100.0%	72	90.0%	84	98.8%	157	94.6%
	Pulses (beans, peas and lentils)	0	0.0%	13	16.3%	69	81.2%	82	49.7%
	Nuts and seeds	0	0.0%	1	1.3%	6	7.1%	7	4.3%
	Dairy	1	100.0%	23	28.8%	43	50.6%	67	40.4%
	Meat, poultry and fish	0	0.0%	1	1.3%	5	5.9%	6	3.7%
	Eggs	0	0.0%	1	1.3%	4	4.7%	5	3.1%
	Dark green leafy vegetables	0	0.0%	1	1.3%	18	21.2%	19	11.7%
	Other vitamin A-rich fruits and vegetables	0	0.0%	2	2.6%	1	1.2%	3	1.8%
	Other vegetables	0	0.0%	10	12.8%	33	38.8%	43	26.4%
	Other fruits	0	0.0%	21	26.9%	20	23.5%	41	25.2%
	Confectionery	1	100.0%	69	85.2%	65	76.5%	135	80.8%
	Beverages	0	0.0%	51	63.8%	59	69.4%	110	66.7%
	Processed foods	0	0.0%	55	67.1%	61	71.8%	116	69.5%
	Bal shakti	0	0.0%	2	2.5%	0	0.0%	2	1.2%

Table 4.24 presents the Minimum Dietary Diversity (MDD) in children aged 6-72 months. MDD is a measure of the variety of foods in a child's diet, and meeting the criteria for MDD indicates a higher quality diet. Out of total children, 88 children (23.8%) met the criteria for MDD, while 281 children (76.2%) did not meet the criteria for MDD. The majority of children who did not meet the criteria for MDD were in the 36-72 month age range (58.2%).

When examining the results by gender, 53 male children (27.0%) met the criteria for MDD, while 143 male children (73.0%) did not meet the criteria for MDD. For female children, 35 (20.2%) met the criteria for MDD, while 138 (79.8%) did not meet the criteria for MDD. Among both genders, a higher percentage of children in the 36-72 month age range met the criteria for MDD compared to the 6-36 month age range.

The results suggest that a significant proportion of young children do not meet the criteria for MDD, indicating a potential lack of dietary variety and quality. There are also differences in MDD by age and gender, with older children and male children more likely to meet the criteria for MDD.

Table 4. 24: Minimum Dietary Diversity among Children

	Minimum Dietary Diversity	6-36 months (N = 175)		36-72 months (N =194)		Total (N = 369)	
		N	%	N	%	N	%
Total (N = 369)	MDD met	7	4.0%	81	41.8%	88	23.8%
	MDD not met	168	96.0%	113	58.2%	281	76.2%
Male (N = 197)	MDD met	3	3.4%	50	45.9%	53	27.0%
	MDD not met	84	96.6%	59	54.1%	143	73.0%
Female (N = 172)	MDD met	4	4.5%	31	36.5%	35	20.2%
	MDD not met	84	95.5%	54	63.5%	138	79.8%

Morbidity profile of Children

Table 4.25 shows the morbidity profile of children in the last 15 days, categorized by age group and gender. The most prevalent illness among children was cough and cold, with a percentage ranging from 68.6% to 77.4% across all age groups and genders. Fever was also a common illness, with a percentage ranging from 34.3% to 37.6% across all age groups and genders. Diarrhea and measles were less prevalent, with Diarrhea ranging from 9.7% to 17.2% and measles ranging from 1.8% to 6.5% across all age groups and genders. There were no significant differences between males and females in terms of the prevalence of these illnesses.

Table 4. 25: Morbidity profile of Children

	Disease/ illness present in last 15 days	**0-6 months (N = 31)**		**6-36 months (N = 175)**		**36-72 months (N =194)**		**Total (N = 400)**	
		N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Total	Fever	8	25.8%	60	34.3%	71	36.6%	139	34.8%
	Diarrhea	3	9.7%	29	16.6%	20	10.3%	52	13.0%
	Cough and Cold	24	77.4%	125	71.4%	133	68.6%	282	70.5%
	Measles	2	6.5%	4	2.3%	6	3.1%	12	3.0%
Male	Fever	6	28.6%	32	36.8%	41	37.6%	79	36.4%
	Diarrhea	2	9.5%	15	17.2%	11	10.1%	28	12.9%
	Cough and Cold	18	85.7%	67	77.0%	72	66.1%	157	72.4%
	Measles	2	9.5%	3	3.4%	2	1.8%	7	3.2%
Female	Fever	2	20.0%	28	31.8%	30	35.3%	60	32.8%
	Diarrhea	1	10.0%	14	15.9%	9	10.6%	24	13.1%
	Cough and Cold	6	60.0%	58	65.9%	61	71.8%	125	68.3%
	Measles	0	0.0%	1	1.1%	4	4.7%	5	2.7%

Immunization Information of Children

From Table 4.26, it can be inferred that the vast majority of children (95.8%) were fully immunized, with only a small proportion (4%) being partially immunized. There was no significant difference in immunization rates between male and female children, with both groups having similarly high rates of full immunization (95.1% for females and 96.3% for males). Only one child in the sample was not immunized at all.

Table 4. 26: Immunization Information of Children

	Female (N = 183)		**Male (N = 217)**		**Total (N = 400)**	
	N	**%**	**N**	**%**	**N**	**%**
Fully immunized	174	95.1%	209	96.3%	383	95.8%
Partially immunized	9	4.9%	7	3.2%	16	4.0%
Not immunized	0	0.0%	1	0.5%	1	0.3%

Nutritional Status of Children

Table 4.27 presents mean anthropometric measurements of children across three age groups: 0-6 months, 6-36 months, and 36-72 months, as well as for the total sample of 400 children. The table includes data on birth weight, weight (kg), and height (cm) for both female and male children.

For birth weight, the mean for the total sample is 2.77 kg with a standard deviation (SD) of 0.47. The mean birth weight is slightly higher for female children (2.72 kg) compared to male children (2.81 kg). For weight, the mean weight for female children is slightly lower than that for male children across all age groups. For height, the mean height for female children is slightly lower than that for male children across all age groups. Overall, the mean anthropometric measurements of the sample of 400 children are within expected ranges for their age groups. The slight differences between male and female children in birth weight, weight, and height may reflect natural variations in growth and development.

Table 4.28 shows the mean z scores of anthropometric indicators, such as weight-for-height (WHZ), height-for-age (HAZ), and weight-for-age (WAZ), for different age groups (0-6 months, 6-36 months, and 36-72 months) and genders based on a sample size of 400.

For Weight-for-height (WHZ) scores the mean WHZ scores were below the median for all age groups and genders, with the lowest mean score of -1.57 observed for females aged 0-6 months. This suggests that a significant proportion of the children were underweight for their height.

For Height-for-age (HAZ) scores the mean HAZ scores were also below the median for all age groups and genders, with the lowest mean score of -1.90 observed for male children aged 6-36 months. This suggests that a significant proportion of the sample children was stunted, which means that they were shorter than expected for their age.

For Weight-for-age (WAZ) scores the mean WAZ scores were also below the median for all age groups and genders, with the lowest mean score of -1.52 observed for female children aged 36-72 months. This suggests that a significant proportion of the sample population was underweight for their age.

For Body Mass Index-for-age Z score (BAZ) the mean and standard deviation of the children aged 60-72 months, were categorized by gender (female and male) (N = 46). The mean BAZ score for the total children was -1.30, indicating under nutrition. Females (N = 29) had a lower mean BAZ score (-1.55) than males (N = 29) (-1.16). Standard deviation for both genders is small, suggesting low variability.

Overall the children had poor nutritional status, with a high prevalence of underweight, stunting, and wasting. The data also suggests that females had a slightly worse nutritional status than males, with lower mean scores observed for all three anthropometric indicators.

Table 4. 27: Mean Anthropometric Measurements of Children

		0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N =194)		Total (N = 400)	
		Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Total	Birth Weight	2.68	.36	2.80	.45	2.75	.50	2.77	.47
	Weight (kg)	5.26	1.30	9.46	2.03	13.91	2.34	11.29	3.49
	Height (cm)	59.70	5.13	77.68	8.34	98.97	7.51	86.61	15.00
Female	Birth Weight	2.78	.22	2.71	.45	2.71	.48	2.72	.46
	Weight (kg)	5.10	1.02	9.26	2.03	13.69	1.86	11.09	3.22
	Height (cm)	59.72	2.74	77.74	7.94	98.79	6.42	86.54	14.02
Male	Birth Weight	2.63	.41	2.89	.44	2.79	.51	2.81	.48
	Weight (kg)	5.33	1.42	9.66	2.02	14.09	2.64	11.47	3.71
	Height (cm)	59.69	6.01	77.62	8.78	99.11	8.29	86.68	15.82

Table 4. 28: Mean Z scores of Anthropometric Indicators

		0-6 months (N = 30)		6-36 months (N = 175)		36-72 months (N =194)		Total (N = 399)	
		Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Female (N = 183)	WHZ	-1.57	1.36	-.75	1.12	-.95	.91	-.88	1.07
	HAZ	-.41	.98	-1.48	1.22	-1.31	.90	-1.34	1.09
	WAZ	-1.38	.94	-1.35	1.19	-1.52	.84	-1.43	1.03
Male (N = 217)	WHZ	-1.28	1.12	-.56	1.41	-1.09	1.00	-.87	1.25
	HAZ	-.79	1.28	-1.90	1.37	-1.32	1.15	-1.50	1.30
	WAZ	-1.49	1.05	-1.41	1.27	-1.50	1.04	-1.46	1.13
Total (N = 400)	WHZ	-1.38	1.19	-.66	1.27	-1.03	.96	-.87	1.17
	HAZ	-.67	1.19	-1.69	1.31	-1.32	1.04	-1.43	1.21
	WAZ	-1.45	1.00	-1.38	1.23	-1.51	.95	-1.45	1.09

BAZ		
	60-72 months (N = 46)	
	Mean	**SD**
Female (N = 29)	-1.55	.98
Male (N = 29)	-1.16	.76
Total (N = 46)	-1.30	.86

Prevalence of Malnutrition among Children

Table 4.29 presents the prevalence of malnutrition among children according to gender. The table shows the number and percentage of children who fall under different categories of malnutrition for each of the four indicators: weight-for-height (WHZ), height-for-age (HAZ), weight-for-age (WAZ), and body mass index-for-age (BAZ). For WHZ, 44% of the total children were classified as normal, while 28% were at risk of malnutrition and 8% had moderate or severe acute malnutrition (MAM and SAM). In terms of gender, a higher percentage of males were overweight or obese compared to females (7% vs. 1.5%), while more females were at risk of malnutrition (28% vs. 28%) and had MAM (6.56% vs. 8.76%) or SAM (4.92% vs. 3.69%). For HAZ, 30% of children were classified as normal, while the majority had some degree of stunting, ranging from mild (38.5%) to severe (8.5%). A higher percentage of males were severely stunted compared to females (11.52% vs. 4.92%). For WAZ, 30.25% of children were classified as normal, while 42% were mildly underweight and 7.75% were severely underweight. More females were classified as mildly underweight compared to males (43.72% vs. 40.55%). For BAZ, only a small percentage of children were classified as overweight or obese (3.5%), while 5.75% were at risk of malnutrition and 2% had MAM. No children were classified as severely wasted according to BAZ.

Table 4.30 shows the prevalence of malnutrition among children according to age. The results reveal that 44% had normal weight for height (WHZ), 30% had normal height for age (HAZ), and 42% had mild underweight (WAZ). In terms of WHZ, a higher percentage of males (38.7%) than females (27.87%) were overweight, while a higher percentage of females (27.87%) than males (28.11%) were at risk of malnutrition. Regarding HAZ, the highest percentage of children with severe stunting was in the 36-72 months age group (11.52%). In terms of WAZ, the highest percentage of children with severe underweight was in the 36-72 months age group (8.76%). In general, the prevalence of malnutrition was higher among older children (36-72 months) compared to younger ones (0-6 months).

Table 4. 29: Prevalence of Malnutrition among Children according to Gender

	Female (N = 183)		Male (N = 217)		Total (N = 400)	
	N	%	N	%	N	%
WHZ						
Normal	92	50.27%	84	38.71%	176	44.00%
At risk	51	27.87%	61	28.11%	112	28.00%
MAM	12	6.56%	19	8.76%	31	7.75%
SAM	9	4.92%	8	3.69%	17	4.25%
Overweight	3	1.64%	9	4.15%	12	3.00%
Obese	0	0.00%	6	2.76%	6	1.50%
HAZ						
Normal	51	27.87%	69	31.80%	120	30.00%
Mild stunted	83	45.36%	71	32.72%	154	38.50%
Moderately stunted	35	19.13%	47	21.66%	82	20.50%
Severely stunted	9	4.92%	25	11.52%	34	8.50%
WAZ						
Normal	57	31.15%	64	29.49%	121	30.25%
Mild Under weight	80	43.72%	88	40.55%	168	42.00%
Moderately Under weight	32	17.49%	42	19.35%	74	18.50%
Severely Underweight	12	6.56%	19	8.76%	31	7.75%
Mildly Over nourished	2	1.09%	4	1.84%	6	1.50%
BAZ						
Normal	4	2.19%	10	4.61%	14	3.50%
At risk	8	4.37%	15	6.91%	23	5.75%
MAM	3	1.64%	5	2.30%	8	2.00%
SAM	2	1.09%	0	0.00%	2	0.50%

Table 4. 30: Prevalence of Malnutrition among Children according to Age

	0-6 months (N = 31)		6-36 months (N = 175)		36-72 months (N =194)		Total (N = 400)	
	N	%	N	%	N	%	N	%
WHZ								
Normal	12	38.7%	94	53.7%	70	36.1%	176	44.0%
At risk	9	29.0%	42	24.0%	61	31.4%	112	28.0%
MAM	5	16.1%	16	9.1%	10	5.2%	31	7.8%
SAM	3	9.7%	8	4.6%	6	3.1%	17	4.3%
Overweight	1	3.2%	10	5.7%	1	0.5%	12	3.0%
Obese	0	0.0%	5	2.9%	1	0.5%	6	1.5%
HAZ								
Normal	17	54.8%	46	26.3%	57	29.4%	120	30.0%
Mild stunted	8	25.8%	59	33.7%	87	44.8%	154	38.5%
Moderately stunted	3	9.7%	41	23.4%	38	19.6%	82	20.5%
Severely stunted	1	3.2%	26	14.9%	7	3.6%	34	8.5%
WAZ								
Normal	12	38.7%	61	34.9%	48	24.7%	121	30.3%
Mild Under weight	12	38.7%	63	36.0%	93	47.9%	168	42.0%
Moderately Under weight	4	12.9%	30	17.1%	40	20.6%	74	18.5%
Severely Underweight	3	9.7%	18	10.3%	10	5.2%	31	7.8%
Mildly Over nourished	0	0.0%	3	1.7%	3	1.5%	6	1.5%
BAZ								
Normal	0	0.0%	0	0.0%	14	7.2%	14	3.5%
At risk	0	0.0%	0	0.0%	23	11.9%	23	5.8%
MAM	0	0.0%	0	0.0%	7	3.6%	7	1.8%
SAM	0	0.0%	0	0.0%	2	1.0%	2	0.5%

Frequency of Consumption of Various Foods among Children

The table 4.31 shows the frequency of consumption of unprocessed and minimally processed foods among a certain group of people. The food items are categorized based on their type, and the frequency of consumption is indicated in terms of the number of times per week or month.

Grains are consumed the most frequently, with 87.5% of respondents consuming them 4-5 times a week. Millets are consumed less frequently, with only 2.0% consuming them 4-5 times a week, and the majority consuming them once a week or less. Pulses are consumed frequently, with 45.5% consuming them 3 times a week, and a total of 82.3% consuming them at least once a week. Nuts and seeds are also consumed fairly frequently, with 60.8% consuming them at least once a week. Green leafy vegetables and vitamin A rich fruits and vegetables are consumed less frequently than other food items, with only 1.5% and 1.5% respectively consuming them 4-5 times a week. Other fruits and vegetables and other vegetables are consumed more frequently than green leafy vegetables and vitamin A rich fruits and vegetables. Milk and curd are consumed frequently, with 23.5% and 14.3% respectively consuming them 4-5 times a week. Butter milk is also consumed fairly frequently, with 22.3% consuming it 3 times a week. Meat, poultry, and fish are consumed less frequently, with only 0.3% and 0.5% consuming them 4-5 times a week.

Overall, the table suggests that grains, pulses, milk, and curd are consumed most frequently among the food items listed, while green leafy vegetables and vitamin A rich fruits and vegetables are consumed less frequently. It also suggests that meat, poultry, and fish are not consumed as frequently as other food items.

Table 4.32 shows the frequency of consumption of processed culinary ingredients by individuals. 86.3% of individuals consume cooking oil 4-5 times a week, while only 3% of individuals never consume it. In contrast, hydrogenated oil is rarely consumed, with only 1% of individuals consuming it once a week or more, and 91% of individuals never consuming it.

Sugar is consumed more frequently than honey, with 84% of individuals consuming sugar 4-5 times a week, while only 2.8% of individuals consume honey on the same frequency. Butter and ghee are consumed by a smaller proportion of individuals, with butter being consumed more frequently than ghee. Only 1% of individuals consume butter daily, while 11.5% of individuals consume ghee on a daily basis.

Table 4.33 suggests that tea is the most frequently consumed processed food item among the participants, with 62% reporting consuming it daily, while coffee is consumed less frequently with only 0.8% of participants reporting consumption at the same frequency. Oats and flakes are

consumed by a very small percentage of participants on a regular basis, while maida and unpacked buns are consumed more frequently.

Packed milk is also consumed frequently, with 57.3% of participants reporting daily consumption. Cheese, paneer, and channa are consumed less frequently. Packed fruit juice is consumed occasionally by a large percentage of participants, with 53.8% reporting consumption at this frequency. Overall, the data suggests that the consumption of processed foods varies widely among the participants, with some food items being consumed more frequently than others.

The table 4.34 shows the frequency of consumption of ultra-processed foods among the participants. The majority of the participants reported never consuming infant formula and cereal as ultra-processed foods. However, bread and buns were consumed by a significant proportion of the participants, with 46.3% and 58.8% reporting never and occasionally consuming bread and buns, respectively. It is important to note that consuming ultra-processed foods has been associated with negative health outcomes, and efforts should be made to reduce their consumption in the diet.

Table 4.35 shows that Mayo was never consumed by the majority of the participants (87.3%), while Sev was consumed occasionally by most participants (31%). Chips/Kurkure were consumed frequently by a significant portion of participants, with 34% consuming them 4-5 times a week and 27% consuming them thrice a week. Choda Fadi/Mathi were consumed rarely by most participants, with 51% consuming them once in 10 days and 25.8% never consuming them. Papdi/Gathiya were consumed frequently by a significant portion of participants, with 42.5% consuming them 4-5 times a week and 23.5% consuming them thrice a week. Namkeen/Chavanu were also consumed frequently by a significant portion of participants, with 20.8% consuming them thrice a week and 20.5% consuming them once a week. These foods are generally considered unhealthy due to their high fat content, and consuming them frequently may lead to health problems such as obesity and heart disease. Therefore, it is recommended to limit the consumption of these foods and opt for healthier options.

Looking at the table 4.36, it is evident that homemade sweets are consumed the least frequently, with only 6.8% of respondents reporting that they never consume them. On the other hand, ready-to-eat sweets and sweet buns are consumed frequently, with 76% and 73.8% of respondents reporting that they never consume them, respectively.

Cream rolls are consumed occasionally by 50.3% of respondents, while ice cream is consumed occasionally by 31.8% of respondents. Cakes and pastries are consumed occasionally by 10.8% of respondents, while biscuits, toast, and khari are consumed daily by 60.5% of respondents. Chocolates and candies are consumed frequently by 26.8% of respondents and occasionally by 34.3% of respondents. Carbonated soft drinks are consumed frequently by 70% of respondents, while health drinks like Bournvita and Horlicks are consumed occasionally by 67.5% of respondents.

Table 4.37 shows the frequency of consumption of foods high in salt among the study participants. The table includes food items such as pickles, papad, bhungla, instant soup, and instant sauces. The majority of participants reported consuming pickles (43.8%) and papad (34.5%) at least once in 10 days or more frequently. Bhungla was also frequently consumed, with 30.3% of participants reporting consumption once a week. Instant soup and instant sauces were less commonly consumed, with 77.3% and 21.3% of participants, respectively, reporting never consuming them. Overall, the table suggests that some participants consume foods high in salt quite frequently, while others rarely or never consume them. It is important to moderate salt intake as a high-salt diet can lead to health problems like high blood pressure and heart disease.

The table 4.38 shows that Sev mamra and Papad poha are consumed by the majority of the children, with 35.3% consuming it thrice a week and 33.8% consuming it once a week. Puff is consumed mostly occasionally and never by a large number of people (46.3% and 35.8%, respectively). Samosa is consumed by 37% of the children once a week, and Vada pav is consumed by 36.3% of the children once in 10 days. Pani Puri is consumed by 20.5% of the children occasionally and once a week, respectively. Sev usal is consumed by a majority of the children occasionally and once in 15 days (34% and 53.8%, respectively). Pav bhaji is consumed by 47% of the children once a month, while Dabeli is consumed by 60% of the children once a month. Pune misal is consumed by 87.3% of the population once a month. Khaman is consumed by 52.5% once in 15 days, and Chinese food is consumed by 49.5% of the children occasionally. Pizza and Burger are consumed by 65% of the children never. Instant noodles (Maggie) are consumed by 21.3% of the children once a week, and Sakarpara is consumed by 40% of the population occasionally. Methi Puri, Chakri, Mathri are consumed by 58% of the children once a month, and Sukhadi is consumed by 36.8% of the children once a month. Finally, Chikki is consumed by 51.8% of the children occasionally.

Table 4. 31: Unprocessed and minimally processed foods

Food item	Daily		4-5 times a week		Thrice a week		Once a week		Once in 10 days		Once in 15 days		Once in a month		Occasionally		Never	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Grains	350	87.5 %	6	1.5 %	7	1.8%	0	0.0%	0	0.0%	0	0.0 %	0	0.0 %	0	0.0%	6	1.5%
Millets	8	2.0%	20	5.0 %	48	12.0 %	52	13.0 %	5	1.3%	3	0.8 %	3	0.8 %	56	14.0 %	174	43.5 %
Pulses	8	2.0%	182	45.5 %	143	35.8 %	18	4.5%	0	0.0%	3	0.8 %	5	1.3 %	3	0.8%	7	1.8%
Nuts and seeds	10	2.5%	11	2.8 %	41	10.3 %	214	53.5 %	31	7.8%	10	2.5 %	4	1.0 %	19	4.8%	29	7.3%
Green leafy vegetables	6	1.5%	25	6.3 %	112	28.0 %	119	29.8 %	15	3.8%	5	1.3 %	3	0.8 %	30	7.5%	54	13.5 %
Vitamin A rich fruits and vegetables	0	0.0%	6	1.5 %	14	3.5%	48	12.0 %	8	2.0%	7	1.8 %	3	0.8 %	234	58.5 %	49	12.3 %
Other fruits and vegetables	13	3.3%	104	26.0 %	95	23.8 %	104	26.0 %	14	3.5%	9	2.3 %	2	0.5 %	12	3.0%	16	4.0%
Other vegetables	23	5.8%	201	50.3 %	75	18.8 %	22	5.5%	3	0.8%	4	1.0 %	0	0.0 %	15	3.8%	26	6.5%
Roots and tubers	24	6.0%	83	20.8 %	194	48.5 %	35	8.8%	6	1.5%	2	0.5 %	1	0.3 %	5	1.3%	19	4.8%
Milk	94	23.5 %	3	0.8 %	1	0.3%	76	19.0 %	0	0.0%	0	0.0 %	0	0.0 %	4	1.0%	267	66.8 %
Curd	7	1.8%	20	5.0 %	57	14.3 %	5	1.3%	44	11.0 %	21	5.3 %	4	1.0 %	44	11.0 %	96	24.0 %
Butter milk	8	2.0%	25	6.3 %	70	17.5 %	89	22.3 %	36	9.0%	10	2.5 %	3	0.8 %	39	9.8%	84	21.0 %
Meat, poultry and fish	1	0.3%	2	0.5 %	35	8.8%	82	20.5 %	53	13.3 %	19	4.8 %	1	0.3 %	5	1.3%	171	42.8 %

Table 4. 32: Processed culinary ingredients

Food item	Daily		4-5 times a week		Thrice a week		Once a week		Once in 10 days		Once in 15 days		Once in a month		Occasionally		Never	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Cooking oil	345	86.3%	5	1.3%	6	1.5%	0	0.0%	1	0.3%	0	0.0%	0	0.0%	0	0.0%	12	3.0%
Hydrogenated oil	4	1.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.3%	364	91.0%
Sugar	336	84.0%	7	1.8%	10	2.5%	3	0.8%	1	0.3%	0	0.0%	0	0.0%	1	0.3%	11	2.8%
Honey	11	2.8%	0	0.0%	5	1.3%	7	1.8%	2	0.5%	3	0.8%	2	0.5%	80	20.0%	259	64.8%
Butter	4	1.0%	4	1.0%	1	0.3%	7	1.8%	6	1.5%	5	1.3%	3	0.8%	38	9.5%	301	75.3%
Ghee	46	11.5%	30	7.5%	28	7.0%	13	3.3%	8	2.0%	7	1.8%	12	3.0%	191	47.8%	34	8.5%

Table 4. 33: Processed foods

Food item	Daily		4-5 times a week		Thrice a week		Once a week		Once in 10 days		Once in 15 days		Once in a month		Occasionally		Never	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Tea	248	62.0%	13	3.3%	20	5.0%	2	0.5%	2	0.5%	2	0.5%	0	0.0%	14	3.5%	68	17.0%
Coffee	3	0.8%	0	0.0%	2	0.5%	5	1.3%	0	0.0%	0	0.0%	0	0.0%	10	2.5%	349	87.3%
Oats	2	0.5%	2	0.5%	4	1.0%	1	0.3%	1	0.3%	0	0.0%	0	0.0%	3	0.8%	356	89.0%
Flacks (corn wheat)	1	0.3%	0	0.0%	3	0.8%	1	0.3%	0	0.0%	1	0.3%	0	0.0%	4	1.0%	359	89.8%
Maida	1	0.3%	1	0.3%	8	2.0%	17	4.3%	9	2.3%	20	5.0%	26	6.5%	232	58.0%	55	13.8%
Unpacked bun	2	0.5%	3	0.8%	14	3.5%	13	3.3%	3	0.8%	1	0.3%	19	4.8%	54	13.5%	260	65.0%
Packaged milk	229	57.3%	6	1.5%	2	0.5%	1	0.3%	0	0.0%	1	0.3%	0	0.0%	2	0.5%	128	32.0%
Cheese	0	0.0%	0	0.0%	1	0.3%	4	1.0%	3	0.8%	2	0.5%	3	0.8%	107	26.8%	249	62.3%
Panner	0	0.0%	0	0.0%	0	0.0%	8	2.0%	4	1.0%	6	1.5%	33	8.3%	151	37.8%	167	41.8%
Channa	0	0.0%	0	0.0%	0	0.0%	1	0.3%	0	0.0%	4	1.0%	1	0.3%	5	1.3%	358	89.5%
Packed fruit juice	6	1.5%	8	2.0%	9	2.3%	6	1.5%	9	2.3%	14	3.5%	54	13.5%	215	53.8%	48	12.0%

Table 4. 34: Ultra-processed foods

Food item	Daily		4-5 times a week		Thrice a week		Once a week		Once in 10 days		Once in 15 days		Once in a month		Occasionally		Never	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Infant formula	3	0.8 %	1	0.3%	0	0.0%	0	0.0 %	0	0.0%	0	0.0%	0	0.0%	1	0.3%	364	91.0 %
Cereal	7	1.8 %	1	0.3%	0	0.0%	0	0.0 %	0	0.0%	0	0.0%	0	0.0%	6	1.5%	355	88.8 %
Bread	2	0.5 %	4	1.0%	18	4.5%	10	2.5 %	7	1.8%	13	3.3%	61	15.3%	185	46.3 %	69	17.3 %
Buns	0	0.0 %	5	1.3%	8	2.0%	11	2.8 %	10	2.5%	9	2.3%	24	6.0%	235	58.8 %	67	16.8 %

Table 4. 35: Foods high in fats

Food item	Daily		4-5 times a week		Thrice a week		Once a week		Once in 10 days		Once in 15 days		Once in a month		Occasionally		Never	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Mayo	0	0.0 %	0	0.0%	0	0.0%	1	0.3 %	1	0.3%	0	0.0%	6	1.5%	12	3.0 %	349	87.3 %
Sev	12	3.0 %	52	13.0%	87	21.8 %	118	29.5 %	30	7.5%	16	4.0%	8	2.0%	15	3.8 %	31	7.8 %
Chips, Kurkure	50	12.5 %	136	34.0%	108	27.0 %	37	9.3 %	6	1.5%	0	0.0%	0	0.0%	2	0.5 %	30	7.5 %
Choda Fadi, Mathi	1	0.3 %	7	1.8%	9	2.3%	10	2.5 %	3	0.8%	11	2.8%	21	5.3%	204	51.0 %	103	25.8 %
Papdi, gathiya	56	14.0 %	170	42.5%	94	23.5 %	29	7.3 %	2	0.5%	0	0.0%	1	0.3%	3	0.8 %	14	3.5 %
Namkeen, chavanu	12	3.0 %	32	8.0%	83	20.8 %	82	20.5 %	43	10.8%	18	4.5%	11	2.8%	36	9.0 %	52	13.0 %

Table 4. 36: Foods high in sugar

Food item	Daily		4-5 times a week		Thrice a week		Once a week		Once in 10 days		Once in 15 days		Once in a month		Occasionally		Never	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Homemade sweets	0	0.0%	0	0.0%	8	2.0%	9	2.3%	13	3.3%	47	11.8%	146	36.5%	119	29.8%	27	6.8%
Ready to eat sweets	1	0.3%	0	0.0%	2	0.5%	2	0.5%	3	0.8%	2	0.5%	15	3.8%	304	76.0%	40	10.0%
Sweet bun	1	0.3%	0	0.0%	2	0.5%	3	0.8%	3	0.8%	2	0.5%	18	4.5%	295	73.8%	45	11.3%
Cream roll	3	0.8%	3	0.8%	10	2.5%	11	2.8%	0	0.0%	11	2.8%	30	7.5%	100	25.0%	201	50.3%
Icecream	3	0.8%	1	0.3%	18	4.5%	12	3.0%	9	2.3%	17	4.3%	42	10.5%	140	35.0%	127	31.8%
Cakes, Pastry	0	0.0%	4	1.0%	6	1.5%	3	0.8%	4	1.0%	11	2.8%	43	10.8%	267	66.8%	31	7.8%
Biscuits, Toast, Khari	242	60.5%	82	20.5%	23	5.8%	8	2.0%	0	0.0%	0	0.0%	0	0.0%	3	0.8%	11	2.8%
Chocolates and canndies	22	5.5%	107	26.8%	137	34.3%	67	16.8%	4	1.0%	2	0.5%	1	0.3%	8	2.0%	21	5.3%
Carbonated soft driks	1	0.3%	0	0.0%	2	0.5%	7	1.8%	4	1.0%	5	1.3%	17	4.3%	280	70.0%	53	13.3%
Health drinks (Bournvita, Horlicks)	29	7.3%	5	1.3%	16	4.0%	9	2.3%	3	0.8%	1	0.3%	5	1.3%	31	7.8%	270	67.5%

Table 4. 37: Foods high in salt

Food item	Daily		4-5 times a week		Thrice a week		Once a week		Once in 10 days		Once in 15 days		Once in a month		Occasionally		Never	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Pickle	9	2.3%	11	2.8%	47	11.8%	47	11.8%	20	5.0%	13	3.3%	2	0.5%	45	11.3%	175	43.8%
Papad	4	1.0%	11	2.8%	53	13.3%	138	34.5%	65	16.3%	24	6.0%	3	0.8%	22	5.5%	49	12.3%
Bhungla	9	2.3%	71	17.8%	107	26.8%	121	30.3%	17	4.3%	10	2.5%	3	0.8%	5	1.3%	26	6.5%
Instant soup	0	0.0%	0	0.0%	5	1.3%	1	0.3%	1	0.3%	2	0.5%	4	1.0%	47	11.8%	309	77.3%
Instant sauces	6	1.5%	20	5.0%	44	11.0%	94	23.5%	49	12.3%	30	7.5%	16	4.0%	25	6.3%	85	21.3%

Table 4. 38: Commonly consumed foods

Food item	Daily		4-5 times a week		Thrice a week		Once a week		Once in 10 days		Once in 15 days		Once in a month		Occasionally		Never	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Sev mamra, Papad poha	6	1.5%	141	35.3%	135	33.8%	51	12.8%	1	0.3%	4	1.0%	3	0.8%	5	1.3%	18	4.5%
Puff	0	0.0%	0	0.0%	0	0.0%	5	1.3%	8	2.0%	6	1.5%	19	4.8%	143	35.8%	185	46.3%
Samosa	0	0.0%	1	0.3%	12	3.0%	8	2.0%	9	2.3%	34	8.5%	69	17.3%	148	37.0%	82	20.5%
Vada pav	0	0.0%	0	0.0%	0	0.0%	14	3.5%	8	2.0%	7	1.8%	15	3.8%	145	36.3%	189	47.3%
Pani Puri	0	0.0%	1	0.3%	7	1.8%	5	1.3%	9	2.3%	58	14.5%	82	20.5%	69	17.3%	69	17.3%
Sev usal	0	0.0%	0	0.0%	0	0.0%	74	18.5%	1	0.3%	4	1.0%	12	3.0%	136	34.0%	215	53.8%
Pav bhaji	0	0.0%	0	0.0%	0	0.0%	1	0.3%	3	0.8%	5	1.3%	49	12.3%	188	47.0%	122	30.5%
Dabeli	0	0.0%	0	0.0%	0	0.0%	2	0.5%	2	0.5%	2	0.5%	13	3.3%	112	28.0%	240	60.0%
Pune misal	0	0.0%	0	0.0%	0	0.0%	2	0.5%	0	0.0%	0	0.0%	1	0.3%	17	4.3%	349	87.3%
Khaman	0	0.0%	2	0.5%	2	0.5%	5	1.3%	9	2.3%	11	2.8%	26	6.5%	210	52.5%	104	26.0%
Chinese	0	0.0%	0	0.0%	1	0.3%	7	1.8%	7	1.8%	10	2.5%	55	13.8%	198	49.5%	91	22.8%
Pizza, Burger	0	0.0%	0	0.0%	0	0.0%	1	0.3%	0	0.0%	0	0.0%	5	1.3%	103	25.8%	260	65.0%
Instant noodles (maggie)	3	0.8%	17	4.3%	65	16.3%	85	21.3%	38	9.5%	54	13.5%	39	9.8%	13	3.3%	55	13.8%
Sakarpara	0	0.0%	4	1.0%	2	0.5%	4	1.0%	16	4.0%	16	4.0%	36	9.0%	160	40.0%	131	32.8%

Methi Puri, Chakri, Mathri	1	0.3 %	1	0.3%	3	0.8%	2	0.5%	9	2.3%	16	4.0%	20	5.0%	232	58.0 %	85	21.3 %
Sukhadi	2	0.5 %	0	0.0%	1	0.3%	3	0.8%	9	2.3%	8	2.0%	64	16.0%	135	33.8 %	147	36.8 %
Chikki	1	0.3 %	3	0.8%	2	0.5%	8	2.0%	8	2.0%	6	1.5%	39	9.8%	204	51.0 %	98	24.5 %
Kacchariyu	0	0.0 %	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	46	11.5 %	323	80.8 %

Gender-based Consumption of Processed foods

Figure 4.2 shows that overall, 70.7% of the total children (N=369) consumes processed foods more than four times a week. Among the gender-based classification, both females (89%) and males (86.8%) consume biscuits/ toast/ khari the most frequently. The second most frequently consumed processed food item among both females (70.3%) and males (71.1%) is tea. Papdi/ gathiya is consumed more by females (63.4%) than males (59.4%). Chips/ kurkure is consumed almost equally by both females (50.6%) and males (50.3%). Sev mamra/ papad poha is consumed more by females (45.3%) than males (35%). Chocolates/candies are consumed almost equally by both females (34.9%) and males (35%).

Figure 4. 2: Gender-based classification of consuming processed foods more than four times a week.

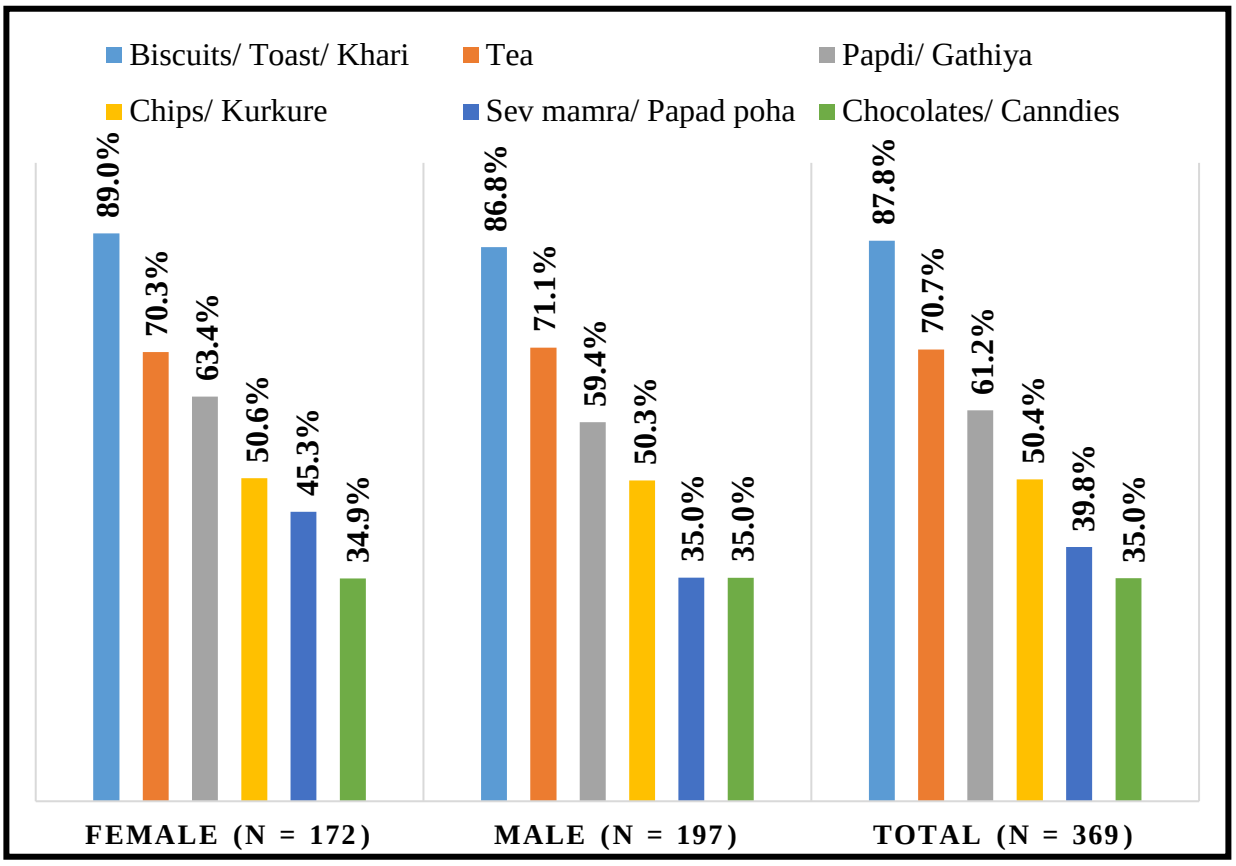
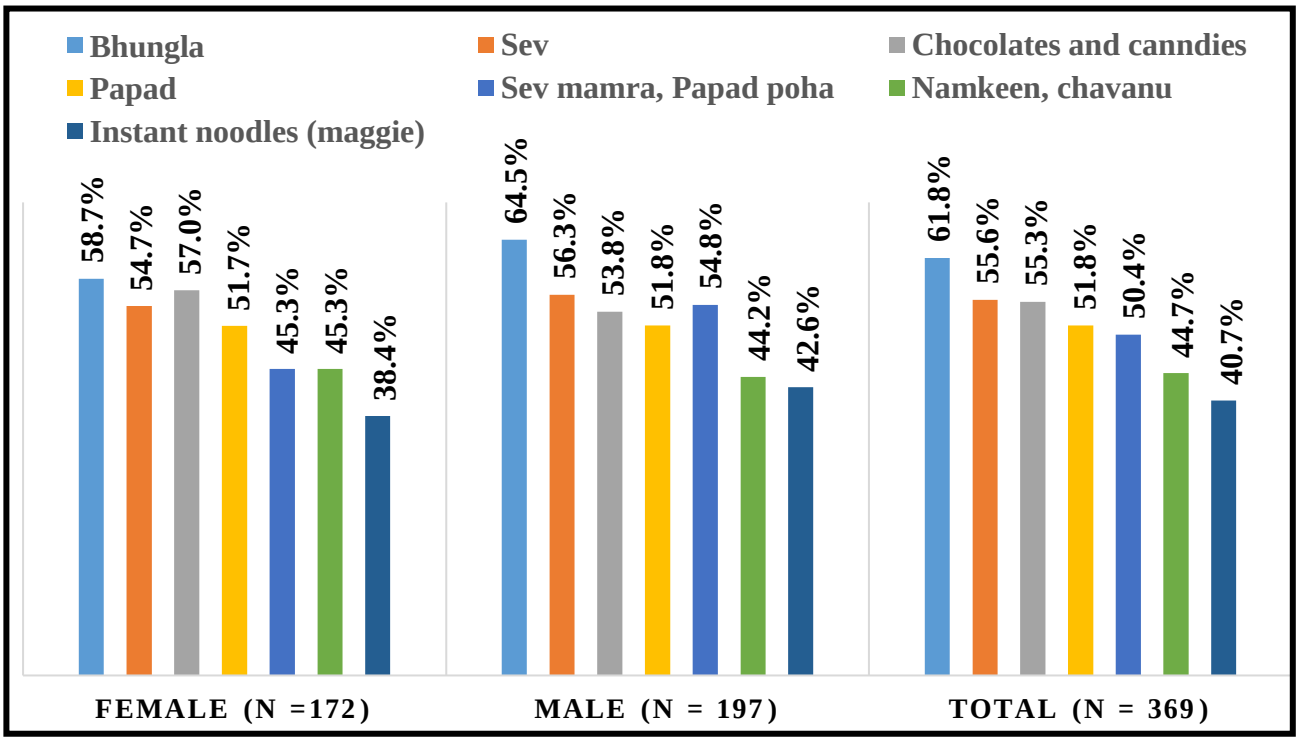


Figure 4.3 shows that overall, a higher percentage of males consume processed foods than females. For instance, 64.5% of males consume Bhungla thrice or once a week compared to 58.7% of females. Similarly, 56.3% of males consume Sev compared to 54.7% of females. However, the difference in consumption patterns is not significant for all food items.

Overall, it indicates that males tend to consume more processed foods than females.

Figure 4. 3: Gender-based classification of consuming processed foods thrice or once a week



In figure 4.4 it appears that both males and females consume instant noodles (Maggie) the most, with a percentage of 25.4% and 24.4%, respective to once in 10-15 days frequency. Papad consumption is also quite similar between males and females, with 25.4% and 22.7%, respectively.On the other hand, males seem to consume instant sauces slightly less than females, with a percentage of 19.3% compared to 23.8% for females. Similarly, females seem to consume Pani Puri and Namkeen/Chavanu slightly less than males, with a percentage of 16.3% and 14.0%, respectively, for Pani Puri, and 18.8% and 14.0%, respectively, for Namkeen/Chavanu. Overall, there does not seem to be a significant difference between males and females in terms of consuming processed foods once in 10-15 days. However, it is worth noting that instant sauces and snacks like Pani Puri and Namkeen/Chavanu are slightly more popular among females, while instant noodles and papad are equally popular among both genders.

Figure 4. 4: Gender-based classification of consuming processed foods once in 10-15 days

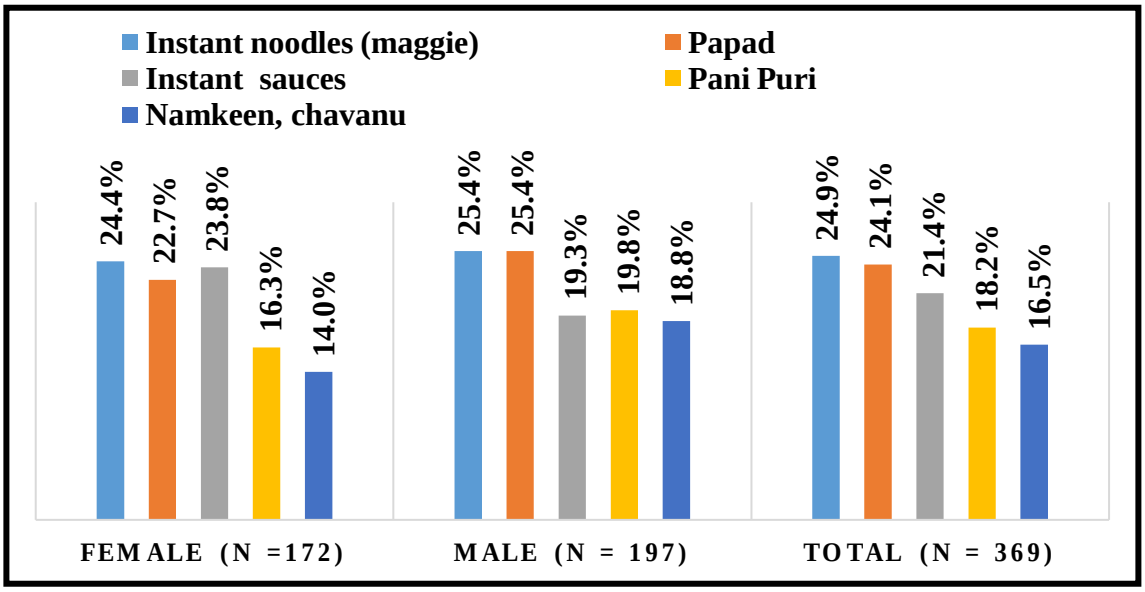


Figure 4.5 reflects that both male and female children consume processed foods once a month. Among female children, the most commonly consumed processed food once a month is Pani Puri (23.3%), followed by Samosa (19.2%). And among male, is also Pani Puri (21.3%), followed by Samosa (18.3%). Male children are more likely to consume packed fruit juice (18.8%) once a month compared to female children (9.9%). Both gender children consume bread and Chinese food once a month, with a slightly higher percentage of male consuming them compared to female. Overall, the gender-based differences in consuming processed foods once a month are relatively small, with no significant differences between the top three most commonly consumed processed foods for both men and women.

Figure 4. 5: Gender-based classification of consuming processed foods once in a month

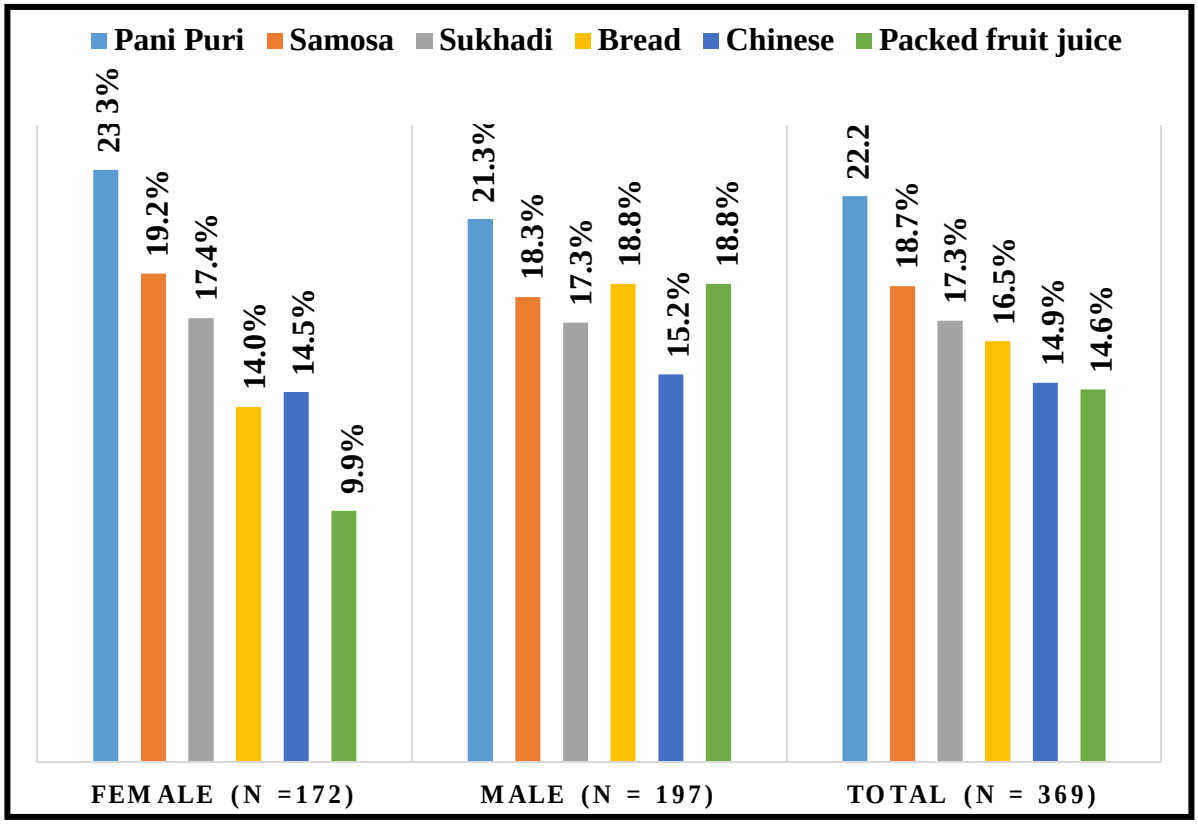
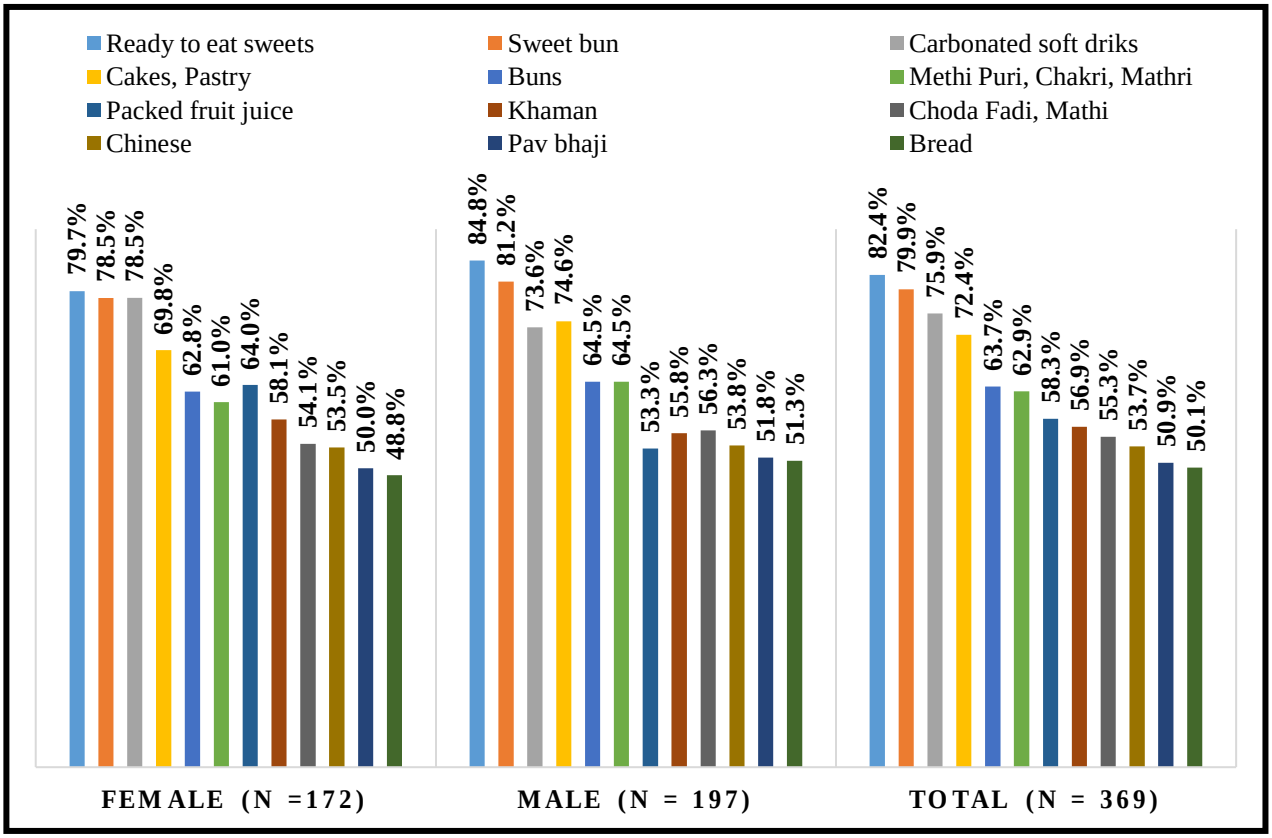


Figure 4.6 shows that a higher percentage of males (84.8%) than females (79.7%) consume ready-to-eat sweets occasionally. Similarly, a higher percentage of males (81.2%) than females (78.5%) consume sweet buns occasionally. On the other hand, a higher percentage of females (69.8%) than males (74.6%) consume cakes and pastries occasionally. In terms of carbonated soft drinks, a higher percentage of females (78.5%) than males (73.6%) consume them occasionally. However, when it comes to packed fruit juice, a higher percentage of females (64.0%) than males (53.3%) consume it occasionally. Overall, these findings suggest that gender-based differences exist in the consumption patterns of processed foods.

Figure 4. 6: Gender-based classification of consuming processed foods occasionally



Age group based Consumption of Processed foods

Figure 4.7 indicates that the consumption of processed foods is more prevalent in older age groups. For example, 91.2% of individuals in the 36-72 month age group consume biscuits, toast, or khari more than four times a week, compared to 84.8% in the 6-36 month age group, and 50.0% in the 0-6 month age group. Indicating early initiation of complementary foods and that too processed. Similarly, the percentage of individuals consuming tea and papdi or gathiya is also higher in the older age groups compared to the younger age groups. However, the consumption of chips, kurkure, sev mamra, papad poha, chocolates, and candies is relatively lower in all age groups, with less than 60% of children consuming these foods more than four times a week.

Figure 4. 7: Age group based classification of consuming processed foods more than four times a week

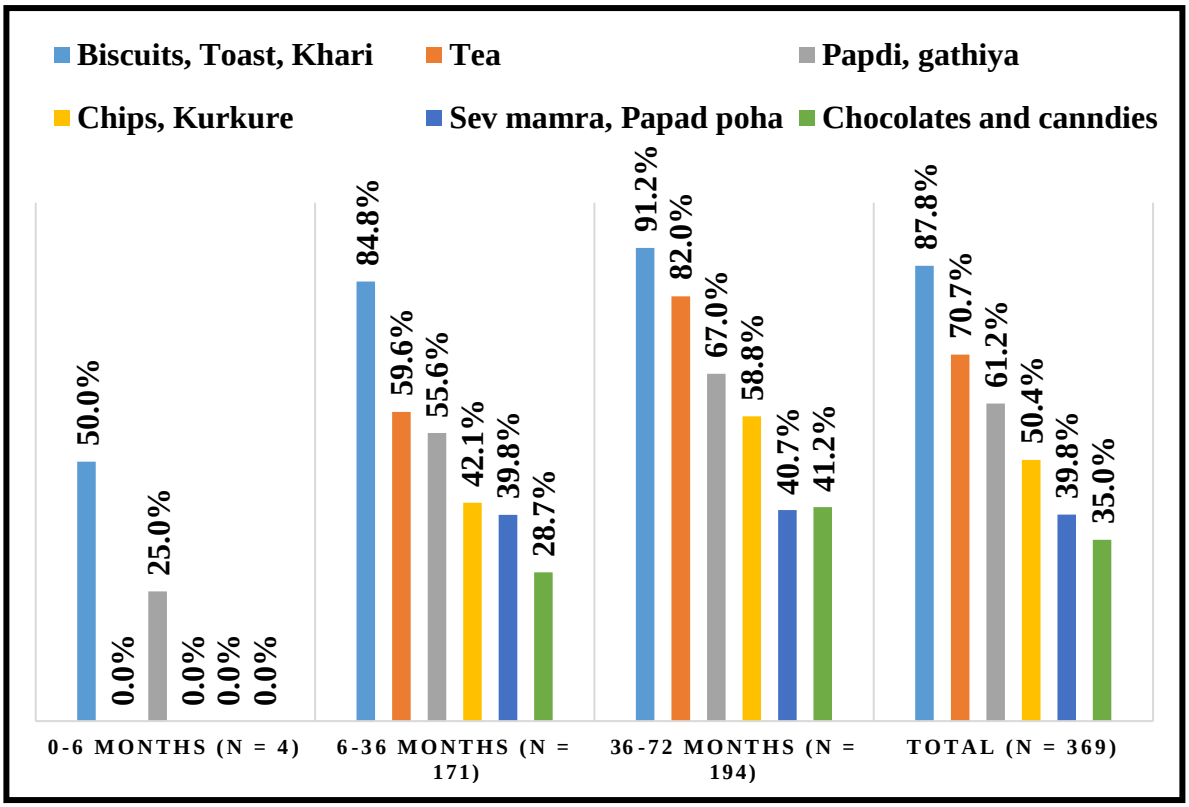
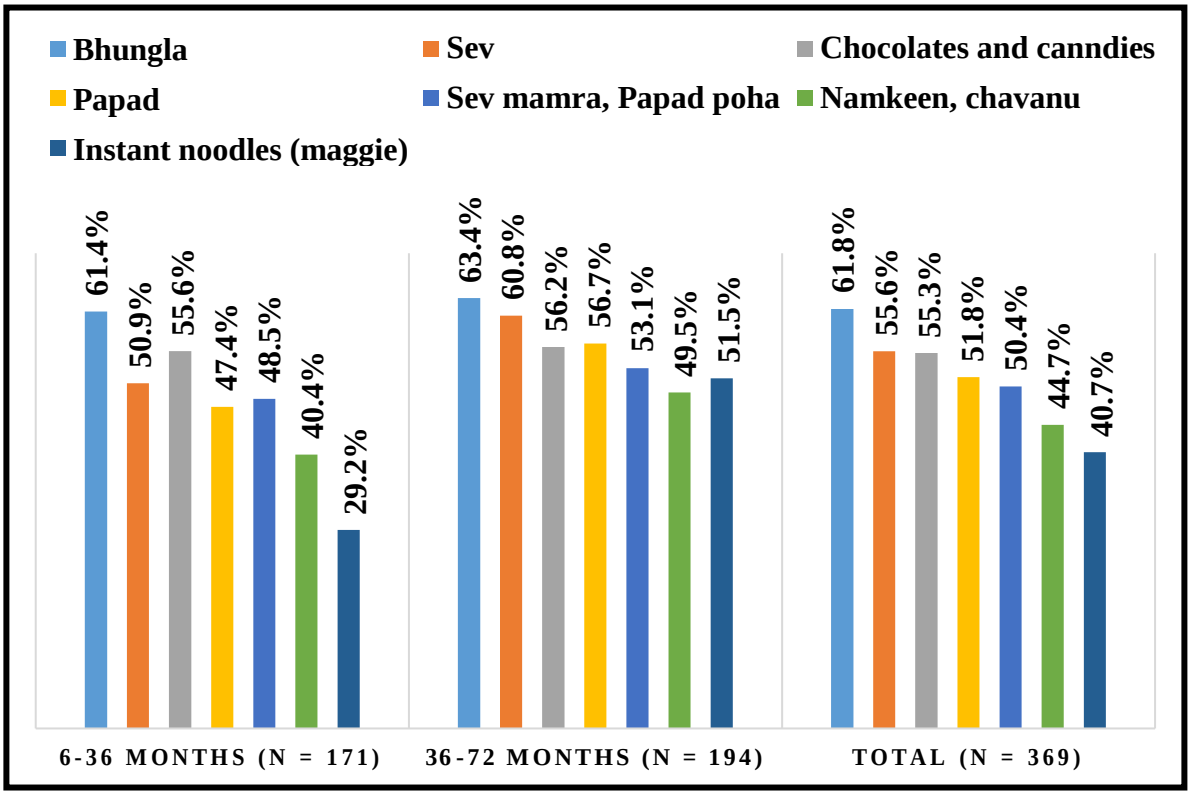


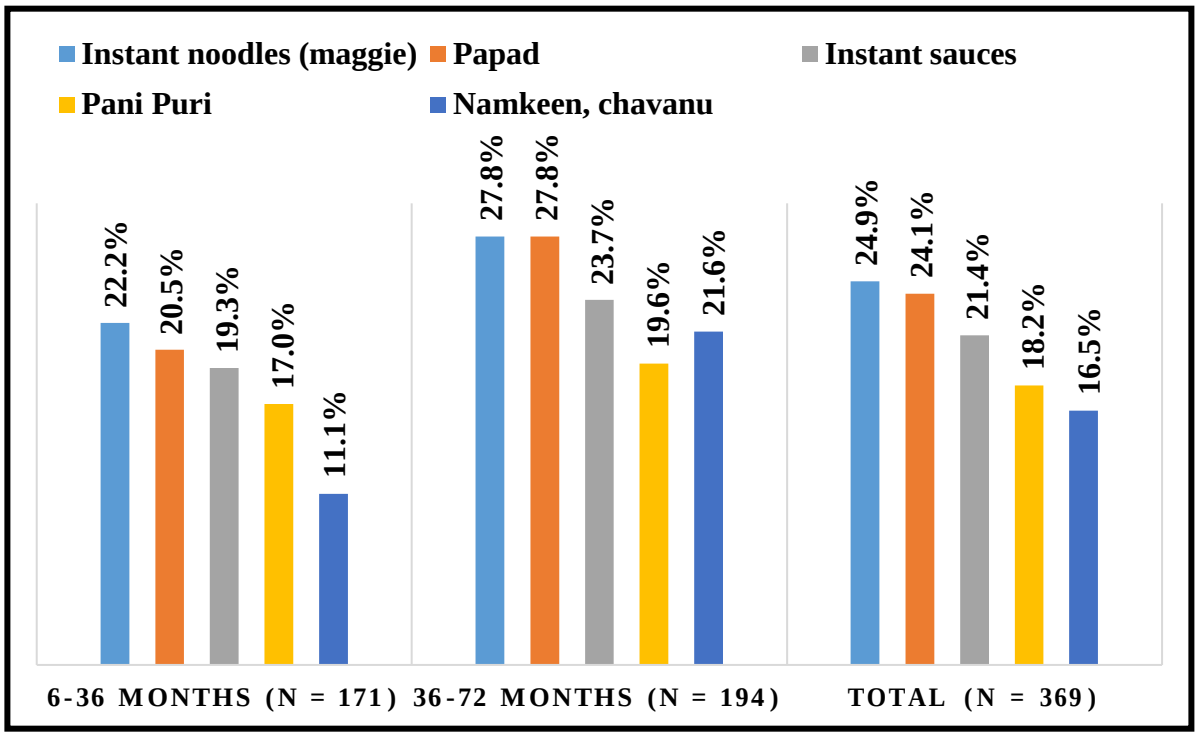
Figure 4.8 shows that 63.4% of children in the 36-72 month age group consume bhungla once or thrice a week, compared to 61.4% in the 6-36 month age group, and 0.0% in the 0-6 month age group. Similarly, the percentage of individuals consuming sev, chocolates and candies, papad, sev mamra, papad poha, namkeen, and instant noodles is also higher in the older age groups compared to the younger age groups. However, it is important to note that the percentage of individuals consuming these processed foods once or thrice a week is relatively lower compared to the percentage of individuals consuming them more than four times a week.

Figure 4. 8: Age group based classification of consuming processed foods thrice or once a week



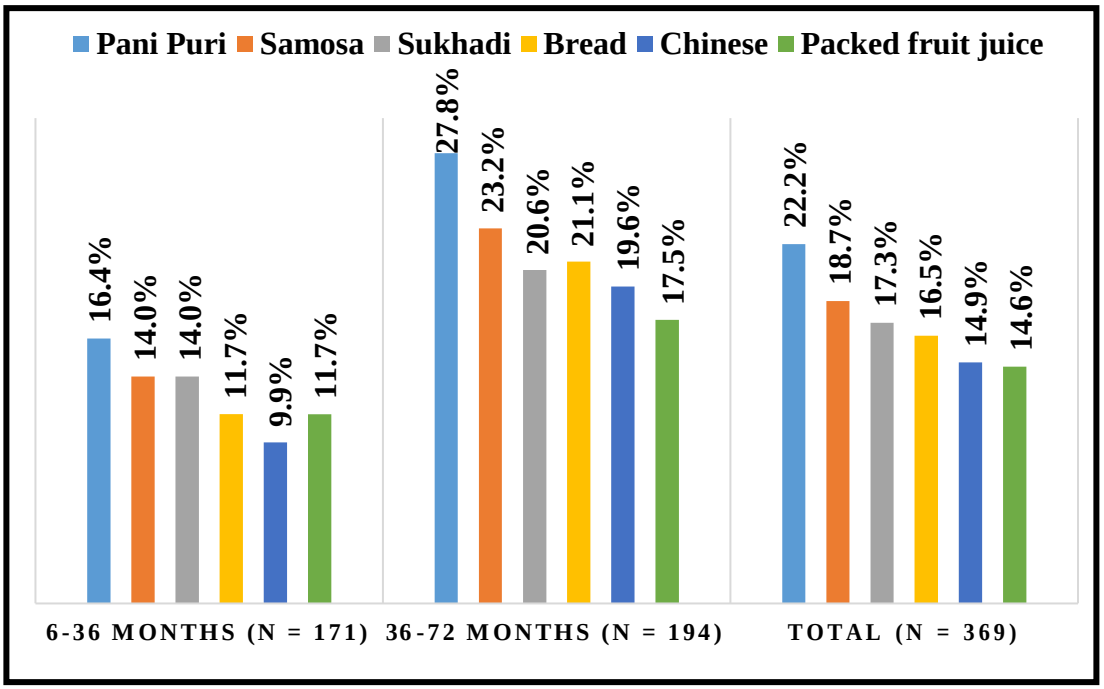
From figure 4.9, it appears that processed foods such as instant noodles, papad, and instant sauces are consumed more frequently by older children (36-72 months) compared to younger children (0-6 months and 6-36 months). Pani Puri and Namkeen, chavanu are consumed less frequently overall, but again, more frequently by older children. It's important to note that consuming processed foods occasionally may not be harmful, but it's recommended to limit their consumption and focus on a balanced and nutritious diet.

Figure 4. 9: Age group based classification of consuming processed foods once in 10-15 days



From figure 4.10 we can see that the top processed food items consumed by children aged 36-72 months are Pani Puri and Samosa with a consumption rate of 27.8% and 23.2% respectively. For children aged 6-36 months, Pani Puri is top processed food items consumed with a consumption rate of 16.4% respectively. Overall it suggests that with increase in age children are consuming more processed foods.

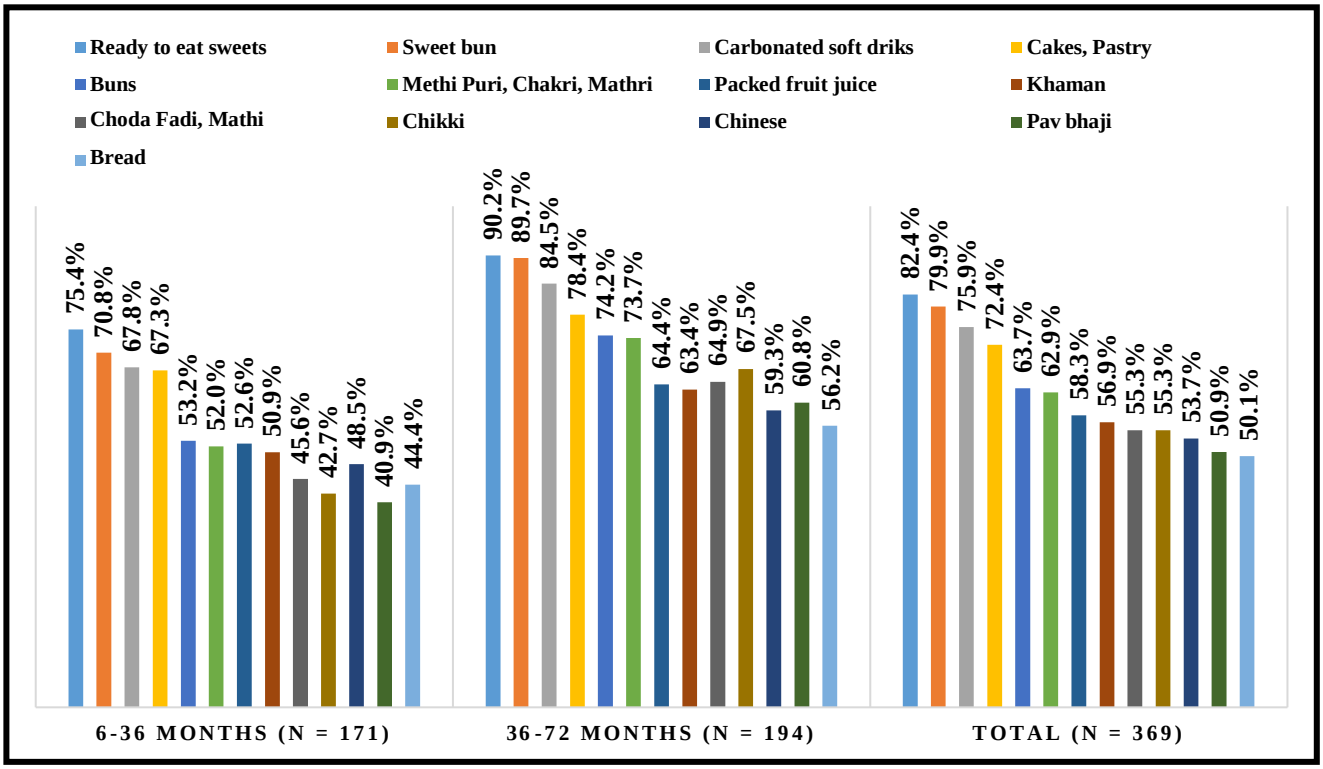
Figure 4. 10: Age group based classification of consuming processed foods once in a month



From figure 4.11 it can be interpreted that the consumption of processed foods is high among children aged 6-72 months, with a majority of them consuming these foods on a regular basis. Among children aged 6-36 months and 36-72 months, the most commonly consumed processed foods are Bhungla, Sev, Chocolates and Candies, Papad, and Sev mamra. However, among children aged 0-6 months, no processed foods were consumed regularly.

When it comes to consuming processed foods occasionally, the most commonly consumed foods among all age groups are Ready to eat sweets, Sweet bun, and Carbonated soft drinks. The consumption of Cakes, Pastry, Buns, Methi Puri, Chakri, Mathri, and Packed fruit juice is also high among children aged 6-72 months. However, the consumption of processed foods like Pav bhaji and Bread is comparatively low among all age groups.

Figure 4. 11: Age group based classification of consuming processed foods occasionally



Nutritional Status based consumption of Processed Foods

Table shows the percentage of children consuming processed foods more than four times a week based on their nutritional status. The nutritional status is categorized into Normal, At risk, MAM (moderate acute malnutrition), SAM (severe acute malnutrition), Overweight, and Obese. The table indicates that the percentage of children consuming biscuits, toast, and khari are in the Obese category (100%) and in the SAM category (73.3%). For tea consumption, the highest percentage is in the MAM category (76.5%), and the lowest percentage is in the overweight category (54.5%). In terms of chips and kurkure consumption, the highest percentage is in the overweight category (54.5%), and the lowest percentage is in the SAM category (33.3%). For chocolates and candies consumption, the highest percentage is in the overweight category (45.5%), and the lowest percentage is in the SAM category (20.0%). The percentage of children consuming bhungla is lowest in the at risk category (17.5%) and highest in the Obese category (40.0%).

Table 4. 39: Nutritional Status based classification of consuming processed foods more than four times a week

Food items	Normal (N = 178)	At risk (N = 126)	MAM (N = 34)	SAM (N = 15)	Overweight (N = 11)	Obese (N = 5)	Total (N = 369)
Biscuits, Toast, Khari	92.7%	83.3%	85.3%	73.3%	81.8%	100.0 %	87.8%
Tea	74.7%	65.9%	76.5%	60.0%	54.5%	80.0%	70.7%
Papdi, gathiya	59.0%	62.7%	67.6%	60.0%	63.6%	60.0%	61.2%
Chips, Kurkure	52.2%	53.2%	44.1%	33.3%	54.5%	0.0%	50.4%
Sev mamra, Papad poha	43.3%	35.7%	32.4%	46.7%	45.5%	40.0%	39.8%
Chocolates and canndies	36.5%	34.1%	32.4%	20.0%	45.5%	40.0%	35.0%
Bhungla	22.5%	17.5%	26.5%	26.7%	27.3%	40.0%	21.7%

DISCUSSION

When we think about the food and beverages that are commonly consumed and marketed to children, they often fall into the category of ultra-processed foods (UPF). These are foods that have been extensively processed, with little to no whole food remaining and containing added flavors, colors, and additives. Examples of UPF include packaged snacks, soda, flavored dairy drinks, cookies, and instant noodles. UPF are typically high in free sugars, saturated fat, and sodium, and low in protein, dietary fiber, micronutrients, and phytochemicals (Khandpur, N. et al., 2020). And when a survey was conducted among 13,274 school children aged 9-17 from urban areas across India. The majority of respondents were from north, south, and west India, with 97% of responses from 97 districts spread across 15 states. Results showed that most children did not have a balanced diet, with low intake of cereals, millets, vegetables, milk, milk products, fruits, and pulses. Packaged food was more popular than non-packaged food, with salted packaged food, sweet packaged food, and sugar-sweetened packaged beverages being consumed at an average of over twice a week by a high percentage of children. Boys and older children consumed packaged food more frequently than girls and younger children. Schools or nearby areas were prominent sources of packaged food for children (Bhushan et al., 2017).

The present study also found similar results regarding the consumption of processed foods among children, including high intake of packaged foods such as papdi, gathiya, biscuits/toast/khari, chips, kurkure, and bhungla, as well as tea being a popular sweet beverage. Additionally, food items like pani puri and samosas were also highly consumed. However, there were differences in consumption patterns between genders, with males and females having varying preferences for different types of processed foods.

Complementary feeding is a process starting when breast milk alone is no longer sufficient to meet the nutritional requirements of infants after the age of 6 months, and therefore other foods and liquids are needed, along with breast milk. In a community based cross sectional study conducted in Urban and Rural area of Mangalore Taluka among 408 mothers, it was found that mothers in the rural and urban area started complementary feeds at the age of 6 months mostly with combination of rice and dal together. The number of meals per day given to the child varied from 2-4/day. The number of snacks given per day to the child varied from 1-4 /day; commonly preferred snacks were Biscuits both in urban and rural areas Bottle feeding was practiced by 181

(44.4%) of the mothers, that included 113/181 (62.4%) from rural area and 68/181 (37.5%) from urban area (Javalkar & Aras, 2018).

Similarly with the present study it was found that infants below 6 months of age were being given complementary feeds, including processed foods such as biscuits, papdi, and gathiya which goes against the recommended practice of exclusive breastfeeding for the first 6 months of life.

To characterize the feeding and caring practices of urban slum Indian children aged 12 to 24 months in relation to WHO and PAHO recommendations a cross-sectional study was conducted and found that despite 88% of children achieving minimum meal frequency, only 50% consumed at least four food groups, and 44% a minimum acceptable diet. Consumption of iron-rich or iron-fortified foods, vitamin A–rich fruits and vegetables, and eggs was low, while consumption of sugary and snack foods was high. Reported compliance to responsive feeding indicators was generally around 50%, but food safety and hygiene practices were suboptimal and not consistent with home observations. The study highlights the poor dietary diversity (MDD) among young Indian children (Houghton et al., 2020). Also the diets of 285 children between the ages of 7-59 months were assessed in a study conducted by Chandodkar S. and Shah P. in the rural block of Vadodara. The study found that out of the 285 children, only 29 met the minimum dietary diversity (MDD) score by consuming more than 5 food groups, while 256 children consumed less than 5 food groups. This indicates that there is a significant lack of dietary diversity among young children in rural Vadodara. (Chandodkar S. and Shah P., 2017)

The recent study found that although approximately 80% of the children had a meal frequency of more than 3 times per day, only 23.8% of them met the Minimum Dietary Diversity criteria by consuming more than 5 food groups in the age group of 6-23 months, and more than 4 food groups in the age group of 23 to 72 months, indicating poor dietary quality among the majority of the children.

SUMMARY AND CONCLUSIONS

The first few years of a child's life are crucial for their growth and development, and adequate nutrition plays a significant role. Complementary feeding is essential to ensure children receive adequate energy and nutrients, develop eating habits and preferences, and avoid health issues. Processed foods high in fats, sodium, and sugars lack essential nutrients and can lead to poor eating habits and chronic diseases in adulthood. Studies in Brazil have shown a high consumption of processed foods among children under two years, reflecting an inadequate and poor-quality dietary pattern. The consumption of processed foods often replaces or supplements breastfeeding, leading to unhealthy eating habits (Cavassim et al., 2016).

Therefore, it is essential to understand the consumption patterns of processed foods among children to develop effective interventions that improve nutrition outcomes and decrease the likelihood of malnutrition.

Demographic Profile and Socio-economic Characteristics

- 5.3% of the participants were Hindu, 24.5% were Muslim, and 0.3% were Christian.
- 59.3% of the participants belonged to the OBC caste, 21.0% were General, 14.0% were ST, and 5.8% were SC.
- The majority of participants lived in nuclear or extended families (43.3% and 33.5%, respectively), while 23.3% lived in joint families.
- 63.3% of the participants had between 5-8 family members, and 42.5% had two children.
- Most participants lived in their own houses (63.5%), while 36.5% lived in rented or government-owned housing.
- 98% of households had access to toilet facilities, while only 2% lacked access.
- Majority of the mothers had primary to high school certificates. Most were unemployed (84.8%) while a small percentage were skilled workers or professionals.
- Out of the 400 children, 7.75% were aged 0-6 months, 43.75% were aged 6-36 months, and 48.5% were aged 36-72 months.
- The highest number of children in all age groups were from Ghatak 4, and there were more males than females in all age groups.
- Mobile phone usage is high in all age groups, with over 93% of households using it.

- TV usage is also high, with around 75% of households using it in all categories, while radio usage is negligible. There are some gender differences in media usage, but the patterns are consistent across age groups.
- The majority of households in all age groups fall under the income range of 9232-27648, with the lowest proportion of households in the income range of ≤9226.
- The income distribution is similar for male and female-headed households across all age groups, there are slight differences in per capita income across the age groups.

Obstetric information

- 55.8% of the 400 births were delivered at government hospitals, while 40.5% were delivered at private hospitals and 3.8% at home.
- 30% of the deliveries were caesarean, while 70% were normal.
- 91.8% of the newborns were full-term, and 19.5% had low birth weight.
- More females were born at government hospitals and delivered through caesarean section, and the percentage of new-borns with low birth weight was higher among females than males.
- 6.5% of the participants attained more than four ANC visits, while only 13% attained four ANC visits and 10.5% attained less than four ANC visits.
- 90% of the participants received counseling about feeding practices during ANC, and 88% received information about proper child feeding practices during PNC.
- The majority of families in the study had one or two children, and a smaller percentage had three or more children.

IYCF Practices

- 89.3% of mothers did not face difficulties while breastfeeding their child.
- 72.8% of mothers reported giving colostrum to their newborns, but 14.5% did not due to myths associated with it.
- 41.8% of mothers initiated breastfeeding within an hour of birth, while 83.0% exclusively breastfed up to six months.
- 17.0% of participants gave their child feeds other than breast milk for ritual purposes or due to hot weather, digestion problems, or insufficient breast milk.
- 19.8% of infants were given formula milk.

- All 31 children in the 0-6 months age group were breastfed.
- In the 6-36 months age group, 54.3% of children were still breastfed.
- Breastfeeding frequency per day varied by age group, with 9-12 times per day for 0-6 months, and 1-12 times per day for 6-36 months.
- Males in the 6-36 months age group (57.5%) were more likely to be breastfed compared to females (51.1%).
- The frequency of breastfeeding per day and the proportion of children receiving solid foods did not differ significantly by gender.
- Children aged 6-36 months mostly consumed complementary foods 3-4 times a day
- Male children had slightly higher percentages of consuming complementary foods 3-4 times a day in the 6-36 months age group, while female children had slightly higher percentages of consuming complementary foods 1-2 times a day.
- 2.9% of children in the 0-6 months age group had started on complementary foods
- In the 6-36 months age group, 1/4th cup (32.6%) and 1/2 cup (41.1%) were the most commonly fed quantities of complementary foods
- There were no significant differences in the quantities of complementary foods fed when comparing by gender, except for a higher percentage of female children fed 1/4th cup in the 6-36 months age group.
- Majority of children in the 6-36 months age group were consuming thick foods, while the majority of children in the 36-72 months age group were consuming very thick foods.
- A higher percentage of children in the 6-36 months age group were consuming blended foods compared to those in the 0-6 months and 36-72 months age groups.
- Gender differences were observed in the consistency of complementary foods consumed, with a higher percentage of males consuming medium-thick foods and a higher percentage of females consuming thick foods in the 6-36 months age group.
- 61% of families were non-vegetarian and 39% were vegetarian.
- Among non-vegetarian families, 65.5% of children aged 6-36 months were fed eggs and 58.3% in the 36-72 months age group.
- 60.8% of males and 61.2% of females from non-vegetarian families were fed eggs.
- Only 0.5% of male children consume ready-to-eat nutrition supplements with iron syrup and vitamin D, while the majority of children (99.5%) do not consume any such supplements.

- Consumption of ready-to-eat market products is high among children aged 6-72 months, ranging from 84.8% to 99.0%.
- Biscuits and namkeen/sev mumra are the most commonly consumed products across all age groups and genders.
- Differences in consumption by gender exist, with males consuming more chips and papdi/gathiya, while females consume more biscuits and namkeen/sev mumra. Differences in consumption between the 6-36 months and 36-72 month age groups are not significant.
- Only a minority of caregivers reported storing cooked complementary foods for 2-3 hours (16.8%) or more than 4 hours (17.5%), while the majority (65.8%) did not store food.
- Most mothers reported soaking pulses before cooking (91.3%), while the majority (66.0%) reported cutting vegetables both before and after washing.
- Almost all mothers (99.8%) reported covering the salt container for their child's food.
- A majority of caregivers (81.3%) reported adding extra fats, oils, sugar, and jaggery after preparing complementary foods, and a higher percentage of male caregivers reported doing so compared to female caregivers (86.4% vs. 70.0%)
- None of the children aged 0-6 months were bottle fed in the last 24 hours, and top milk was given only to a single female child.
- Among children aged 6-36 months, 6.3% were bottle fed in the last 24 hours, and Gold top milk was the most commonly given type of top milk.
- The majority of children in all age and gender groups were given less than one cup of milk.
- Siro/Halva was the most commonly consumed form of Bal Shakti, with 73.7% of children aged 6-36 months consuming it.
- Breast milk was exclusively consumed by all infants in the 0-6 months age group.
- Grains, white roots and tubers, and plantains were the most commonly consumed food types in the 6-36 months and 36-72 months age groups.
- Processed foods, such as confectionery and beverages, were popular across all age groups.
- Both genders commonly consumed grains, white roots and tubers, and plantains, and pulses. Dairy products were also commonly consumed.
- The consumption of other food groups such as dark green leafy vegetables, other vitamin A-rich fruits and vegetables, meat, poultry, and fish is relatively low across all age groups.
- Only 23.8% of children aged 6-72 months met the criteria for Minimum Dietary Diversity (MDD).

- A higher percentage of children in the 36-72 month age range met the criteria for MDD compared to the 6-36 month age range.
- Male children were more likely to meet the criteria for MDD than female children, and older children were more likely to meet the criteria than younger children.

Morbidity Profile and Immunization Information

- Cough and cold were the most prevalent illness among children, followed by fever, diarrhea, and measles.
- There were no significant gender differences in the prevalence of these illnesses.
- The majority of children in the sample (95.8%) were fully immunized, with only a small proportion (4%) being partially immunized or not immunized at all.

- Table 5.1 shows the nutritional status across all 400 children included in the study.

Table 5. 1: Nutritional Status among Children

WHZ Categories	**Total (N = 400)**	
	N	**%**
Normal	190	47.50%
At risk	135	33.75%
MAM	38	9.5%
SAM	19	4.75%
Overweight	12	3.00%
Obese	6	1.50%

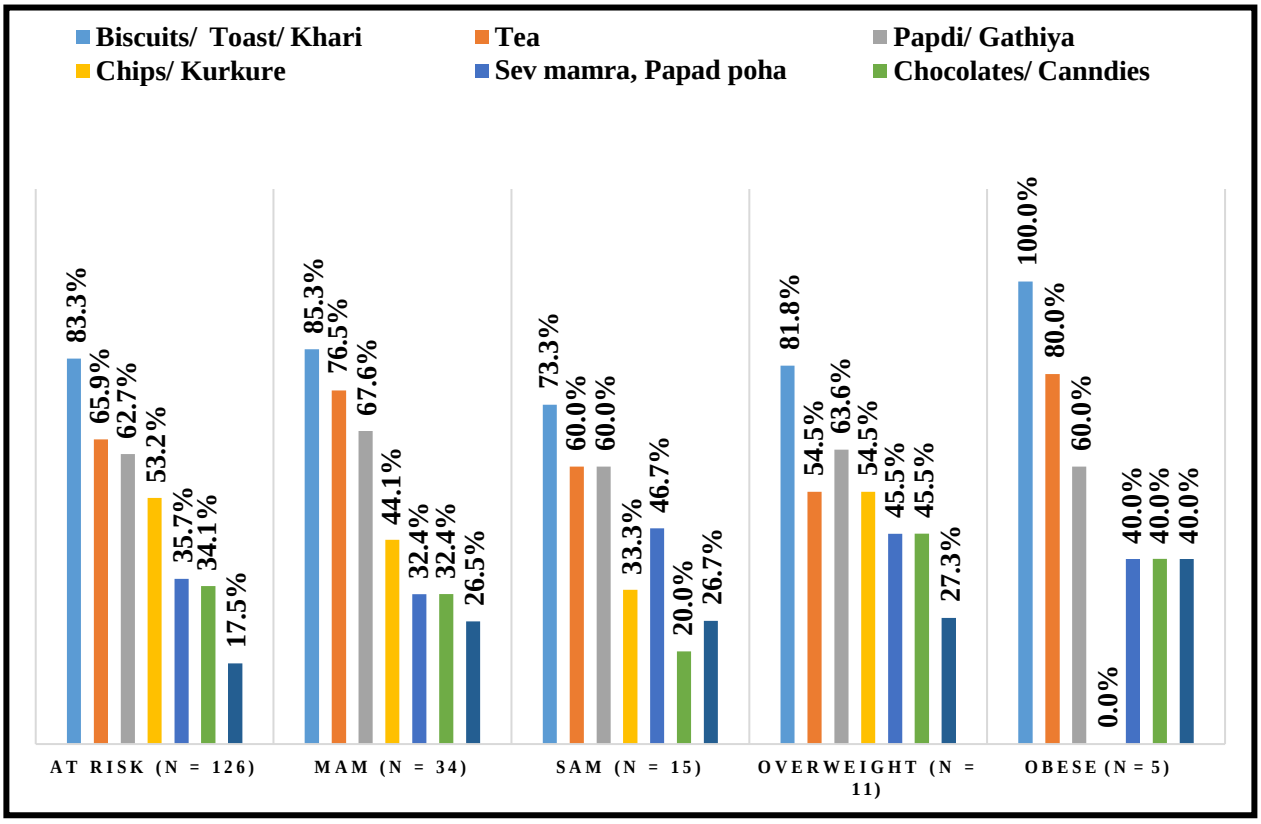
Frequency of Consumption of Various Foods among Children

- Grains are the most frequently consumed food item, with 87.5% of respondents consuming them 4-5 times a week.

- Pulses are also consumed frequently, with 45.5% consuming them 3 times a week and 82.3% consuming them at least once a week.
- Milk and curd are frequently consumed, with 23.5% and 14.3% respectively consuming them 4-5 times a week.
- Green leafy vegetables and vitamin A rich fruits and vegetables are consumed less frequently, with only 1.5% consuming them 4-5 times a week.
- Meat, poultry, and fish are not frequently consumed, with only 0.3% and 0.5% consuming them 4-5 times a week.
- Cooking oil is consumed by the majority of individuals, with 86.3% consuming it 4-5 times a week, while only 3% never consume it.
- Hydrogenated oil is rarely consumed, with only 1% of individuals consuming it once a week or more, and 91% of individuals never consuming it.
- Sugar is more commonly consumed than honey, with 84% of individuals consuming sugar 4-5 times a week, while only 2.8% of individuals consume honey on the same frequency. Butter and ghee are consumed by a smaller proportion of individuals, with butter being consumed more frequently than ghee.
- Tea is the most frequently consumed processed food item, with 62% of participants reporting daily consumption, while coffee is consumed less frequently with only 0.8% of participants reporting consumption at the same frequency.
- Packed milk is also consumed frequently, with 57.3% of participants reporting daily consumption, while cheese, paneer, and channa are consumed less frequently.
- The data suggests that the consumption of processed foods varies widely among the participants, with some food items being consumed more frequently than others. Oats and flakes are consumed by a very small percentage of participants on a regular basis, while maida and unpacked buns are consumed more frequently, and packed fruit juice is consumed occasionally by a large percentage of participants.
- Bread and buns were consumed by a significant proportion of participants, with 46.3% and 58.8% reporting never and occasionally consuming bread and buns, respectively.
- Chips/Kurkure, Papdi/Gathiya, and Namkeen/Chavanu were consumed frequently by a significant portion of participants, with 34%, 42.5%, and 20.5% consuming them 4-5 times a week, respectively. Choda Fadi/Mathi were consumed rarely by most participants.

- Processed sweet foods, such as ready-to-eat sweets, sweet buns, and carbonated soft drinks, are consumed frequently by a significant proportion of respondents, while homemade sweets are consumed the least frequently.
- The majority of participants reported consuming pickles and papad at least once in 10 days or more frequently. Bhungla was also frequently consumed.
- Samosa by 37% Pani Puri by 20.5% and Instant noodles (Maggie) by 21.3% are consumed of the children once a week.
- Overall, 70.7% of children consume processed foods more than four times a week, with biscuits/toast/khari and tea being the most frequently consumed items by both females and males.
- 64.5% of males consume Bhungla thrice or once a week compared to 58.7% of females. Similarly, 56.3% of males consume Sev compared to 54.7% of females.
- Both males and females consume instant noodles (Maggie) and papad the most, with no significant difference in consumption frequency, but females consume instant sauces and snacks like Pani Puri and Namkeen/Chavanu slightly more than males.
- With increase in age higher percentage of children are consuming biscuits/toast/khari, tea, and papdi/gathiya.
- Figure 5.1 shows frequency of processed foods consumption based on nutritional status og child shows high consumption of processed foods among overweight and obese children.

Figure 5. 1: Nutritional Status based classification of consuming processed foods more than four times a week



CONCLUSION

The findings of the study reveal a concerning reality about the state of children & nutrition in the population. A significant proportion of children are suffering from malnutrition, with less than half, or 47.5%, exhibiting a normal nutritional status. This indicates a widespread problem that needs urgent attention.

Moreover, the study highlights the coexistence of both under nutrition and over nutrition, with a high prevalence of at-risk, MAM, SAM, overweight, and obesity among the children. This points to the presence of a dual burden of malnutrition, which makes it a complex issue to tackle.

One of the contributing factors to the poor nutritional status of the children is the high consumption of processed foods in daily life, such as biscuits, khari, toast, papdi, gathiya, bhungla, chips, kurkuree, confectionaries, and processed beverages. These types of foods are often high in calories, sugar, and unhealthy fats, but low in essential nutrients, leading to malnutrition and other related health problems.

LIMITATION AND RECOMMENDATION

The limitation of the study is that since 24-hour dietary recall was not carried out, we could not determine the percentage of processed food contributing to the nutrient intake.

The recommendation is as such that it is crucial to promote a balanced and healthy diet, including fresh fruits, vegetables, whole grains, lean proteins, and dairy products. Additionally, there is a need for public education and awareness campaigns on the importance of good nutrition and healthy eating habits to prevent malnutrition in children. The government and other stakeholders also need to take significant steps towards regulating the production and marketing of processed foods, especially those targeted at children, to improve their nutritional status and overall health.

BIBLIOGRAPHY

Araya, C., Corvalán, C., Cediel, G., Taillie, L. S., & Reyes, M. (2021). Ultra-Processed Food Consumption Among Chilean Preschoolers Is Associated With Diets Promoting Non-communicable Diseases. *Frontiers in Nutrition*, *8*(March), 1–10. https://doi.org/10.3389/fnut.2021.601526

Berhane, H. Y., Ekström, E. C., Jirström, M., Berhane, Y., Turner, C., Alsanius, B. W., & Trenholm, J. (2018). What influences urban mothers' decisions on what to feed their children aged under five—the case of addis ababa, Ethiopia. *Nutrients*, *10*(9). https://doi.org/10.3390/nu10091142

Bhushan, C., Taneja, S., & Khurana, A. (2017). Burden of Packaged Food Burden of Packaged Schoolchildren. *Centre for Science and Environment*. https://www.cseindia.org/content/downloadreports/8538

de Almeida, K., da Silva, L. L., & dos Santos, E. M. (2020). Consumption of ultra-processed foods by children under 24 months of age and associated factors. *Revista Paulista de Pediatria*, *38*. https://doi.org/10.1590/1984-0462/2020/38/2020139

Fonseca, P. C. de A., Ribeiro, S. A. V., Andreoli, C. S., de Carvalho, C. A., Pessoa, M. C., de Novaes, J. F., Priore, S. E., & Franceschini, S. do C. C. (2019). Association of exclusive breastfeeding duration with consumption of ultra-processed foods, fruit and vegetables in Brazilian children. *European Journal of Nutrition*, *58*(7), 2887–2894. https://doi.org/10.1007/s00394-018-1840-9

Francisca Cavassim, A., Augusto Taconeli, C., Teresinha Schmidt, S., Antunes Tsupal, P., & Bettega Almeida, C. C. (2016). Consumption of processed foods among children under two years of age: Foods' pattern analysis. *Integrative Food, Nutrition and Metabolism*, *3*(3), 318–323. https://doi.org/10.15761/ifnm.1000151

JAIN A & MATHUR P. (2020). Intake of Ultra-processed Foods Among Adolescents From Low- and Middle-Income Families in Delhi. *INDIAN PEDIATRICS*.

Javalkar, S. R., & Aras, R. Y. (2018). A study on complementary feeding practices among mothers in urban and rural areas. *International Journal Of Community Medicine And Public Health*, *5*(3), 1162. https://doi.org/10.18203/2394-6040.ijcmph20180777

Khor, G. L., & Lee, S. S. (2021). Complementary foods and milk-based formulas provide excess protein but suboptimal key micronutrients and essential fatty acids in the intakes

of infants and toddlers from urban settings in malaysia. *Nutrients*, *13*(7). https://doi.org/10.3390/nu13072354

Lauria, F., Dello Russo, M., Formisano, A., De Henauw, S., Hebestreit, A., Hunsberger, M., Krogh, V., Intemann, T., Lissner, L., Molnar, D., Moreno, L. A., Reisch, L. A., Tornaritis, M., Veidebaum, T., Williams, G., Siani, A., & Russo, P. (2021). Ultra-processed foods consumption and diet quality of European children, adolescents and adults: Results from the I.Family study. *Nutrition, Metabolism and Cardiovascular Diseases*, *31*(11), 3031–3043. https://doi.org/10.1016/j.numecd.2021.07.019

Neves, P. A. R., Barros, A. J. D., Baker, P., Piwoz, E., Santos, T. M., Gatica-Domínguez, G., Vaz, J. S., Rollins, N., & Victora, C. G. (2022). Consumption of breast milk, formula and other non-human milk by children aged under 2 years: analysis of eighty-six low- and middle-income countries. *Public Health Nutrition*, *25*(3), 680–688. https://doi.org/10.1017/S1368980020004061

Neves, P. A. R., Vaz, J. S., Maia, F. S., Baker, P., Gatica-Domínguez, G., Piwoz, E., Rollins, N., & Victora, C. G. (2021). Rates and time trends in the consumption of breastmilk, formula, and animal milk by children younger than 2 years from 2000 to 2019: analysis of 113 countries. *The Lancet Child and Adolescent Health*, *5*(9), 619–630. https://doi.org/10.1016/S2352-4642(21)00163-2

Rodríguez-Artalejo, F., López García, E., Gorgojo, L., Garcés, C., Royo, M. Á., Martín Moreno, J. M., Benavente, M., Macías, A., & de Oya, M. (2003). Consumption of bakery products, sweetened soft drinks and yogurt among children aged 6–7 years: association with nutrient intake and overall diet quality. *British Journal of Nutrition*, *89*(3), 419–428. https://doi.org/10.1079/bjn2002787

Spaniol, A. M., da Costa, T. H. M., Souza, A. D. M., & Gubert, M. B. (2021). Early consumption of ultra-processed foods among children under 2 years old in Brazil. *Public Health Nutrition*, *24*(11), 3341–3351. https://doi.org/10.1017/S1368980020004759

Taye, A. A., Asegidew, W., Taderegew, M. M., Bizuwork, Y. G., & Zegeye, B. (2021). Formula feeding practice and associated factors among mothers with infants 0–6 months of age in Addis Ababa, Ethiopia: a community-based cross-sectional study. *Italian Journal of Pediatrics*, *47*(1), 1–9. https://doi.org/10.1186/s13052-021-01010-x

UNICEF. (2021). Fed to Fail: The crisis of children's diets in early life. *Unicef*, 2021 Child Nutrition Report. https://data.unicef.org/resources/fed-to-fail-2021-child-nutrition-report/

Agrawal, S., Kim, R., Gausman, J., Sharma, S., Sankar, R., Joe, W., & Subramanian, S. v. (2019). Socio-economic patterning of food consumption and dietary diversity among Indian children: evidence from NFHS-4. *European Journal of Clinical Nutrition*, *73*(10), 1361–1372. https://doi.org/10.1038/s41430-019-0406-0

Bégin F, Aguayo VM. First foods: Why improving young children's diets matter. Matern Child Nutr. 2017;13(S2):e12528. https://doi.org/10.1111/mcn.12528

Cavassim AF, Taconeli CA, Schmidt ST, Tsupal PA, Almeida CCB (2016) Consumption of processed foods among children under two years of age: Foods' pattern analysis. Integr Food Nutr Metab 3: doi: 10.15761/IFNM.1000151 https://www.oatext.com/pdf/IFNM-3-151.pdf

Chandodkar S. and Shah P, (2017). Mapping food and nutrition security among children age of 7-59 months in rural Vadodara. Department of foods and nutrition Faculty of family and community sciences, The Maharaja Sayajirao University of Baroda, Vadodara.

CNNS. (2019). *Comprehensive National Nutrition Survey*.

Costa CS, Rauber F, Leffa PS, Sangalli CN, Campagnolo PDB, Vitolo MR. Ultra-processed food consumption and its effects on anthropometric and glucose profile: A longitudinal study during childhood. Nutr Metab Cardiovasc Dis. 2019 Feb;29(2):177-184. doi: 10.1016/j.numecd.2018.11.003. Epub 2018 Nov 22. PMID: 30660687.

Dhruv S and Gohil U, (2018). A Cross sectional Study on the Consumption Pattern of Foods High in Fat, Salt and Sugar (HFSS) in adult population of Urban Vadodara. Department of Foods and nutrition Faculty of family and community sciences, The Maharaja Sayajirao University of Baroda, Vadodara.

Gandhi H and Thakur B, (2021) Complementary feeding: comprehensive nutrient gap analysis of children (6-23 months) and capacity building of frontline worker (FLW'S) of selected village of Jamusar block in Bharuch District. Department of Foods and nutrition

Faculty of family and community sciences, The Maharaja Sayajirao University of Baroda, Vadodara.

Hoffman, Daniel & Leffa, Paula & Sangalli, Caroline & Valmórbida, Júlia & Rauber, Fernanda & Vitolo, Márcia. (2020). Ultra-Processed Foods Consumption and Lipid Profile in Brazilian Children. Current Developments in Nutrition. 4. 842-842. 10.1093/cdn/nzaa053_047. file:///C:/Users/admin/Downloads/Ultra-Processed_Foods_Consumption_and_Lipid_Profil.pdf

Houghton, L. A., McIntosh, D. R., Trilok-Kumar, G., Haszard, J. J., & Gibson, R. S. (2020). Suboptimal feeding and caring practices among young Indian children ages 12 to 24 mo living in the slums of New Delhi. *Nutrition*, *69*, 110553. https://doi.org/10.1016/j.nut.2019.110553

Kantawala S and Hardikar A, (2022) Consumption pattern of Ultra-processed foods among 0-24 months children in Urban Surat. Department of Foods and nutrition Faculty of family and community sciences, The Maharaja Sayajirao University of Baroda, Vadodara.

Kantawala S and Pathak R, (2020) Barriers and Facilitators promoting IYCF practices among working mothers in urban Vadodara - A pilot study. Department of foods and nutrition Faculty of family and community sciences, The Maharaja Sayajirao University of Baroda, Vadodara.

Kantawala S and Shah E, (2019) Assessing the Dietary Diversity Score of Complementary foods consumed by children (6-23 months) of Urban Vadodara. Department of foods and nutrition Faculty of family and community sciences, The Maharaja Sayajirao University of Baroda, Vadodara.

Khandpur, N., Neri, D. A., Monteiro, C., Mazur, A., Frelut, M. L., Boyland, E., Weghuber, D., & Thivel, D. (2020). Ultra-Processed Food Consumption among the Paediatric Population: An Overview and Call to Action from the European Childhood Obesity Group. In *Annals of Nutrition and Metabolism* (Vol. 76, Issue 2, pp. 109–113). S. Karger AG. https://doi.org/10.1159/000507840

Mameli, C., Mazzantini, S., & Zuccotti, G. V. (2016). Nutrition in the first 1000 days: The origin of childhood obesity. In *International Journal of Environmental Research and Public Health* (Vol. 13, Issue 9). MDPI. https://doi.org/10.3390/ijerph13090838

Monteiro, C. A., Cannon, G., Lawrence, M., Costa Louzada, M. L., & Machado, P. P. (2019). The NOVA food classification system and its four food groups. In *Ultra-processed foods, diet quality, and health using the NOVA classification system*. http://www.wipo.int/amc/en/mediation/rules

NFHS 5. (2021a). National Family Health Survey (NFHS-5) District Fact Sheet - VADODARA. *Ministry of Health and Family Welfare National*.

NFHS 5. (2021b). National Family Health Survey (NFHS-5) Gujarat 2019-21. *Ministry of Health and Family Welfare National*, 2019–2040. http://www.rchiips.org/nfhs

NFHS 5. (2021c). National Family Health Survey (NFHS-5) India 2019-21. *Ministry of Health and Family Welfare National*, *361*, 2.

UNICEF. (2019). *Children, food and nutrition : growing well in a changing world.*

UNICEF. (2021). Fed to Fail: The crisis of children's diets in early life. *Unicef*, 2021 Child Nutrition Report. https://data.unicef.org/resources/fed-to-fail-2021-child-nutrition-report/

WHO 2021, Obesity and Overweighthttps://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight

ANNEXURES

Annexure 1: Permission Letter of ICDS

VADODARA MUNICIPAL CORPORATION
Health Department – Main Office,
Khaderao Market Building, Rajmahal Road,
Vadodara - 390 001.
Ph.-NO.: 0265-2433116 (Int.293).

H.O.W. No. 874/ – /2022-23.
Date : 14-10- 2022.

To,
Dr. Shruti Kantawala,
Guide & Asst. Professor (CES),
Dept. of Food & Nutrition,
Faculty of Family & Community Sciences,
The M.S. University of Baroda,
Vadodara – 390 002.

Sub. ::- Permission to conduct research in the ICDS set-up of Urban Vadodara.
Ref ::- Your letter No. F.C.Sc./FND/....., Dt. 12/10/2022.

With reference to above cited subject & the matter stated in your letter, a student of Dept. of Food & Nutrition namely - Ms. Vishwa Kalsariya is hereby permitted to conduct research in "Consumption of Ultra Processed food among Children (o-6 years) in Urban Vadodara" from the selected Anganwadi Centres of ICDS Project [Urban Block-I & II] of Vadodara Municipal Corporation during working hours 09=00 AM to 02=00 PM from 21st.. November to 31st.. March-2023.

More-over, pl. note that, the details carried out during this research study must be confidential, not to be published without our prior permission. Vadodara Municipal Corporation will not hold any responsibility for transportation or other expense incurred by you / by the student.

You are requested to submit the detailed study report to our office.

VADODARA MUNICIPAL CORPORATION HEALTH DEPT. VADODARA.

Chief Health Officer
Vadodara Municipal Corporation

Copy to : for information & needful.

[1] Program Officer Shri, ICDS Project [Urban Block-I & II].
[2] CDPO Shri, ICDS Project [Urban Block-I & II].

Annexure 2: IECHR Certificate

Institutional Ethics
Committee for Human
Research
(IECHR)

FACULTY OF FAMILY AND COMMUNITY SCIENCES
THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA

Ethical Compliance Certificate 2022 – 2023

This is to certify that Ms. Vishwa Kalsariya's study titled, "**Consumption of Processed Food among Children (0-6years) in Urban Vadodara**" from Department of Foods and Nutrition has been approved by the Institutional Ethics Committee for Human Research (IECHR), Faculty of Family and Community Science, The Maharaja Sayajirao University of Baroda. The study has been allotted the ethical approval number **IECHR/FCSc/MSc/2022/35.**

Prof Mini Sheth
Member Secretary
IECHR

Prof Shagufa Kapadia
Chairperson
IECHR

Annexure 3: Questionnaire

Name of Investigator: Date of Survey:

Personal Information

1) Name of Mother
2) Age of Mother
3) Religion

1. Hindu
2. Muslim
3. Jain
4. Christian
5. Other (specify)

4) Caste

1. SC
2. ST
3. OBC
4. General

5) Type of family

1. Nuclear
2. Joint
3. Extended

6) Total no. of family member
7) Total no. of children
8) Educational Qualification

1. Profession or Honors
2. Graduate
3. Intermediate or diploma
4. High school certificate
5. Middle school certificate
6. Primary school certificate
7. Illiterate

9) Occupation

1. Legislators, Senior Officials & Managers
2. Professionals
3. Technicians and Associate Professionals
4. Clerks
5. Skilled Workers and Shop & Market SalesWorkers
6. Skilled Agricultural & Fishery Workers
7. Craft & Related Trade Workers
8. Plant & Machine Operators and Assemblers
9. Elementary Occupation
10. Unemployed

10) Other source of income

1. Agriculture
2. Poultry
3. House/Shop rent
4. None
5. Other (specify)

11) Total monthly income of the family
12) No. of earning member in the family
13) Living in a type of house

1. Own house
2. Rented/Govt. house
3. Other

14) Is there toilet facility available in the household?

1. Yes
2. No

15) What kind of mass media do the members of household usually use? (Multiple responses)

1. TV
2. Radio…
3. News paper
4. Mobile phone
5. All of the above

Obstetric Information of Respondent

16) Type of current delivery

1. Normal
2. Caesarean

17) Outcome of current delivery

1. Full-term
2. Preterm

18) Place of delivery

1. At private hospital
2. At govt. hospital
3. Home
4. Other

19) How many ANC you attained?

1. Less than 4
2. 4
3. More than 4
4. Don't know

20) Did you receive counselling about Feeding practices during ANC?

1. Yes
2. No

21) Have you received post-natal care?

1. Yes
2. No

22) How many times you were gone for PNC?

23) Did you get information about proper child feeding practices during PNC follow up?

1. Yes
2. No

Child Information:

24) Name of child

25) Gender of child

1. Male
2. Female
3. Other

26) Age of child (in month) / Birth date of child

27) Birth weight of child

28) Birth order of child

29) Anthropometric measurements

Weight: ……kg Length: …….cm

Breastfeeding Information

30) Did you face any difficulty while breastfeeding your baby?

1. Yes
2. No

31) Did you give colostrum to the child?

1. Yes
2. No

If no, why?

32) When was breastfeeding initiated after birth?

1. Same day within 1 hour of birth
2. Same day after 1 hour
3. 2nd -3rd day
4. After 3 days

33) Till what age was the child exclusively breastfed (not even water)?

1. Upto 6 months
2. < 6 months
3. > 6 months

34) Did you give anything else during 6 months apart of breast milk?

1. Yes
2. No

If yes, what did you give? Why?

Complimentary feeding Information

35) At which month you introduced top feed or complementary feed?

1. At Completion of 6 months
2. Before 6 months
3. After 7 month
4. Not started yet

36) How many times you give complementary feed in a day?

Is the child still breast-fed?

1.
2. Yes
3. No

If yes, how many times?

37) Is the child receiving solid, semi-solid or mashed foods along with breast milk?

1. Yes
2. No

38) Do you blend the food before giving it to the child?

1. Yes
2. No

If no, why has complementary feedingnot started?

1. Is still fed only breast-milk
2. Cannot digestfoods
3. Does not like to eat
4. Others

39) How much is the child fed at one time?

1. 1 tbsp
2. 1/4th cup
3. ½ cup
4. 1 cup

40) What is the consistency of the complementary food?

1. Thin
2. Medium
3. Thick

41) What type of top milk is given to the child?

1. Gold
2. Shakti
3. Slim and trim
4. Cow's milk
5. Buffalo's milk

42) What is the amount of milk given to the child?

1. < 1 cup
2. 1 cup
3. 2 cup
4. >= 4 cups

43) Does the child eating any ready to eat nutrition supplements?

1. Yes
2. No

Specify:

44) Does the child eating any ready to eat market products?

1. Yes
2. No

Specify:

45) Do you eat vegetarian food or other?

1. Vegetarian
2. Vegan
3. Non vegetarian

46) No. of eggs given to the child

47) Which part of the egg is fed to the child?

1. White
2. Egg yolk
3. Both

<u>Sanitation, Hygiene, Child care practices</u>

48) Do you wash hands with soap? (Multiple response)

1. Before cooking
2. After cooking
3. Before feeding the child
4. After feeding the child
5. After cleaning the child'sfaeces

49) For how long you store cooked complementary foods?

1. Not storing
2. For 2 – 3 hours
3. More than 4 hours
4. More than 1 day

50) When do you cut your vegetables?

1. Before washing
2. After washing

51) How do you keep your salt container?

1. Covered
2. Not covered

52) Do you soak pulses before cooking?

1. Yes
2. No

53) Do you add extra fats, oils, sugar and jegarry after preparing complementary foods?

1. Yes
2. No

<u>Supplementary Nutrition from ICDS Sector:</u>

54) Do you get Bal Shakti?

1. Yes
2. No

If no, why

55) How often do you get Bal Shakti?

1. Once a month
2. Twice a month
3. Thrice a month

56) How many packets are received in a month?

57) Do you receive it regularly?

1. Yes
2. No

58) Does your child consume it regularly?

1. Yes
2. No

59) How are the packets consumed?

1. Solely by child
2. Shared by siblings
3. Shared by other family members
4. Others

60) Does your child like the taste?

1. Yes
2. No

61) In which form do you give Bal Shakti?

62) Do you find any benefit in your child consuming Bal Shakti?

1. Yes
2. No

Immunization Schedule:

Vaccine Name	Y/N
BCG	
Hepatitis B	
OPV – 0	
OPV 1,2 & 3	
DPT 1,2 & 3	
Hep B 1,2 & 3	
Measles 1st dose	
Vitamin A (1st dose)	
DPT booster	
Measles 2nd dose	
OPV booster	
Vitamin A (2nd to 9th dose)	

Morbidity Profile:

Illness/ Disease	Presence in last 15 days (Y/ N)
Fever	
Diarrhea	
Acute respiratory Infection (ARI)	
Measles	

Food frequency:

Food Item	Daily	4-5 times a week	Thrice a week	Once a week	Once in10 days	Once in15 days	Once in a month	Occasionally	Never
Unprocessed or minimally processed foods									
Grains									
Millets									
Pulses									
Nuts and seeds									
Green leafy vegetables									
Vitamin A rich fruits and vegetables									
Other fruits									
Other vegetables									
Roots, tubers									
Milk									
Tea									
Coffee									
Curd									
Butter milk									
Meat, poultry and fish									
Processed foods									
Oats									
Flacks (corn, wheat)									
Maida									
Unpacked bun									
Packaged milk									
Skimmed Milk									
Cheese									
Panner									
Channa									
Packed fruit juice									

Processed culinary ingredients									
Cooking oil									
Hydrogenated oil									
Sugar									
Honey									
Butter									
Ghee									
Ultra-processed foods									
Infant formula									
Cereal									
Bread									
Buns									
High in Fats									
Mayo									
Sev									
Chips, Kurkure									
Choda Fadi, mathiya									
Papdi/ gathiya									
Namkeen/ chavanu									
High in Sugar									
Homemade sweets									
Ready to eat sweets									
Sweet bun									
Cream roll									
Ice-cream									
Cakes/ Pastry									
Cookies/ Khari/ Toast									
Chocolates, Candies									
Carbonated soft drinks									
Health drinks (Bournvita, Horlicks)									
High in Salt									
Pickle									
Papad									
Bhungla									

Instant soup									
Instant sauces									
Commonly consumed foods									
Sev mamra/ Papad Poha									
Puff									
Samosa									
Pani puri									
Vada Pav									
Sev usal									
Pav bhaji									
Dabeli									
Pune Misal									
Khaman									
Chinese									
Pizza/ Burger									
Instant noodles (maggie)									
Sakarpara									
Methi Puri/ Chakri/ Mathri									
Sukhadi									
Chikki									
Kacchariyu									

DDQ FOR IYCF INDIA			
		(circle answer)	
1	Was [NAME] ever breastfed?	YES or NO	DON'T KNOW (DK)
2	How long after birth was [NAME] first put to the breast?		
	If immediately, circle "000"	000	
	If less than one hour, record "00" hours		
	If less than 24 hours, record hours		
	Otherwise, record days		
3	In the first 2 days after delivery, was [NAME] given anything other than breastmilk to eat or drink – anything at all like water, infant formula or baby milk, honey, sugar water, or gripe water?	YES or NO	DK
4	Was [NAME] breastfed yesterday during the day or at night?	YES or NO	DK
5	Did [NAME] drink anything from a bottlewith a nipple yesterday during the day or at night?	YES or NO	DK

6	Now I would like to ask you about liquids that [NAME] may have had yesterday during the day or at night. Please tell me about all drinks, whether [NAME] had them at home, or somewhere else. Yesterday during the day or at night, did [NAME] have...		
6 A	Plain water?	YES or NO	DK
6B	Infant formula or baby milk such as Amul, Lactogen, or Dexolac?	YES or NO	DK
6 B num	IF YES: How many times did (NAME) drink infant formula? (IF 7 OR MORE TIMES, RECORD '7').	#	DK
6C .25	Milk from animals including fresh, packaged, or or powdered?	YES or NO	DK
6 C num	IF YES: How many times did (NAME) drink milk? (IF 7 OR MORE TIMES, RECORD '7').	#	DK
6C swt.26	IF YES: Was any of the milk a sweet or flavoured type of milk?	YES or NO	DK
6 K	N/A	YES or NO	DK
6 Kswt	N/A	YES or NO	DK
6E	Bournevita, Horlicks, or Boost?	YES or NO	DK
6F .27	Fruit juice, packet juice such as Rasna or Frooti, sugarcane juice, or nannari sarbath?	YES or NO	DK
6 G. 28	Soft drinks such as Sprite, Pepsi, Mirinda, or energy drinks?	YES or NO	DK
6 H	Tea, coffee, or herbal drinks?	YES or NO	DK
6 Hswt .26	IF YES: was the drink sweetened?	YES or NO	DK
6I	Clear broth or clear soup?	YES or	DK

		NO	
6J	Any other liquids?	YES or NO	DK
	IF YES: What was the liquid or what were the liquids?		
6Jswt	IF YES: Was the drink sweetened?	YES or NO	DK
7	Now I would like to ask you about foods that [NAME] had yesterday during the day or at night. I am interested in foods your child ate whether at home or somewhere else. Please think about snacks and small meals as well as main meals. I will ask you about different types of foods, and I would like to know whether your child ate the food even if it was combined with other foods. Please do not answer 'yes' for any food or ingredient used in a small amount to add flavour to a dish. Yesterday during the day or at night, did [NAME] eat:		
7.15	Curd, lassi, buttermilk, or raita?	YES or NO	DK
7.15num	IF YES: How many times did (NAME) have curd, lassi, buttermilk, or raita?	#	DK
6D	IF YES: Did (NAME) have any lassi or buttermilk to drink?	YES or NO	DK
6Dswt	IF YES: Was it a sweet type of drink?	YES or NO	DK
	Yesterday, did [NAME] eat any of the following foods:		
7.1	Rice, idli, dosa, poha, naan, kulcha, paratha, upma, Cerelac, or Farex?	YES or NO	DK
7.2.1	Chapati, roti, dalia, roasted maize?	YES or NO	DK
7.2.2	Pearl millet, finger millet, or ragi malt?	YES or NO	DK
7.3	Potato, sweet potato, turnip, arum root, tapioca, or raw banana?		
7.4	Daal, sambar, chickpeas, kidney beans, soya, or khichdi?	YES or NO	DK
	Yesterday, did [NAME] eat any of the		

	following vegetables:		
7.5	Carrots, or pumpkin that is orange inside?	YES or NO	DK
7.6.1	Mustard leaves, spinach, radish leaves, cassava leaves, taro leaves, drumstick leaves, amaranth leaves, or wild greens/other greens?	YES or NO	DK
7.7.1	Tomatoes, eggplant, okra/lady finger, French beans, cauliflower, cabbage, or beetroot?	YES or NO	DK
7.7.2	Bitter gourd, bottle gourd, pointed gourd, ivy gourd, apple gourd, ridged gourd, or snake gourd?	YES or NO	DK
7.7.3	Cucumber, radish, capsicum, German turnip, or drumstick?	YES or NO	DK
	Yesterday, did [NAME] eat any of the following fruits:		
7.8	Ripe papaya, ripe mango, orange musk melon, or apricots?	YES or NO	DK
7.9	Orange, tangerine, or grapefruit?	YES or NO	DK
7.10.1	Ripe banana, apple, pear, watermelon, guava, custard apple, pomegranate, or pineapple?	YES or NO	DK
7.10.2	Grapes, kiwi, peaches, jackfruit, chickoo, jamun, palmyra palm fruit, or other wild fruits?	YES or NO	DK
	Yesterday, did [NAME] eat any of the following sweets:		
7.11	Cakes, cream biscuits, biscuits, suji halwa / kesari bath, jalebi, or ladoo?	YES or NO	DK
7.12	Other mithai, rice pudding, kulfi, ice cream, milkshake, toffees, or chocolates?	YES or NO	DK
	Yesterday, did [NAME] eat any of the following foods of animal origin:		
7.13	Eggs?	YES or NO	DK
7.14	Paneer or cheese?	YES or NO	DK
7org	Liver or kidney?	YES or NO	DK
7.16	Sausages or salami?	YES or NO	DK
7.17	Mutton, beef, or lamb?	YES or NO	DK
7.1	Pork or wild meat?	YES or	DK

8		NO	
7.19	Chicken, duck, or turkey?	YES or NO	DK
7.20	Fish, prawn, crab, or seafood?	YES or NO	DK
7insect	Termites, ants, or locusts?	YES or NO	DK
	Yesterday, did [NAME] eat any of the following other foods:		
7.21	Peanuts, cashews, almonds, pistachios, walnuts, pumpkin seeds, or sunflower seeds?	YES or NO	DK
7.22	Potato chips, namkeen or mixture?	YES or NO	DK
7.23	Instant noodles such as Maggi noodles or Wai Wai?	YES or NO	DK
7.24	Samosa, pakora, puri, vada, mathri, kachori, murukku, or bonda?	YES or NO	DK
7red	N/A	YES or NO	DK
7R	Any other solid, semi-solid, or soft food?	YES or NO	DK
	IF YES: What was the food?		
	Yesterday, did [NAME] eat food from any place like...		
7.29	McDonald's, KFC, Pizza Hut, Domino's, Burger King, or other places that serve pizza or burgers?	YES or NO	DK
CHECK	*Note for interviewer: If not a single "yes" for foods is recorded, ask 7S.*		
	If at least one "yes" for foods, skip to 8.		
7S	Did [NAME] eat any solid, semi-solid, or soft food yesterday during the day or night?	YES or NO	DK
8	How many times did [NAME] eat any solid, semi-solid or soft foods yesterday during the day or night? If 7 or more times, record "7"	#	DK

DDQ FOR INDIA		
	Yesterday, did you eat any of the following foods:	(circle answer)
1	Rice, idli, dosa, poha, naan, kulcha, paratha, or upma?	YES or NO
2.1	Chapati, roti, dalia, or roasted maize?	YES or NO

2.2	Pearl millet or finger millet?	YES or NO
3	Potato, sweet potato, turnip, arum root, tapioca, or raw banana?	YES or NO
4	Daal, sambar, chickpeas, kidney beans, soya, or khichdi?	YES or NO
	Yesterday, did you eat any of the following vegetables:	
5	Carrots, or pumpkin that is orange inside?	YES or NO
6.1	Mustard leaves, spinach, radish leaves, cassava leaves, taro leaves, drumstick leaves, amaranth leaves, or wild greens/other greens?	YES or NO
7.1	Tomatoes, eggplant, okra/lady finger, French beans, cauliflower, cabbage, or beetroot?	YES or NO
7.2	Bitter gourd, bottle gourd, pointed gourd, ivy gourd, apple gourd, ridged gourd, or snake gourd?	YES or NO
7.3	Cucumber, radish, capsicum, German turnip, or drumstick?	YES or NO
	Yesterday, did you eat any of the following fruits:	
8	Papaya, mango, orange musk melon, or apricots?	YES or NO
9	Orange, tangerine, or grapefruit?	YES or NO
10.1	Ripe banana, apple, pear, watermelon, guava, custard apple, pomegranate, or pineapple?	YES or NO
10.2	Grapes, kiwi, peaches, jackfruit, chickoo, jamun, palmyra palm fruit, or other wild fruits?	YES or NO
	Yesterday, did you eat any of the following sweets:	
11	Cakes, cream biscuits, biscuits, suji halwa / kesari bath, jalebi, or ladoo?	YES or NO
12	Other mithai, rice pudding, kulfi, ice cream, milkshake, toffees, or chocolates?	YES or NO
	Yesterday, did you eat any of the following foods of animal origin:	
13	Eggs?	YES or NO
14	Paneer or cheese?	YES or NO
15	Curd, lassi, buttermilk, or raita?	YES or NO
16	Sausages or salami?	YES or NO
17	Mutton, beef, lamb, or liver?	YES or NO
18	Pork or wild meat?	YES or NO
19	Chicken, duck, or turkey?	YES or NO
20	Fish, prawn, crab, or seafood?	YES or NO
	Yesterday, did you eat any of the following other foods:	
21	Peanuts, cashews, almonds, pistachios, walnuts,	YES or NO

	pumpkin seeds, or sunflower seeds?	
22	Potato chips, namkeen or mixture?	YES or NO
23	Instant noodles such as Maggi noodles or Wai Wai?	YES or NO
24	Samosa, pakora, puri, vada, mathri, kachori, murukku, or bonda?	YES or NO
	Yesterday, did you have any of the following beverages:	
25	Milk, flavoured milk, chai with milk, or coffee with milk?	YES or NO
26	Tea with sugar, coffee with sugar, milk with sugar, flavoured milk, Bournevita, Horlicks, or Boost?	YES or NO
27	Fruit juice, packet juice such as Rasna or Frooti, sugarcane juice, or nannari sarbath?	YES or NO
28	Soft drinks such as Sprite, Pepsi, Mirinda, or energy drinks?	YES or NO
	Yesterday, did you get food from any place like...	
29	McDonald's, KFC, Pizza Hut, Domino's, Burger King, or other places that serve pizza or burgers?	YES or NO

Annexure 4: Consent Form

DEPARTMENT OF FOODS AND NUTRITION
FACULTY OF FAMILY & COMMUNITY SCIENCES
THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA

VADODARA 390 002 - INDIA

Information Letter

I, Vishwa Kalsariya a student of Sr. M.Sc. in Dept of Foods and nutrition at The Maharaja Sayajirao University carrying out research under the guidance of Dr. Shruti Kantawala
The proposed topic of my research is "Consumption of Processed Food among Children (0-6 years) in Urban Vadodara". This letter contains the information regarding the research.

We are carrying out research in which we want to study the consumption of processed foods among children 0-6years of age in Urban Vadodara. With the help of an interview, I will ask you some questions, answers of which will be noted. The questions will be regarding socio-economic status, diet diversity, feeding practices, immunization and morbidity profile. I will measure the height and weight of the child. If you do not want to answer certain questions or do not want to disclose certain information, then you are free to omit them.

The information given by you will be confidential and used only for study purpose.

At the end of the research, the results will be shared with you. By taking part in this research, no remuneration will be provided to child, neither would it harm child.

We thank you for your willingness and participation in this research.

By

(Guide) (Student)

Dr. Shruti Kantawala (+919898516439) Vishwa Kalsariya (+91 6354332391)

Department of Foods and Nutrition, The Maharaja Sayajirao University of Baroda

DEPARTMENT OF FOODS AND NUTRITION
FACULTY OF FAMILY & COMMUNITY SCIENCES
THE MAHARAJA SAYAJIRAO UNIVERSITY OF BARODA
VADODARA 390 002 - INDIA

सत्यं शिवं सुन्दरम्
Estd. 1949
Accredited Grade "A+" by NAAC

માહિતી પત્ર

િું, હિશ્વા કલસહિયા હ સ્ટહિયિ M.Sc.િી હિદ્યાRીિી. મિાિાજા સયાજીિાિ યુહિહસિટીમાું ખોિાક અિે પોષણ હિભાગમાું ડૉ. Rુહત કાુંટાિાલાિા માગિદર્િિ િેઠળ સુંર્ોધિ કિી હિહ્યા છે. માિા સુંર્ોધિિો સૂહત હિષય છે "ર્િેિી િડોદિામાું બાળકો (0-6 િષિ)માું પ્રોસેસ્ડ ફૂડિો િપિાર્". આ પત્રમાું સુંર્ોધિ સુંબુંહધત માહિતી છે. અમે સુંર્ોધિ કિી હિહ્યા છીએ જમાું અમે ર્િેિ િડોદિામાું 0-6 િષિિી િયિા બાળકોમાું પ્રોસેસ્ડ ફૂડિા િપિાર્િો અભ્યાસ કિિા માુંગીએ છીએ. ઇન્ટિવ્યુિી મદદRી, િું તમિે કેટલાક પ્રશ્નો પૂછીર્, જિા જિાબો િોધિામાું આિર્ે. પ્રશ્નો સામાહજક-આહRિક હ સ્Rહત, આિાિિી હિહિધતા, ખોિાક આપિાિી પદ્ધહતઓ, િોગપ્રહતિક્ષા અિે િોહગષ્ઠતા પ્રોફાઇલિે લગતા િર્ે. િું બાળકિી ઊું િાઇ અિે િજિ માપીર્. જો તમે અમુક પ્રશ્નોિા જિાબ આપિા માુંગતા િRી અRિા અમુક માહિતી જાિેિ કિિા માુંગતા િRી, તો તમે તેિે છોડી દેિા માટે સ્િતુંત્ર છો. તમાિા દ્વાિા આપિામાું આિેલી માહિતી ગોપિીય િિેર્ે અિે તેિો ઉપયોગ ફક્ત અભ્યાસ હેત માટે જ કિિામાું આિર્ે. સુંર્ોધિિા અુંતે, પહિણામો તમાિી સાRે ર્ેિ કિિામાું આિર્ે. આ સુંર્ોધિમાું ભાગ લેિાિRી, બાળકિે કોઈ મિેિતાણુું આપિામાું આિર્ે િિી, િ તો તેિાRી બાળકિે િુકસાિ Rર્ે.
આ સુંર્ોધિમાું તમાિી ઈચ્છા અિે સહભાહગતા બદલ અમે

તમાિો આભાિ માિીએ છીએ. દ્વાિા,

(માગિદર્િિ) (હિદ્યાRી)

ડૉ. Rુહત કાુંટાિાલા (+919898516439) હિશ્વા કલસહિયા (+916354332391)

ખાદ્ય અિે પોષણ હિભાગ, મિાિાજા સયાજીિાિ યુહિહસિટી ઓફ બિોડા.

CONSENT FORM

I am there by ready to allow participation in this question. I have understood that in this interview, I will answer certain questions. I have read all the information regarding this research or the information has been read out to me. I have got opportunity to ask question regarding the same and I have got satisfactory answers to my question.
Therefore, I willingly consent to participate.

Name :

Gender:

Date :

Age:

Mo No.:

Signature of the parent

સંમતિપત્રક

િંુ મ◌ાિ◌◌ા બ◌ાળકિ◌ે આ સુંર◌્◌ોધિમ◌ાુ◌ં ભ◌ાગ લેગ◌ા અિ◌મહ્ત આપ છુ◌ં . મ◌ાિ◌ે આ ઇન્ટિ◌વ◌્યમ◌ાુ◌ં કટુ◌ંબ હિ◌ર્◌ે િ◌◌ી સ◌ામ◌ાન્◌્ય મ◌ાહિ◌ત◌ી આપિ◌◌ાિ◌◌ી િ◌િ◌◌ેર્◌ે અિ◌ે મ◌ાિ◌◌ા બ◌ાળકિ◌ િ◌જિ◌ અિ◌ે ઉિ◌◌ાઇિ◌ મ◌ાપ આપિ◌◌ાિ◌ િ◌િ◌◌ેર◌્. મેં આ સુંર◌્◌ોધિ◌ સુંબુંહધત તમ◌ામ મ◌ાહિ◌ત◌ી િ◌◌ાિ◌◌ી છ◌ે. મિ◌ે આ અુંગે પ્રશ્નો પછિ◌◌ાિ◌◌ી તક મળી છ◌ે અિ◌ે મિ◌ે મ◌ાિ◌◌ા પ્રશ્ન◌ોિ◌◌ા સુંત◌ોષક◌ાિ◌ક જિ◌◌ાબો મળ્યા છે.

ત◌ેR◌ી િ◌ુ◌ં સ◌્િ◌ેચ◌્છ◌ાએ ભ◌ાગ લેિ◌◌ા મ◌ાટ◌ે અિ◌્મહ્ત આપ છુ◌ં.

િ◌◌ામ:

ઉમિ:

જાહત:

મ◌ો. િ◌.:

ત◌ાિ◌◌ીખ:

િ◌◌ાલ◌ીિ◌◌ી સિી