ASSESSING THE PREVALENCE AND FACTORS ASSOCIATED WITH MODERATE ACUTE MALNUTRITION AMONG CHILDREN 0-59 MONTHS IN URBAN SLUMS OF VADODARA.

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PGDIPLOMA IN

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CERTIFICATE

CERTIFICATE

This is to certify that the research work presented is this thesis has been carried out independently by Ms. Tanvi Prajapati under the guidance of Dr. Shruti Kantawala in pursuit of a master degree in food and nutrition (diet) and this is her original work.

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Tanvi Prajapati

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ABRREVIATIONS

IYCF	-	Infant And Young Child Feeding
MAM	-	Moderate Acute Malnutrition
SES	-	Socioeconomic Status
UNICEF	-	United Nations Children's Fund
ARI	-	Acute Respiratory Illness
AWCs	-	Anganwadi Centre
CF	-	Complementary Food
DQQ	-	Diet Quality Questionnaire
EBF	-	Exclusive Breast Feeding
HAZ	-	Height For Age Z-score
ICDS	-	Integrated Child Development services
MAM	-	Moderate Acute Malnutrition
MDD	-	Minimum Dietary Diversity
MUAC	-	Mid Upper Arm Circumference
MUAC	-	Mid- Upper Arm Circumference
NFHS	-	National Family Healthy Survey
NFHS	-	National Family Health Survey
RUSF	-	Ready-to-supplementary food
RUTF	-	Ready-to-use therapeutic food
SAM	-	Severe Acute Malnutrition
THR	-	Take Home Ration
WASH	-	Water, Sanitation, and hygiene
WAZ	-	Weight For Age Z-scores
WHO	-	World Health Organization
WHZ	-	Weight For Height Z-scores

ABSTRACT

ABSTRACT

Background : The goal of the current study was to identify the prevalence of undernutrition in children between the ages of 6 and 59 months and to determine age-specific Mid Upper Arm Circumference cut offs for identifying moderate acute malnutrition and severe acute malnutrition in the urban Vadodara area. Children who eat well and stay healthy are less likely to develop chronic diseases. For the first six months of a child's life, breastfeeding gives them the best nutrition and helps keep them healthy. Additionally, age-appropriate supplemental feeding can help prevent stunting and its associated disease load. A child's risk of both acute and chronic malnutrition may rise as a result of an inadequate diet. Micro and macronutrients from complementary foods from various food groups are essential for growth and development. Dietary diversity is a good indicator of how well-balanced a person's diet is in terms of nutrients. Inadequate nutritional intake in newborns and young children is a result of improper feeding techniques. Food resources are unavailable and poorly utilized due to inadequate knowledge, harmful beliefs, and practices.

Methodology: In Vadodara's urban area, a cross-sectional study was carried out. The investigation was divided into two phases. In phase 1, nine AWCs were randomly chosen from each zone, and anthropometric measurements including weight, height, and MUAC were taken. All 6 to 59-month-old children registered in the anganwadi were included in the study, The MUAC was then mapped using a cut-off between 11.5 cm and 12.5 cm, and the SAM (-3 SD) was mapped using WHZ. phase 2: Every youngster who was classified as MAM, or moderately wasting, was enrolled and mothers of MAM children were questioned about the family's history, diet diversity, IYCF practices, immunization status, and morbidity profile.

Results : Highest prevalence of wasted children were seen at age 48-60 months. In youngsters, MAM prevalence was 10.3% and SAM prevalence was 2.2%. Of the children, 33.2% were at risk for acute malnutrition. Only 51.5% of the children that underwent screening had normal WHZ. Following 0-6 months (10%) and 7-35 months (9%), children aged 36-59 months (12%) had the highest incidence. Children 0 to 6 months old had the highest prevalence and risk of being overweight. MUAC in youngsters, MAM prevalence was 8.1% and SAM prevalence was 1.1%. SAM (prevalence 0.7% in boys vs 1.5% in girls) and MAM (prevalence 7.2% in boys vs 9.0% in girls) were more common in girls than in boys. But this distinction lacked statistical significance.

Twenty-four percent (22.4%) of the kids were at risk for stunting. According to the secondary data, only 23.9% of the children that were screened showed normal HAZ. Males are more likely to be severely stunted than girls, while girls are more likely to be moderately stunted. Boys and girls were almost equally likely to be underweight and potentially overweight. As a result, there was no discernible difference between boys and girls in the prevalence of underweight. Children aged 36–59 months had the highest prevalence of severe underweight and moderate underweight (6% and 27%, respectively), followed by those aged 7–35 months (5% and 20%, respectively). Thus, it may be concluded that underweight prevalence rose with age. The majority belonged to the upper lower class (50%) and lower middle class (47%), respectively, according to Kuppuswami's categorisation. It is possible to access and use "Bal shakti" (THR), which the ICDS offers for kids aged 6-59 months. When they are younger than 6 months old, newborns receive matrushakti for mother rather than Bal shakti from the AWCs, whereas children older than 3 years old receive hot, cooked meals from the AWCs. All newborns received a complete BCG vaccination after birth. Acute respiratory infections in children within the previous 15 days (41.1%) were considerably more prevalent in children with fever within the previous two weeks (21.2%). Additionally, diarrhea and vomiting affect children (2.6%). None of the kids had malaria or the measles in the previous 15 days. Eighty-three percent of the youngsters consumed pulses, fourteen percent consumed nuts and seeds, nine percent consumed eggs, and eight percent consumed other non-vegetarian items such meat, fish, and fowl. Cereals, white roots and tubers (96%) and pulses, legumes, nuts, and oilseeds (90%) were the most often consumed food categories when seven food groups were used to assess the quality of children's meals. A study of their ages revealed that six infants younger than six months were given supplemental nutrients even before they were born. 57% of the 230 kids, or more than half of them, were breastfed within an hour of birth and 29% during the first day. 9%, 3%, and 2% of infants were nursed after 24, 48, and 72 hours of birth, respectively. The IYCF indicators for babies and young children (0–23 months). Only 57.9% of mothers who started breastfeeding sooner continued nursing for the full 12 to 23-month period, despite the fact that 99.1% of children who have ever nursed did so.

Conclusion

A child is predisposed to acute malnutrition by being younger in age, growing up in a small nuclear household, having less educated parents, having a poorer job of the family's head, and having a lower socioeconomic level.

Childcare and feeding practices were the main factors influencing the prevalence of acute malnutrition. Improved food security, integrated programming, social and behaviour change

communication techniques aimed at families at risk of undernutrition are all advised to prevent acute malnutrition.

INTRODUCTION

INTRODUCTION

Nutrition during childhood is the foundation of a healthy life for human beings. Optimum nutrition during early childhood ensures optimum growth, immunity, health and wellbeing not only during childhood but also in later stages of life. Nutritional well-being among people is a key to human resource development of nations. The growth of a country's human resources depends on the nutritional health of its citizens. Imbalance in the intake and utilisation of nutrients result in the problem of malnutrition. Malnutrition is a multifaceted concept referring to an array of conditions including undernutrition (acute and chronic malnutrition and micronutrient deficiencies) and overnutrition (overweight and obesity).

Malnutrition is a problem of public health concern in various parts of the world that compromises the quality of life of people. As reported in the Global Burden of Disease Study (1990-2017) carried out by India State-Level Disease Burden Initiative Malnutrition Collaborators, malnutrition was the leading cause of health loss for all age groups, accounting for 17.3% of all disability-adjusted life years (DALYs) in India in 2017. It also accounted for 68.2% of all deaths in children under the age of five.

Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. It covers 2 broad groups of conditions, i.e., 'undernutrition' and 'overnutrition' (WHO, 2019). Undernutrition includes stunting (where one is of low height for age z-score/percentile), wasting (where one is of low weight for height z-score/percentile), underweight (where one is of low weight for age z-score/percentile) and micronutrient deficiencies or insufficiencies (a lack of important vitamins and minerals). On the other hand, 'overnutrition' is characterized by overweight, obesity and diet-related NCDs (such as heart disease, stroke, diabetes, and cancer).

Insufficient dietary consumption of energy and protein results in the condition known as acute malnutrition. As defined by the American Society of Parenteral and Enteral Nutrition (ASPEN), "pediatric malnutrition (undernutrition) is defined as an imbalance between nutrient requirement and intake, resulting in cumulative deficits of energy, protein, or micronutrients that may negatively affect growth, development, and other relevant outcomes." (Mehta et al. 2013)

One of India's biggest barriers to human development is malnutrition, which is a silent crisis. Malnutrition, which can be either over- or under-nutrition, results due to the insufficient or inappropriate consumption of nutrients. Undernutrition is more common in rural and tribal

communities, whereas overnutrition is more common in metropolitan populations. However, double burden of malnutrition i.e.- undernutrition and overnutrition affects children in urban, rural and tribal areas. All age groups are affected by malnutrition, but children are more likely to experience undernutrition. Early childhood nutrition is crucial because it's necessary for development and growth. In contrast to child malnutrition, which contributes to a cycle of poor health and poverty and has a direct impact on the economic growth and development of the nation, children who receive proper nourishment develop into productive adults who uplift their communities and contribute to economic prosperity.

Malnutrition can be acute or persistent or chronic. In children, acute malnutrition causes underweight and wasting while chronic malnutrition causes stunting. Moderate and Severe Acute Malnutrition are additional categories for acute malnutrition. According to UNICEF (2006), people who are undernourished are unable to sustain their natural biological functions like growth, disease resistance, recovery from infection, learning, and physical labour.

Factors such as inadequate infant and young child feeding practices, particularly the absence of optimum breastfeeding and responsive complementary feeding, as well as diseases including diarrhoea, malaria, and HIV/AIDS often result in malnutrition. A malnourished child's immune system is weakened and their cognitive development is compromised, making them more susceptible to illness and having a lower chance of surviving (Black et al., 2008; Liu et al., 2012). Child undernutrition can damage a nation's productivity, and failing to address malnutrition results in lowered potential economic growth, according to a 2015 World Bank report.

The conceptual framework of malnutrition given by UNICEF is shown on figure 1.1. As depicted in the framework, inadequate dietary intake of nutrients and diseases, especially infectious diseases are the immediate causes of malnutrition. Factors such as insufficient access to food, improper maternal and child care practices as well as poor sanitation, hygiene and inadequate health services are the underlying causes of malnutrition which lead to inadequate dietary intakes and illnesses, eventually resulting in malnutrition. These are the household level factors which are influenced by societal factors namely quality and quantity of human, economic and organisational resources. These causes result in compromised nutrition of individuals and contribute to high prevalence of undernutrition at population level.

Undernutrition dramatically raises the risk of contracting infectious diseases. This affects the children more than other groups, especially in underdeveloped and developing nations. In underdeveloped nations, malnutrition contributes to half of the deaths caused by infectious diseases in children under the age of five. An individual's loss of energy due to infection keeps

Figure 1. 1: Conceptual Framework of Malnutrition

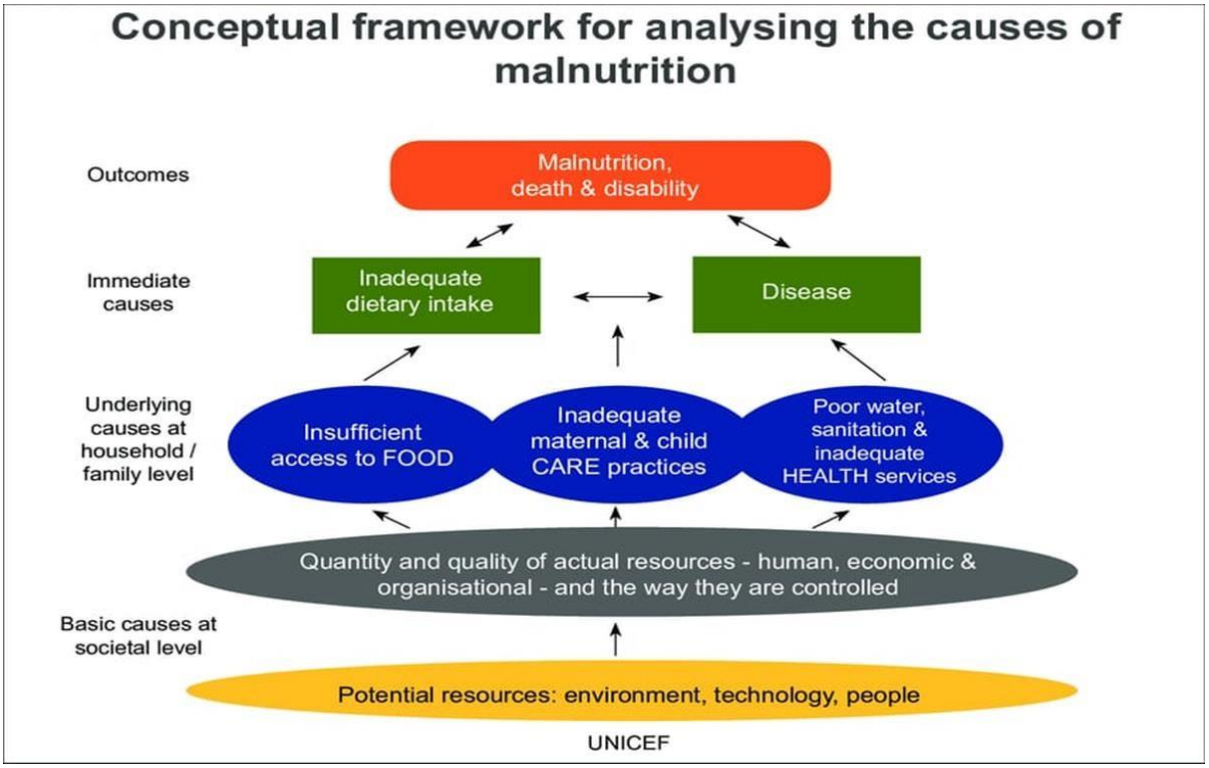
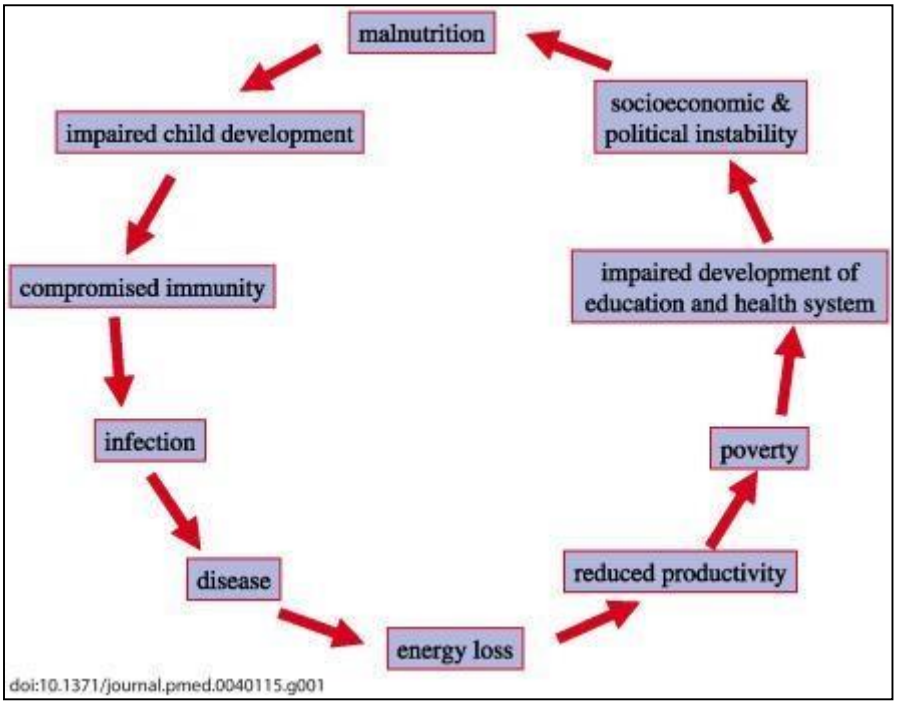


Figure 1. 2: The Vicious Cycle: Malnutrition, Infection and Poverty



Source: (Schaible and Kaufmann, 2007)

the vicious cycle of malnutrition, infectious diseases, and poverty going. This affects productivity and development at population level. (Figure 1.2) (Schaible and Kaufmann, 2007)

Any improvement in these factors leads to improved health, wellbeing and nutrition status but if nothing is done and the causes taken a turn for the worst, then we as a population face the consequences of malnutrition. On a short-term basis, one develops lower IQ, a weakened immune system and impaired brain development. As time progresses, those who are malnourished are seen to be predisposed to premature death, are at a greater risk of diabetes and cancer, are of smaller stature and the pinch is felt by all as there is a loss in productivity and increased healthcare costs (Barker et.al, 2018).

Acute malnutrition during childhood is a problem that requires greater focus. Weight for height and MUAC are used for identification of acute malnutrition among children. A weight-for-height indicator between -3 and -2 z-scores (standard deviations) of the international standard or a mid-upper arm circumference (MUAC) between 11 cm and 12.5 cm are both considered to be indicative of moderate acute malnutrition (MAM), also known as wasting (WHO, 2006). The MUAC ranges in measurement from 6 months to 5 years.

RATIONALE OF THE STUDY

In the Vadodara District, the prevalence of wasting is 12.6%. (NFHS-5). Based on the public health cut-offs, this prevalence ranges from medium to high, indicating a public health concern.

Globally, the use of RUTF and RUSF for management has so far been used to address the burden of acute malnutrition. However, in India, these interventions are precluded; instead, malnourished children, primarily those who are severely underweight, are given a double ration of THR. Then, before devising interventions for MAM children in the community, it is necessary to identify them in the community.

In view of the above-mentioned rationale, the study was planned with the following objectives:

BROAD OBJECTIVE

• To assess prevalence of moderate acute malnutrition among children 0-59 months in Urban Baroda.

SPECIFIC OBJECTIVES

• To assess the nutrition status of children 0-59 months in urban Baroda.

• To determine the socio-economic status of the families from which the children come from.

• To determine the minimum dietary diversity and IYCF practices of the children.

• To determine the morbidity profile of the children.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

Following flow will be followed to read the collected literature about the present research

2.1. Malnutrition

2.2. Global scenario of Malnutrition

2.3. National scenario of Malnutrition

2.4. Regional scenario of Malnutrition

2.5. Factors affecting nutritional status of children

2.1.Malnutrition

The term malnutrition is multifaceted. It encompasses both overnutrition, associated with overweight and obesity, and undernutrition, referring to multiple conditions including acute and chronic malnutrition and micronutrient deficiencies. Undernutrition results from the complex interplay of a range of distal and proximal factors, as illustrated by the United Nations Children's Fund's (UNICEF) conceptual framework for undernutrition. The framework defines basic, underlying, and immediate causes of undernutrition and demonstrates how these causes are interconnected. This general framework also aids in conceptualizing the reasons why children might develop acute malnutrition. Globally, child malnutrition is a major public health problem with major consequences of child survival, poor cognitive and physical development, having an impact on economic productivity of individuals and communities. Malnutrition is one of the leading causes of morbidity and mortality among children under five in low and middle income countries like India (Pravana et al., 2017). Children weakened by all forms of malnutrition often die from diseases which are both preventable and easy-to-treat, such as diarrhoea, pneumonia, and malaria (D. Legason & Dricile, 2018).

Nutrition is a core pillar of human rights and development. Undernutrition (often called as Malnutrition) jeopardizes children's survival, growth, and development, and it slows national progress towards achieving development goals. Undernutrition is often an invisible and silent emergency.

Children of today are citizens of tomorrow, which is why it is extremelyimportant to ensure proper health care facilities as well as adequatenutritional intake for the children. It is now globally acknowledged thatinvestment in human resource development is a pre requisite for

any nation.India is a home to more than one billion people, of which 42 per cent arechildren. Nineteen per cent of world's children live in India. Since 1947, Indiahas made substantial progress in human development. Still the manifestationsof malnutrition are at unacceptable levels (Singh & Sheth 2016)

Under-nutrition is the outcome of insufficient food intake and repeated infectious diseases. it includes being underweight for one's age, too short for one's age (stunted), dangerously thin for one's height (wasted) and deficient in vitamins and minerals (micronutrient malnutrition) (Maleta K, 2006).

In his article entitled Malnutrition and Undernutrition, Shetty (2003) elaborated that "the terms '**malnutrition**' and '**undernutrition**' are often used loosely and interchangeably. Malnutrition refers to all deviations from adequate and optimal nutritional status, including energy undernutrition and over-nutrition (obesity is a form of malnutrition). The term 'undernutrition' is used to refer to generally poor nutritional status, but also implies underfeeding". He further explains "**Malnutrition** arises from deficiencies of specific nutrients or from diets based on inappropriate combinations or proportions of foods; for example, goitre, scurvy, anaemia and xerophthalmiaare forms of malnutrition caused by inadequate iodine, vitamin C, iron and vitamin A, respectively. Malnutrition can also result from excess nutrientlosses or utilization. **Undernutrition** is caused primarily by an inadequate intake of dietary energy, regardless of whether any other specific nutrient is alimiting factor".

Undernutrition in children is the leading cause of mortality and has long-lasting physiological repercussions. It has been related to poor brain development, low academic performance, and divergent behaviours (Martins VJ et. al, 2011).

The consequences of child undernutrition for morbidity and mortality are enormous. The greatest underlying cause of child mortality in many low- and middle-income countries, it continues to be a serious public health concern for children under the age of five. Children are particularly susceptible to macro- and micronutrient deficits as a result of the high calorie requirements during their growth years. Underweight, stunting, wasting with or without oedema (formerly known as marasmus and kwashiorkor, respectively), and even mortality are all consequences of malnutrition in children under the age of five (Govender I et al, 2021).

Causes of Malnutrition

Acute malnutrition is a sudden decrease in food intake or the quality of the diet, and it frequently has pathogenic causes as well. Acute malnutrition has been described in a variety of ways and is known by a number of names with definitions that largely overlap, such as protein-energy

malnutrition, wasting, kwashiorkor, and marasmus.

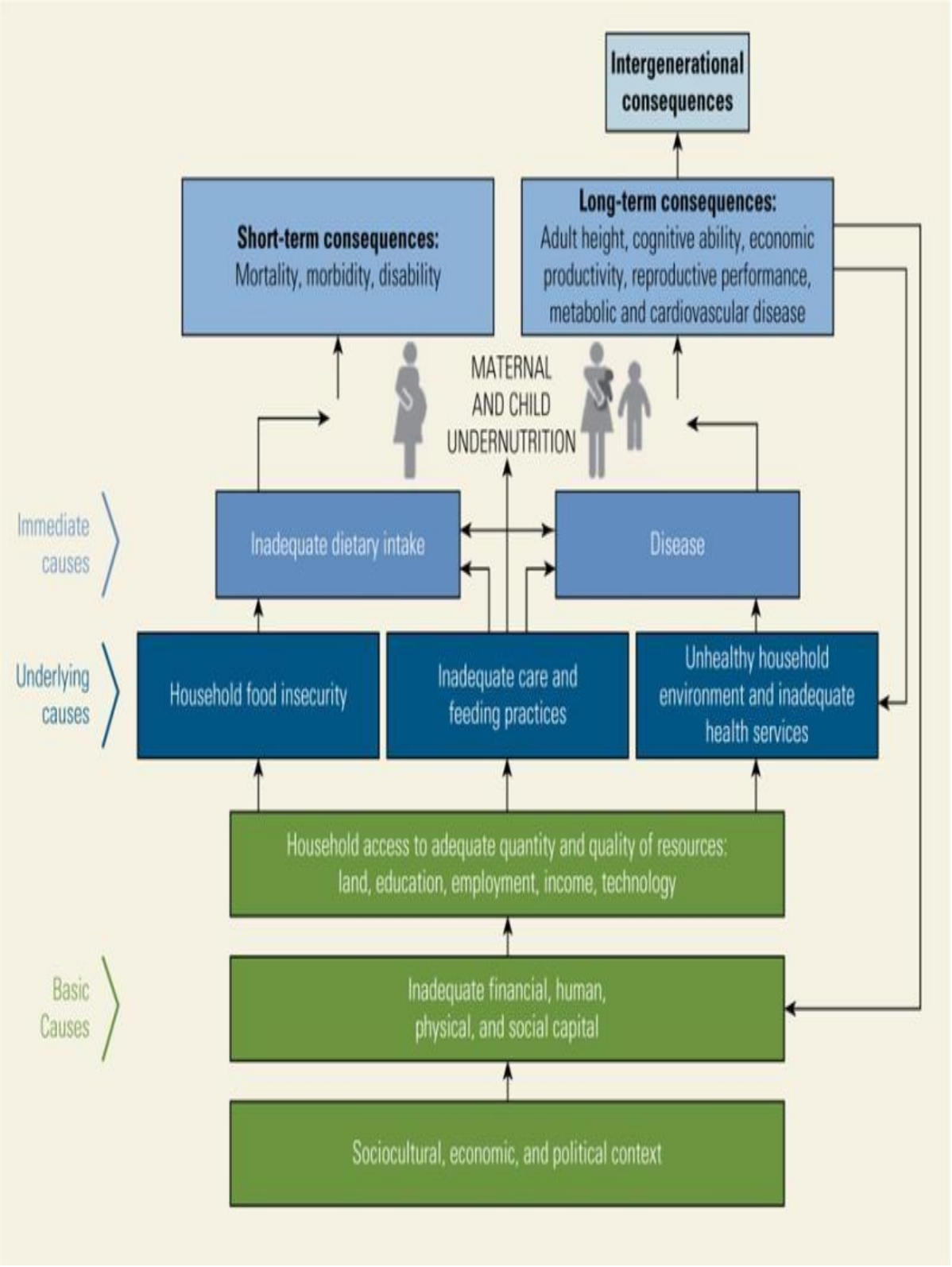
The currently accepted definitions, set out by the WHO, are as follows:

- ***Moderate acute malnutrition (MAM)***, defined as weight-for-height[1] z-score (WHZ) between −2 and −3 or mid-upper arm circumference (MUAC) between 115 millimeters and <125 millimeters (WHO 2012)
- ***Severe acute malnutrition (SAM)***, defined as WHZ < −3 or MUAC < 115 millimeters, or the presence of bilateral pitting edema, or both (WHO 2013)
- ***Global acute malnutrition (GAM)*** refers to MAM and SAM together; it is used as a measurement of nutritional status at a population level and as an indicator of the severity of an emergency situation (GNC 2014).

According to the conceptual framework for undernutrition developed by the United Nations Children's Fund (UNICEF), undernutrition is caused by the complex interaction of a number of distal and proximal factors. The framework identifies the fundamental, immediate, and underlying causes of undernutrition and shows how these factors are related. This broad paradigm also helps in conceptualising the causes of acute malnutrition in children. The following are key risk factors for MAM and SAM based on scientific research examining the connections between particular individual, home, and environmental factors and the development of acute malnutrition in children:

- Inadequate dietary intake
- Inappropriate feeding
- Fetal growth restriction
- Inadequate sanitation
- Lack of parental education
- Family size
- Incomplete vaccination
- Poverty
- Instability in the economy, politics, environment, and crisis circumstances.

Figure 2.1: Causes of Malnutrition



2.2.Global scenario of Malnutrition

Acute malnutrition affects 47 million children aged under 5 years and contributes to nearly 1 million children's deaths annually worldwide. Africa and Asia bear 96% of the global burden of acute malnutrition (Kambale, R. M., & Francisca, I. N. (2022)).

Globally, the prevalence of wasting was 6.3%. On a regional level, Asia had a wasting prevalence that was 3% higher than Africa but 7 to 8% higher than Europe, the Americas, and Oceania. Subregional variations in the burden of wasting were significant. In Africa, for example, Western Africa had nearly twice the prevalence of Eastern and Middle Africa, and three times the prevalence of Southern Africa. 13 countries had a wasting prevalence of more than 10%. There were five from Asia: Timor-Leste, India, Bangladesh, Yemen, and Turkey, and eight from Sub-Saharan Africa: Nigeria, Niger, Burkina Faso, Mali, Chad, Sao Tome Principe, Gambia, and Comoros (Ssentongo et al., 2021).

Figure 2.2: Map of countries with recent prevalence of SAM

The JME dataset's global SAM prevalence rates for children under five are shown in Fig. 2.2 for the most recent year of data available (the overall data coverage spans the years 2006 to 2015). Country data gaps are indicated by grey shading. With some geographical variation, the global SAM prevalence rates for children under five are roughly 2.5 percent. According to World Bank regional groups, the incidence of SAM prevalence children under five is approximately 4.2% in South Asia, 2.6% in sub-Saharan Africa (SSA), 2.9% in East Asia and the Pacific, and less than 0.5% in Latin America and the Caribbean (Moyer et. al, 2020).

2.3 National Prevalence of Malnutrition

According to the India State-Level Disease Burden Initiative, Child Growth Failure is responsible for more than one-fifth of under-5 deaths and disease burden in India, and there are wide variations in the prevalence of growth failure indicators across states, ranging from 21.3 to 49.0% for stunting, 6.3 to 19.3% for wasting, and 16.5 to 42.2% for underweight in 2017. Variations are expected within states as well, because many states have large populations and districts within states frequently differ in terms of ecology, demography, and economy, all of which affect child health (Hemalatha et al., 2020).

Manifold increase in SAM prevalence in several Indian districts is a public health emergency that requires urgent policy response. 115 districts out of the 341 that showed an increase in SAM between NFHS-4 and NFHS-5 also showed a significant rise in SAM (Figure 2.3). However, given the low prevalence documented in NFHS-4 and the quick growth in SAM in 65 districts, the increase's worrying character was concealed by the fact that these districts still fall under the medium prevalence category (Ulahannan SK et, al. 2022)

2.4.Regional scenario of malnutrition (Gujarat)

According to NFHS -5, the prevalence of wasting among children under 5 years was 25.1% which is slightly less than the prevalence of wasting (26.4%) in NFHS -4 (Figure 2.4). The prevalence of wasting is more among male child, rural areas poor families and no education of parents. The prevalence of wasting in Vadodara was 20.1% (Figure 2.5). Similar to the prevalence of wasting in Gujarat.

Figure 2.3: **Prevalence of SAM based on NFHS-5 & NFHS 4**

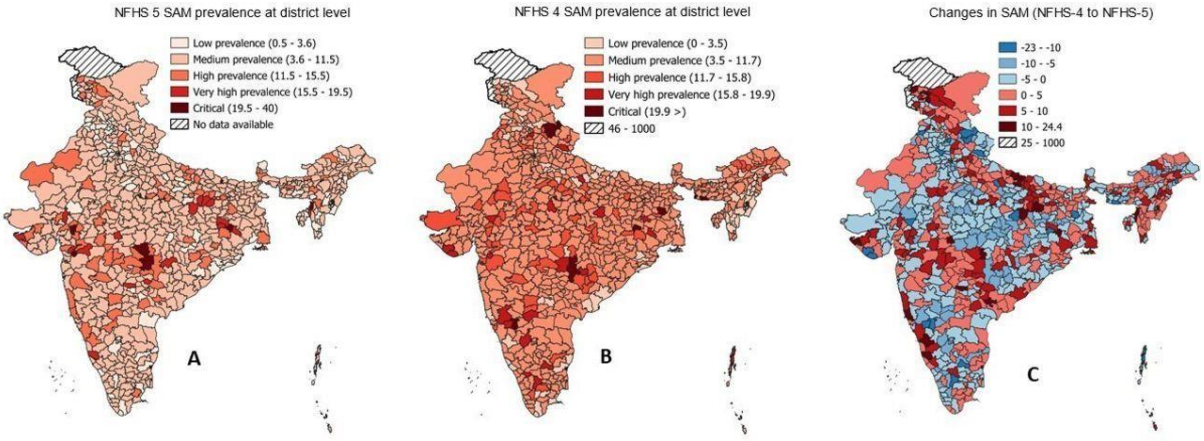


Figure 2.4: Prevalence of Wasting in Gujarat

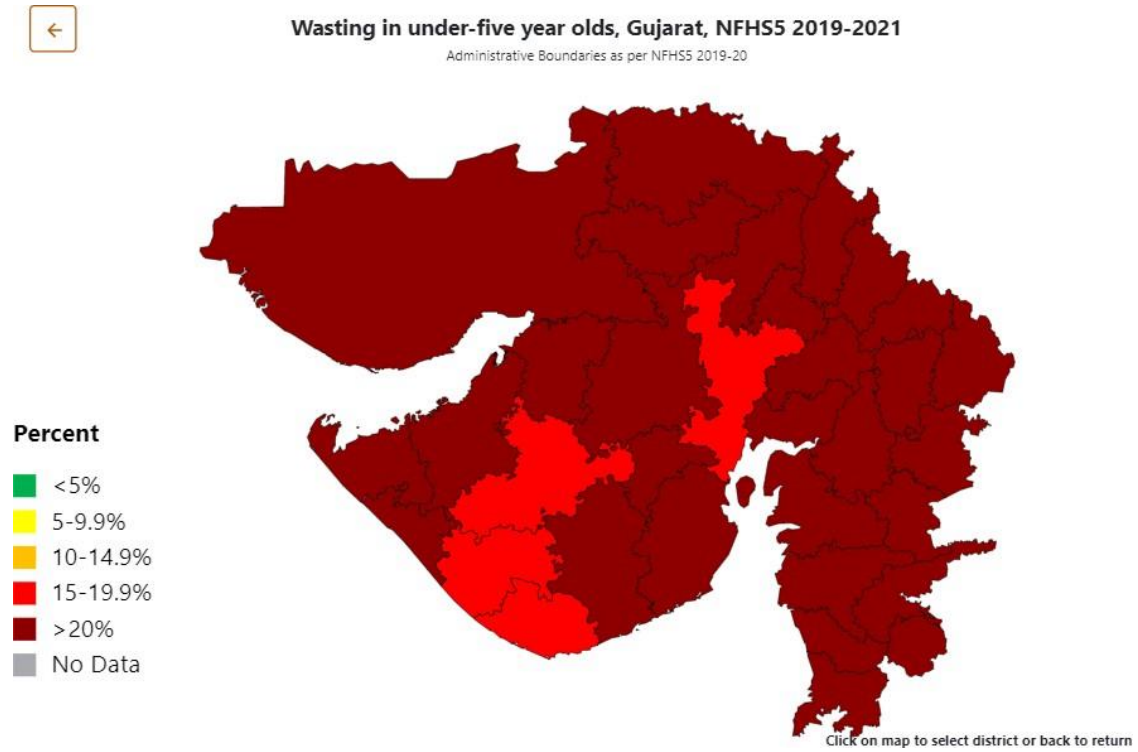
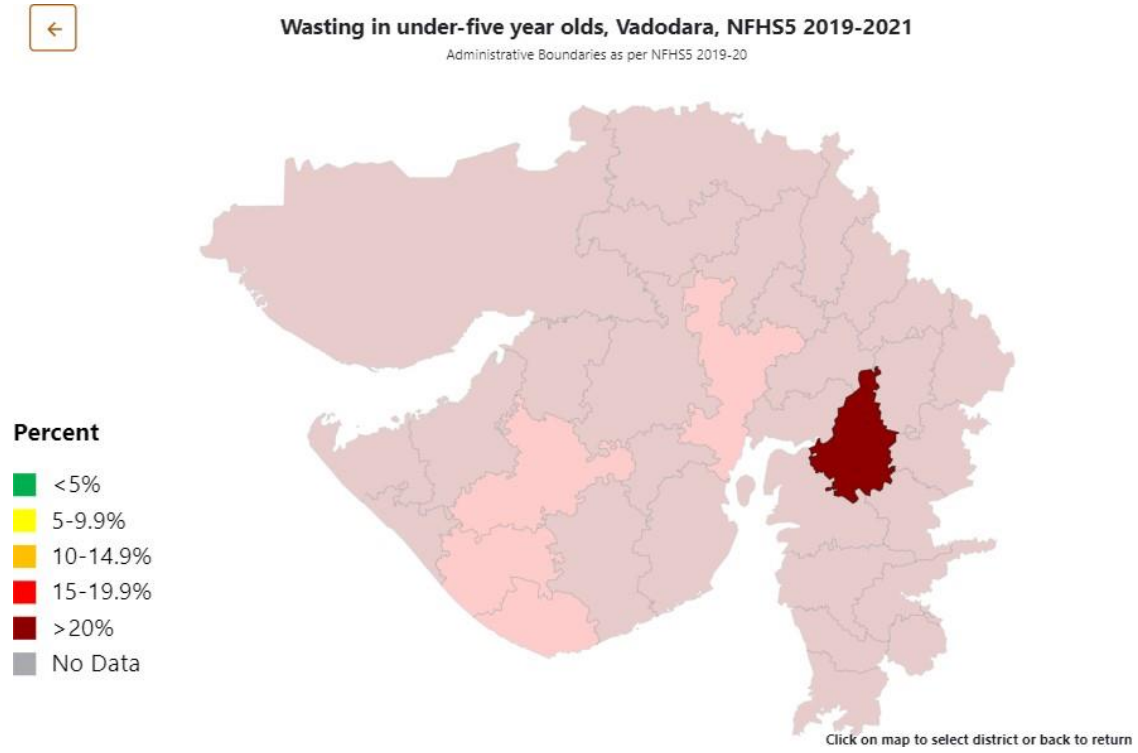


Figure 2.5: Prevalence of Wasting in Vadodara



2.5 Factors affecting nutritional status of Children

Socio-economic status of the family, type of family, Mother age at birth, birth interval, fathers and mothers education, delayed in initiation of breastfeeding, colostrum not fed, not exclusively breastfed, early initiation of complementary feeding, bottle feeding, acute diarrhea were significant factors associated with malnutrition (Pravana et al., 2017), (Murarkar et al., 2020), (Dahal et al., 2021), (Zaba et al., 2021).

According to a study conducted in India, WASH and newborn and young child feeding have an impact on wasting. The researchers discovered that more dietary diversity and better WASH practises were linked to better nutritional outcomes in Indian children, and they came to the conclusion that combined interventions aimed at both of these risk factors would be more effective than separate ones (Menon and others 2013).

The relationship between SAM and low socioeconomic level [12], delayed breastfeeding

after an hour of birth, non-exclusive breastfeeding, birth intervals under two years [13], mother's age at delivery [10], maternal education [14], and family size [11] has been established in several research (Dahal et al., 2021).

Similarly, a study carried out in Nepal's Jhapa and Bara Terai regions indicated that children from extremely food insecure households had a fourfold increased risk of being seriously malnourished (Ghimire U, Aryal BK, Gupta AK Sapkota S. 2020).

A study conducted in tertiary care centre of Odisha reported the overall prevalence of SAM in present study was 2.8%. SAM was more prevalent in males as compared to females. The most vulnerable age group of SAM was found to be 6-12 months. Maximum patients were from rural background and belonged to lower socioeconomic status. Most common factors associated were inadequate breast feeding and weaning practices and improper food choices for weaning (Jena, P., Rath, S., Nayak, M. K., & Satapathy, D. (2019).

A community-based case control study done in Aravalli district of Gujarat reported that poor WASH practices increased children’s risk of developing acute malnutrition. Acute malnutrition is influenced by household food insecurity in addition to childhood diseases and WASH practices. Food consumption among children under 5 years of age is negatively impacted by household food insecurity in terms of both quantity and quality. According to reports, homes with food insecurity are more likely to have children who are acute malnourished (Rana, R., Vaze, G., Christian, P., & Gupta, P.,2019).

METHODOLOGY AND MATERIAL

METHODS AND MATERIALS

Infant malnutrition has been associated with increased severity and frequency of infections, raising energy requirements, while reducing appetite and nutrition absorption. This is ultimately increasing the risk of death. Acute malnutrition is estimated to affect 51.5 million children under five years, contributing to 12.6% of under-five mortality worldwide (Lassi et al., 2020). The title of Present study was "assessing the prevalence and factors associated with moderate acute malnutrition among children (0-59 months) in urban slums of vadodara"

Study Design

A cross – sectional study was conducted in urban Vadodara using a simple random sampling method. Study was carried out in two phases.

Study area

For conducting a study urban Vadodara district was selected. Urban Vadodara was divided into four four ghataks i.e. Ghatak I (East zone), Ghatak II (West zone), Ghatak III (North zone) and Ghatak IV (South zone). Out of 439 Anganwadi Centers (AWCs) of urban Vadodara, 9 AWCs from each zone were randomly selected. A total of 9 AWCs from urban Vadodara were selected randomly. (Annexure1).

Study approval

This study was approved by the Institutional ethics committee for human research (IECHR) under the protocol no. IECHR/FCSc/MSc/2022/44. before the commencement of the study. Mothers were explained in detail about the study and written informed consent was obtained from them (Annexure2).

PHASE 1:

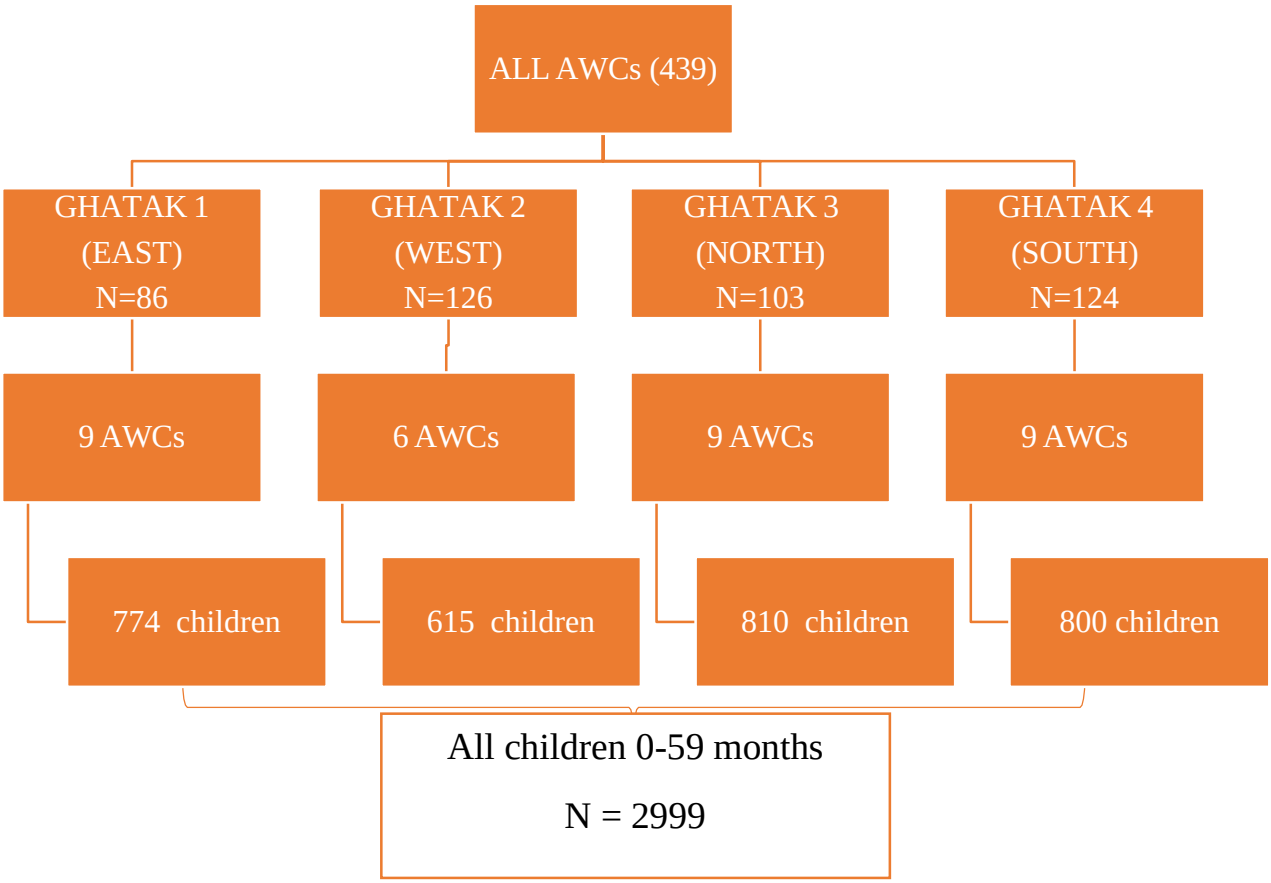
The data of children There are 439 AWC's in urban Vadodara which are divided in four ghataks i.e. Ghatak I (East zone), Ghatak II (West zone), Ghatak III (North zone) and Ghatak IV (South zone). 9 AWC's were then randomly selected from each ghatak. Thus a total of 36 AWC's were enrolled for the study. However, due to time constrain, only 6 AWCs were done in ghatak II (west zone). Thus, a total of 33 AWC's were covered under the study. All children aged (0-59 months) registered under

the anganwadi were enrolled in the study. Anthropometric measurements was done for all children aged (0-59 months). Three consecutive visits were done in each anganwadi to cover the children for anthropometric measurements. 2999 children were registered from 33 AWcs (Figure 1). Anthropometric measurements were done on 1784 children and 1215 children were not covered due to various reasons.

Specific objective

- To assess the nutrition status of children 0-59 months in urban Baroda.
- To screen the MAM children 0-59 months

FIGURE3.1: EXPERIMENT PLAN PHASE 1



Sample size calculation

On the basis of the prevalence of wasting in Vadodara District (NFHS-5) the sample size of the present study has been calculated by adopting the formula:

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

Where, P = Prevalence of wasting is = 12.65%

Q = 1 – P

α = level of Significance (type 1 error) $Z^2 \alpha / 2 = 4$ $\sum$ = Allowable error 5%

Then n = 4 x 0.1265 x 0.8735 / 0.0025

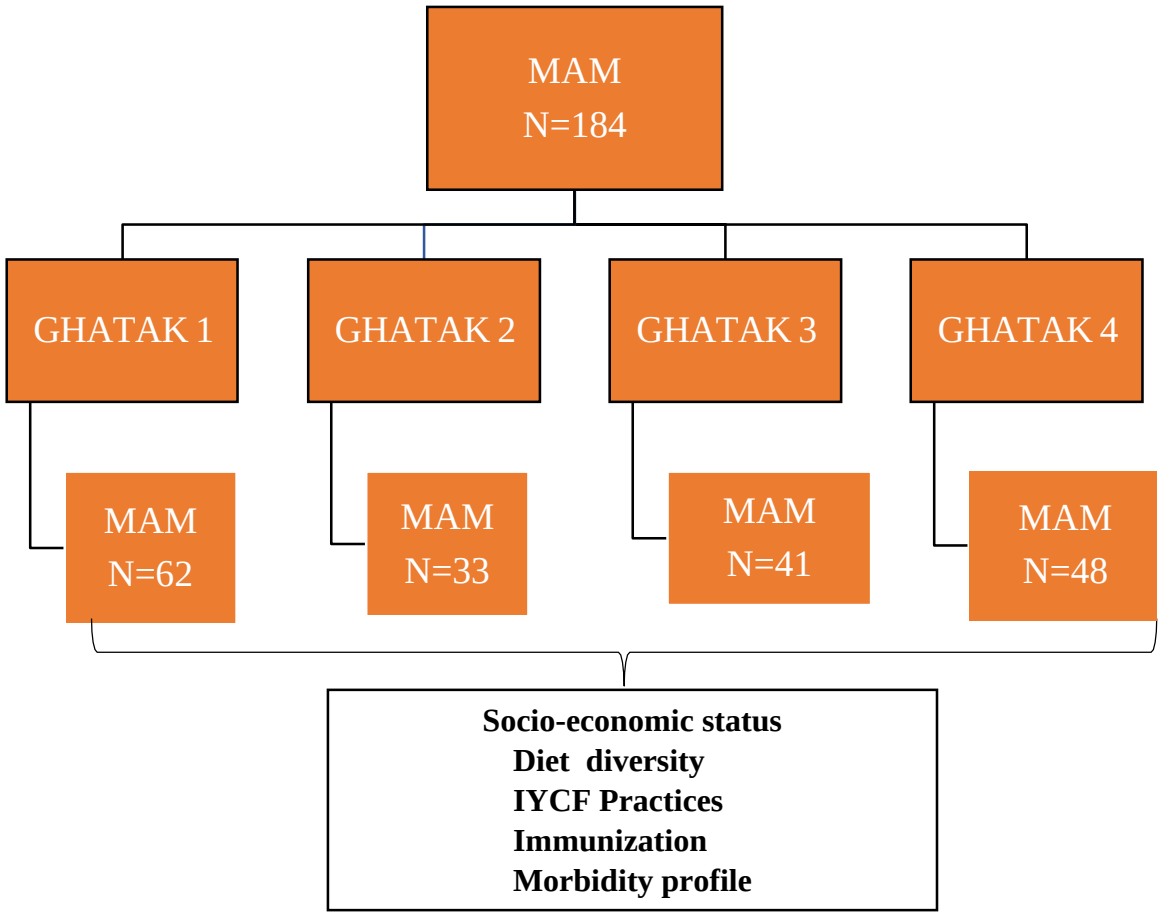
= 177

10% non response rate = 177+18 = 195 ≈<u>200</u>

PHASE 2

All children who were identified as MAM or Moderately wasted were enrolled for the Phase II. Mothers of MAM children who gave consent to participate were interviewed using a semi-structured questionnaire. The data were collected on socioeconomic status, anthropometric measurements of children, dietary diversity , IYCF practices, Immunization and Morbidity profile (Figure 2)

FIGURE 3.2: EXPERIMENT PLAN PHASE 2



Specific objective

- To determine the socio-economic status of the families from which the children come from.
- To determine the minimum dietary diversity and IYCF practices of the children.
- To determine the morbidity profile of the children

Questionnaire designing

A semi-structured questionnaire was developed by the investigator. The questionnaire was developed to elicit information regarding the socioeconomic status of the family, dietary diversity

using IYCF DQQ: Companion questionnaire for infants and young children (age 6-23 months) India, DQQ India for children above 23 months ,IYCF practices, Immunization and Morbidity profile.

Kuppuswamy's scale:

This scale was devised by Kuppuswamy and is the most widely used scale for determining the socio-economic status of an individual or a family in urban areas. Initially, the scale was formulated for determining the SES of an individual but later on, it was modified to determine the SES of a family rather than an individual. The scale was initially developed by Kuppuswamy in the year 1976)including index parameters like education, occupation, and total income which was further modified in later years to include head of families educational status, occupational status and overall aggregate income of the whole family, pooled from all sources. The total score of Kuppuswamy SES ranges from 3-29 and it classifies families into 5 groups, "upper class, upper-middle-class, lower middle class, upper lower and lower socio-economic class" are shown in (Mohd SSheikh,2022).

Kuppuswami socioeconomic class

Sr.no	Score	Socioeconomic class
1	26 - 29	Upper (I)
2	16 - 25	Upper Middle (II)
3	11 - 15	Lower Middle (III)
4	5 -10	Upper Lower (IV)
5	< 5	Lower (V)

Anthropometric measurements

Anthropometry is the measurement of the human body. Anthropometric measures are used to assess the nutritional status of individuals and population groups, and as eligibility criteria for nutrition support programs. Common anthropometric measures are height, weight, and mid-upper arm circumference (MUAC).

1 Weight

An electronic Infant Scale was used for recording the weight of the children. The least count of equipment was 50 gm and the maximum was 10 kg. An infant was placed on his/her back on the

center of the scale pan with a minimum of clothing. Weight was recorded when the digital display was no longer changing (FANTA anthropometry guide, May 2018).

2 Height

The length of the children up to two years was measured using Infantometer. Head was held firmly in position against a fixed upright headboard by one person. Legs were straightened, keeping feet at right angles to legs, with toes pointing upward. The free footboard was brought into firm contact with the child's heels. Length was measured from the scale which is set in the measuring table. Height was recorded to the nearest 0.5cm (FANTA anthropometry guide, May2018)

3 MUAC

MUAC was measured using a non-stretchable MUAC tape. The use of mid- upper arm circumference (MUCA) has improved the ability of front – line health workers to screen and assess for acute malnutrition among children by increasing the reach and enhancing the quality of Community- Based Management of Acute Malnutrition (MAM) services. The MUAC tape was wrapped around the arm, halfway between the tip of the acromion process of scapula and the olecranon of the ulna of the left arm. The MUAC reading was taken through the window, between the black arrows. If using a 3-colour tape: a measurement in the green zone means the child is properly nourished; a measurement in the yellow zone means that the child is at risk of malnutrition; a measurement in the red zone means that the child is acutely malnourished.

The nutritional status of the children was assessed using the following indices, weight for age Z scores (WAZ), height for age Z scores (HAZ), weight for height Z scores (WHZ) and MUAC for age Z scores (MUACZ) using WHO Anthro software (v.3.2.2).

Classification of nutritional status

Weight for age Z score (WAZ)		**Weight for height Z score (WAZ)**	
-1SD to +1 SD	Normal	-1 SD to +1SD	Normal
<= -1 SD to < -2SD	Mild under weight	<= -1SD to < -2 SD	Mild wasted
<= -2SD to < -3 SD	Moderately under weight	<= -2SD to <-3SD	Moderately wasted
<= -3 SD	Severely under weight	<= -3SD	Severely wasted

		>+1 to<= 2	Possible risk overweight
		>+2 to <=3	Overweight
Height for age Z scores (HAZ)		**MUAC for age Z scores (MUACAZ)**	
-1 SD to + 1 SD	Normal	-1 SD to + 1 SD	Normal
<= -1 SD to < -2SD	Mild stunted	<= -1 SD to < -2SD	Mild undernourished
<= -2SD to < -3 SD	Moderately stunted	<= -2SD to <-3SD	Moderately undernourished
<=-3 SD	Severely stunted	<=-3 SD	Severely undernourished
SAM / MAM			
>12.5 cm	Normal		
<=11.5 – 12.5 cm	MAM		
<=11.5 cm	SAM		

DQQ (Diet Quality Questionnaire) - India

The Diet Quality Questionnaire (DQQ) is a standardized tool to collect indicators of dietary adequacy. The DQQ was developed to enable population – level diet quality monitoring. The DQQ can be used to assess dietary patterns and trends in the general population ; separate companion questionnaires for infants and young children under age of 2 year. The DQQ consists of 29 food groups with binary question (YES or NO) about consumption in the previous day or night of a series of sentinel foods that correspond to predefined food groups.

DATA COLLECTION AND TOOLS

Table 3.1 Tools and techniques

PARAMETER	TOOLS
Anthropometric measurements	
Weight	Infant weighing scale/bathroom scale
Height	Infantometer
MUAC	MUAC tape
Socio-economic status	Semi-structured questionnaire
Diet diversity	DQQ for IYCF India
IYCF Practices	Semi-structured questionnaire
Immunization	Semi-structured questionnaire
Morbidity Profile	Semi-structured questionnaire

Inclusion and exclusion criteria :

- All children 0-59 months who are registered in the AWCs (Phase 1)
- All children 0-59 months who are either SAM or MAM (Phase 2)
- Children above 59 months
- Those of normal nutritional status (Phase 2)

Data management and analysis

The data was entered into a computer using an excel spreadsheet. The data was cleaned and verified after which it was subjected to appropriate statistical analysis. Frequency distribution and percentages were calculated for all parameters. Mean and standard deviation as well as t-test was calculated. Chi- square test was used to test the differences between the two setups. Anthropometric data was analyzed by WHO Anthro software (V3.2.2). Results have been presented in tabular and/or graphical form.

RESULTS AND DISCUSSION

RESULTS & DISCUSSION

Malnutrition in infants is a problem affecting large number of children in India. Childhood malnutrition is often an underlying cause of high rates of morbidities and mortalities among children. It has adverse effects on only the health status of an individual during childhood but throughout life. Addressing the problem of childhood malnutrition is important to ensure development and wellbeing.

The problem of malnutrition is addressed globally by the use of RUTF and RUSF for management of acute malnutrition. However, in India, severely malnourished children receive a double serving of THR. It is important to identify MAM (Moderately Acute Malnourished) children in the community before developing interventions for them. In view of this, present study was designed with a **broad objective,** "To assess prevalence of moderate acute malnutrition among children 0-59 months in Urban Baroda."

Specific objectives of the study were,

- To assess the nutrition status of children 0-59 months in urban Baroda.
- To determine the socio-economic status of the families from which the children come from.
- To determine the minimum dietary diversity and IYCF practices of the children.
- To determine the morbidity profile of the children.

The study was a cross-sectional study which was divided into two phases:

Phase I: Screening of moderately acute malnourished children

phase II: Assess IYCF practices of MAM children

Phase I

A total of 36 AWCs were randomly selected from 439 AWCs of urban Vadodara. However, due to time constraint, data was collected from 33 AWCs. These AWCs were selected from 4 zones of Urban Baroda, i.e., East, West, North and South. Total number of registered children in these AWCs were 2,997 out of which 2740 children were below 6 months of age. These children were included for screening. Children above 59 months (n=257) were excluded from the study. Anthropometric

data was collected on 1784 children. Data on the remaining children, who were not available during 3 consecutive visits were not collected.

Results of phase one are discussed in this section.

Age and genderwise distribution of subjects

The genderwise distribution showed that 48% (n=866) of the children were girls and 51% (n=918) were boys. (Table 4.1) Majority of the children (52.7%) were between 6-35 months of age, followed by 37.4% between 36-59 months age group. Only 9.8% children were between 0-6 months of age. (Table 4.2) The genderwise age distribution showed that 10.9% of the boys were in 0-6 months age group, 52.3% were in 6-35 months age group and 36.8% were in 36-59 months age group. Similar agewise distribution was recorder for girls with 8.7% in 0-6 months age group, 53.2% in 6-35 months age group and 38.1% in 36-59 months age group. (Table 4.3)

Anthropometric Measurements

Data on anthropometric measurements were collected for all the enrolled children. The genderwise and age group wise mean anthropometric measurements are shown in (Table 4.3) and (Table 4.4). Mean weight, height and MUAC were 10.6±2.9 Kg, 83.0±12.9 cm and 13.8±1.0 cm respectively. (Table 4.4) Mean weight (10.6±2.9 Kg Vs 10.2±2.9 Kg), mean height (83.2±13.1 cm Vs 82.7±1.1 cm) as well as mean MUAC (13.8±1.0 cm Vs 13.7±1.1 cm) were higher among boys as compared to girls. The difference was significantly higher for weight ($p<0.05$) and MUAC ($p<0.05$). (Table 4.5) .

Secondary data on weight and height measured by the Anganwadi worker (AWW) was also collected. The average weight taken by the AWW was 10.2±2.9 Kg for boys and 10.1±2.7 Kg for girls which was slightly lower than the average of weight measurements taken by the investigator (10.6±2.9 Kg for boys and 10.2±2.9 Kg for girls). Secondary data showed that there was no statistical difference between weight measurements of boys and girls, which was contradictory when compared to data collected by the investigators. Mean height measured by the AWW was 79.1±15.6 cm for boys and 79.3±15.5 cm for boys. The recorded measurements for height was lower than the height measurements taken by investigators (83.2±13.1 cm for boys and 82.7±12.7 cm for girls). (Table 4.5)

Age wise data on mean weight showed an increase across the age groups. Mean weight of 0-6 months old children was 5.49±1.20 Kg, 7-35 months old children was 9.45±1.79 Kg and 36-49 months old children was 13.04±1.69 Kg. Mean height was 59.6±4.4 cm, 78.3±7.5 cm and 95.6±5.4 cm in age groups of 0-6 months, 7-35 months and 36-59 months age. MUAC was not measured in children below 6 months of age. Measurement of MUAC was 13.5±1.9 cm in 7-35 months old children and 14.1±1.5 cm in 36-59 months old children. (Table 4.5)

Table 4.1 Genderwise distribution of the children (N=1748)

	n	Percent
MALE	918	51.5
FEMALE	866	48.5
Total	1784	100.0

Figure 4.1 Gender of children (N=1748)

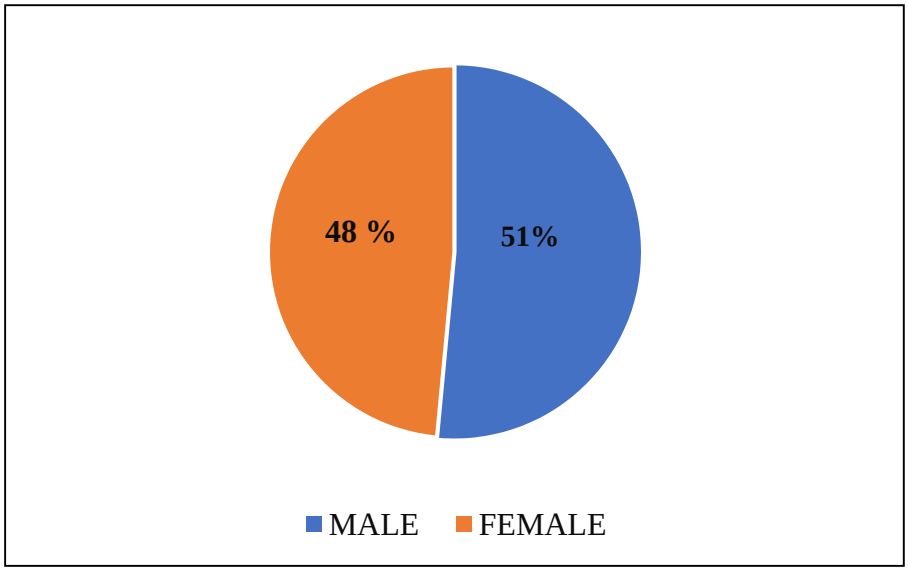


Table 4.2 Age wise distribution of children (6-59 months) (N=1784)

	n	Percent
0-6 months	175	9.8
6-35 months	941	52.7
36-59 months	668	37.4
Total	1784	100.0

Figure 4.2 Age wise Anthropometric measurements of children (6-59

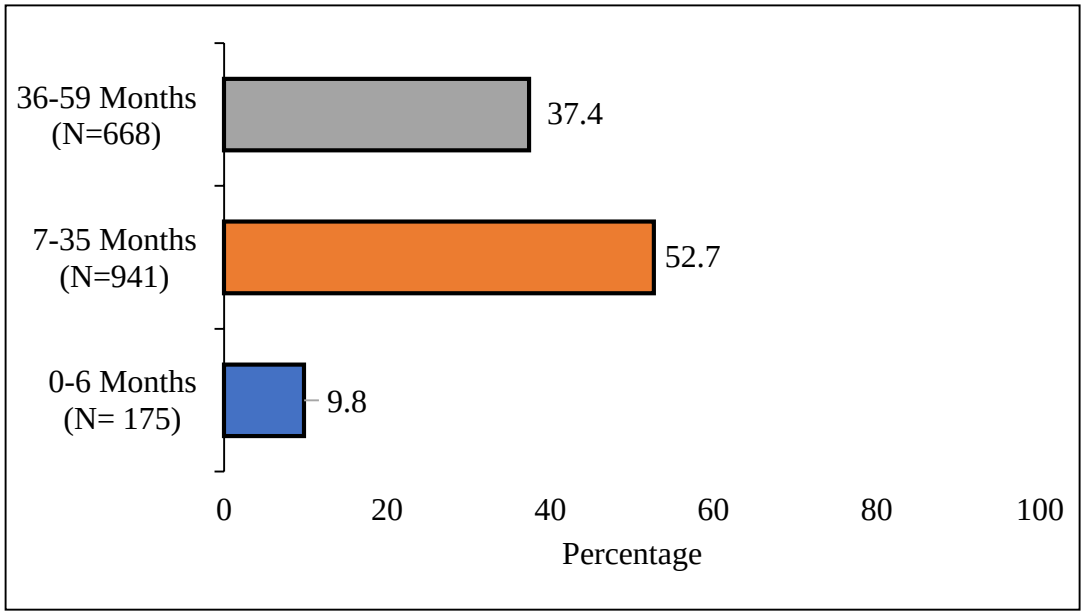


Table 4.3 Age and Genderwise Distribution of Children (N=1784)

Age categories	MALE		FEMALE		TOTAL	
	N	%	N	%	N	%
0-6 months	100	10.9	75	8.7	175	9.8
7-35 months	480	52.3	461	53.2	941	52.7
36-59 months	338	36.8	330	38.1	668	37.4
Total	918	100.0	866	100.0	1784	100.0

Table 4.4 Genderwise Mean Anthropometric Measurements (N=1784)

	Sex	N	Mean	SD	't' Value	'p' Value
Weight (kg)	Male	918	10.6	2.9	2.307	0.021
	Female	866	10.2	2.9		
Height (cm)	Male	918	83.2	13.1	0.943	0.346
	Female	866	82.7	12.7		
MUAC (cm)	Male	814	13.8	1.0	2.468	0.014
	Female	790	13.7	1.1		
Recorded Weight (kg)	Male	702	10.2	2.9	0.759	0.448
	Female	689	10.1	2.7		
Recorded Height (cm)	Male	678	79.1	15.6	-0.245	0.806
	Female	666	79.3	15.5		

Table 4.5 Mean Anthropometric Measurements of the children Across Age Categories (N=1784)

	0-6 months (N = 175)		7-35 months (N= 941)		36-59 months (N= 668)		Total (N = 1784)	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
WEIGHT (Kg)	5.5	1.2	9.4	1.8	13.0	1.7	10.4	2.9
HEIGHT (cm)	59.6	4.4	78.3	7.5	95.6	5.4	83.0	12.9
MUAC (cm)	-	-	13.5	1.9	14.1	1.5	13.8	1.0

Anthropometric Indices

Mean anthropometric indices i.e. weight for height z-scores, height for age z-scores, weight for age z-scores and MUAC for age z-scores were also calculated.

The mean weight for length/height z score (WHZ) of all the children was -0.9±1 SD indicating that the data was slightly shifted towards negative z score (Figure 4.3). Age wise data revealed that with the increase in age, the mean WHZ was shifted to left side of the bell-shaped curve. Highest prevalence of wasted children were seen at age 48-60 months (Figure 4.4) Gender wise data revealed that the mean WHZ score values of male was -0.95±1.03 is slightly more towards negative z score compared to the female -0.84±0.97 (Figure 4.5)

The mean weight for age z score (WAZ) of all the children was -1.39±1.04 SD indicating that the data was slightly shifted towards negative z score compared to the mean. (Figure 4.6) Age wise data revealed that with the increase in age, the mean WAZ was shifted to left side of the bell-shaped curve. Highest prevalence of wasted children were seen at age 48-60 months. (Figure 4.7) Mean WAZ was also the same for both boys (-1.4±1.0) and girls (-1.4±1.0).

The mean Height for age z score (HAZ) of all the children was -1.36±1.19 indicating that the data was shifted towards negative z score compared to the mean. (Table 4.9) There was no genderwise difference in mean HAZ between boys (-1.4±1.3) and girls (-1.4±1.1). (Table 4.6) Mean WHZ and MUACZ were slightly higher in girls (WHZ: -0.9±1.0, MUACZ: -1.3±0.9) than boys (WHZ: -1.0±1.0, MUACZ: -1.4±0.9).

When secondary anthropometric data measured by the AWW was analysed using WHO growth standards, mean of all the three indices (WHZ, HAZ and WAZ) were higher for boys as compared to girls. Mean values of WAZ and HAZ as per the recorded anthropometric measurements were slightly lower than the mean WAZ and HAZ values as per the measurements according to the primary data. This was mainly because the average weight and height measured by the AWW was lower than the measurements taken by the investigators. Comparison of mean WHZ scores for recorded and actual measurements showed that the WHZ was higher for measurements recorded by AWW. This could be because of lower recorded height. (Table 4.6)

Figure 4.3 MEAN WEIGHT FOR LENGTH Z SCORES FOR ALL CHILDREN

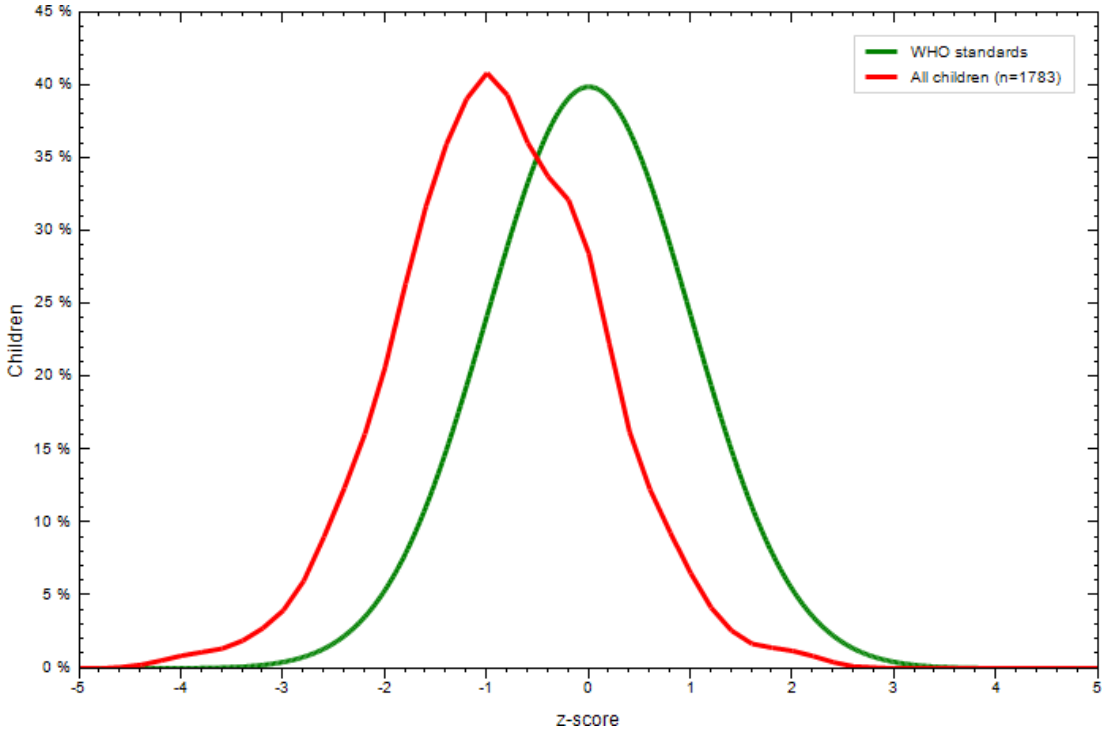


Figure 4.4 Age Wise Mean Weight for Length Z Scores

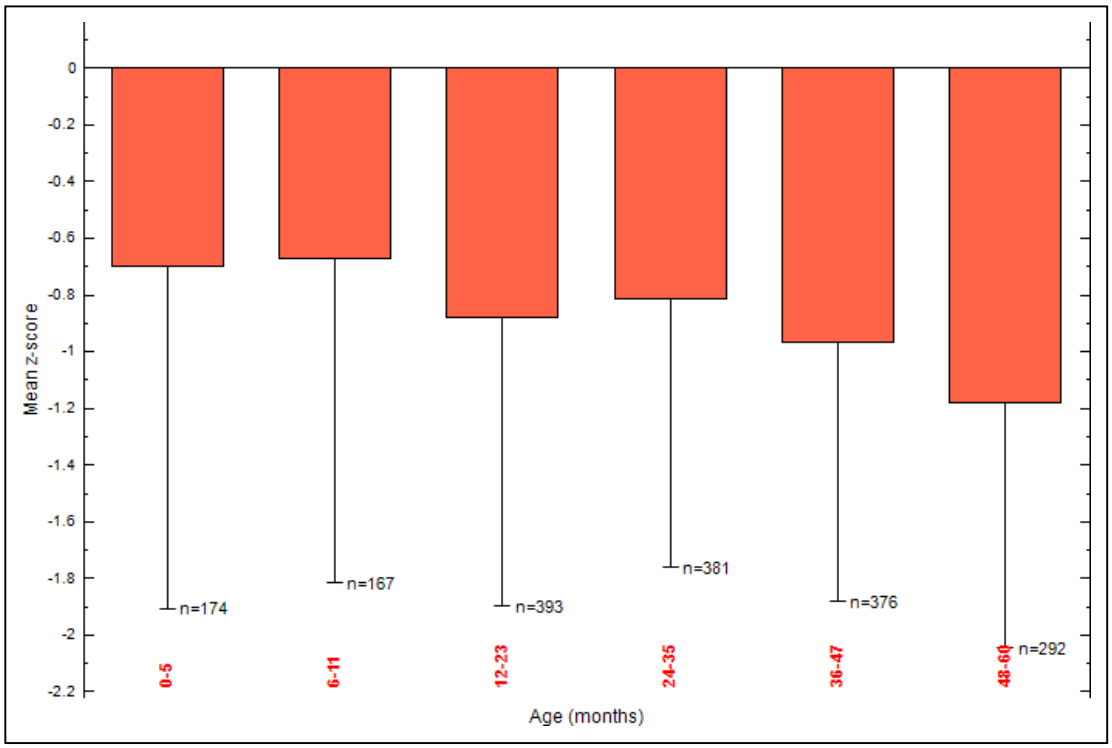


Figure 4.5 Gender Wise Mean Weight for Length Z Scores

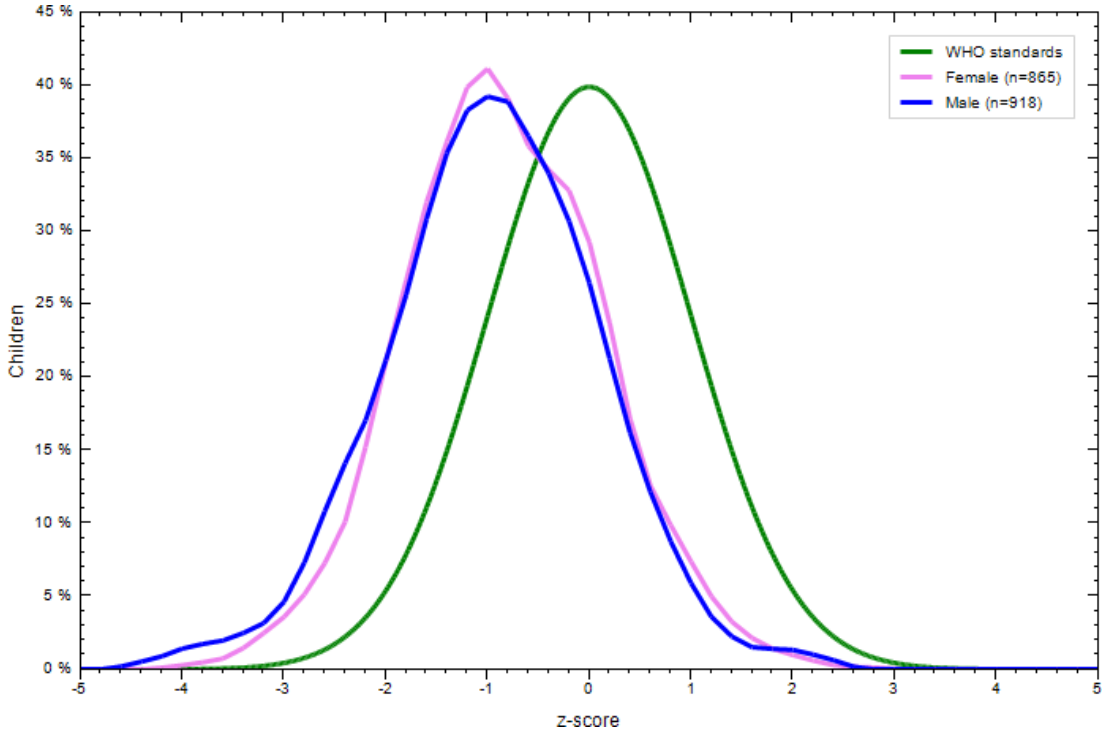


Figure 4.6 Mean Weight for Age Z Scores for All Children

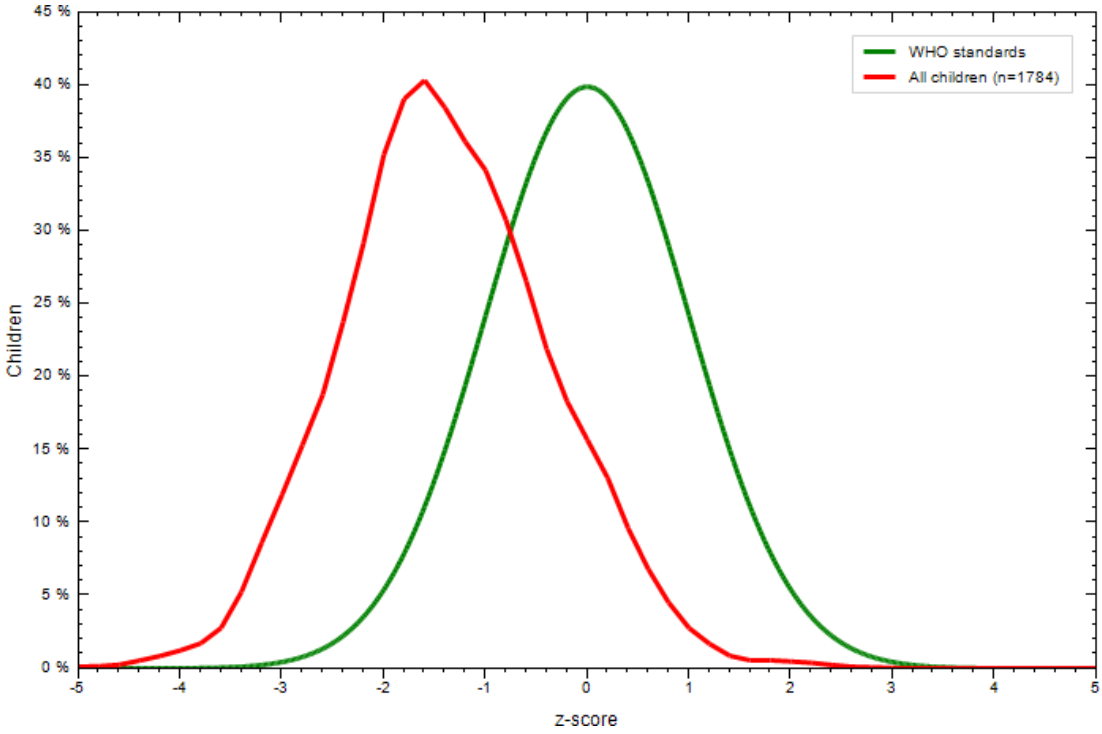


Figure4. 7 Age Wise Mean Weight for Age Z Scores

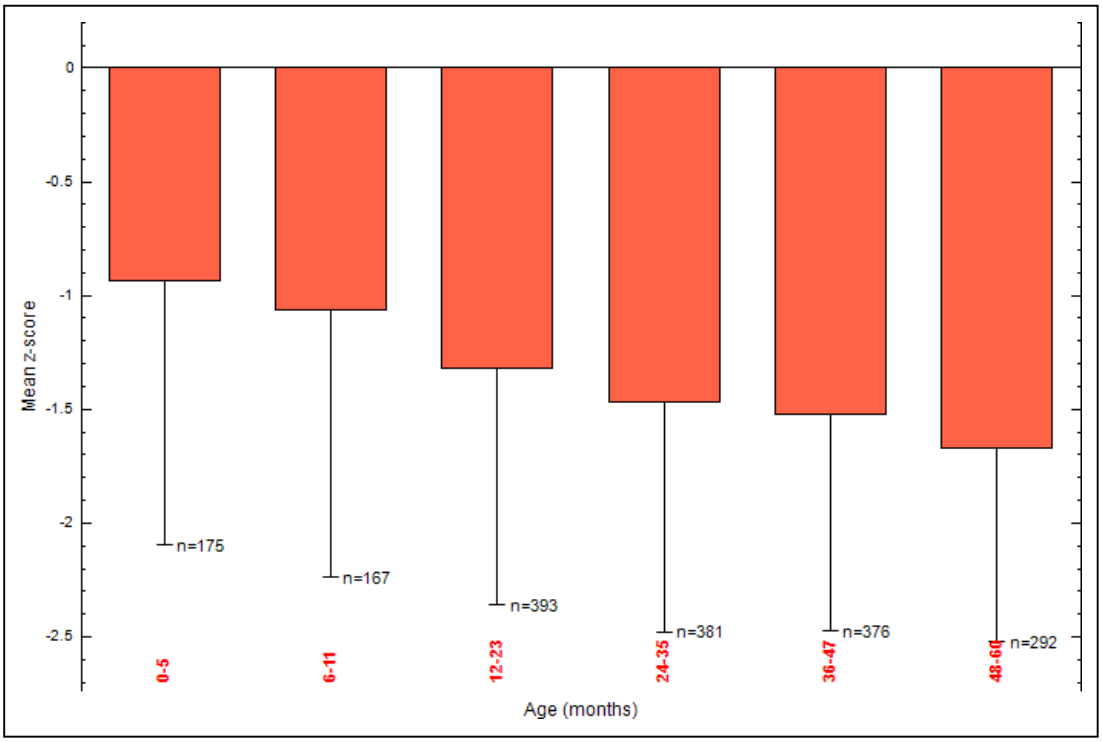


Figure 4.8 Gender Wise Mean Weight for Age Z Scores

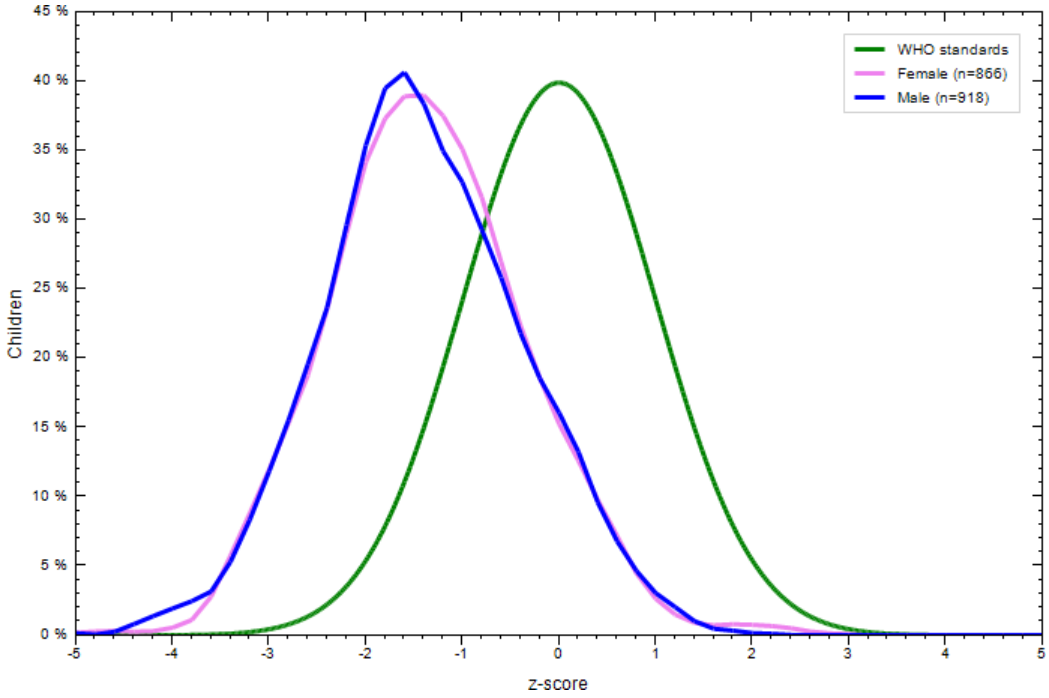


Figure 4.9 Mean Height for Age Z Scores for All Children

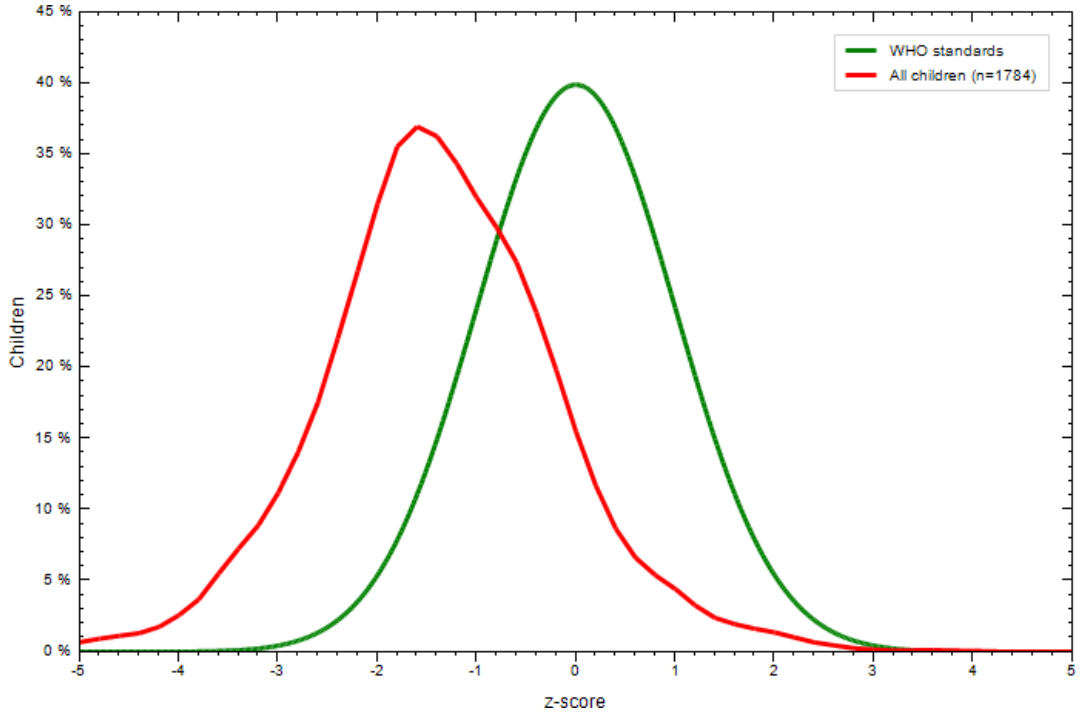


Figure 4.10 Age Wise Mean Height for Age Z Scores

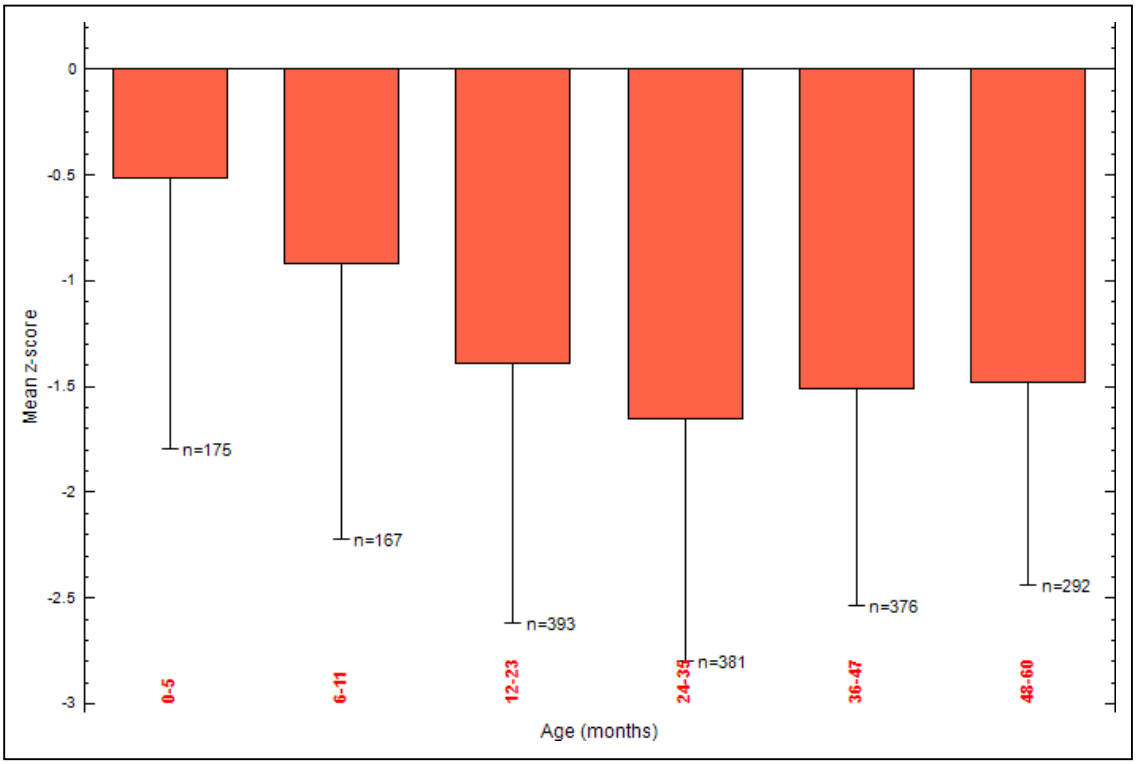


Figure 4.11 Gender Wise Mean Height for Age Z Scores

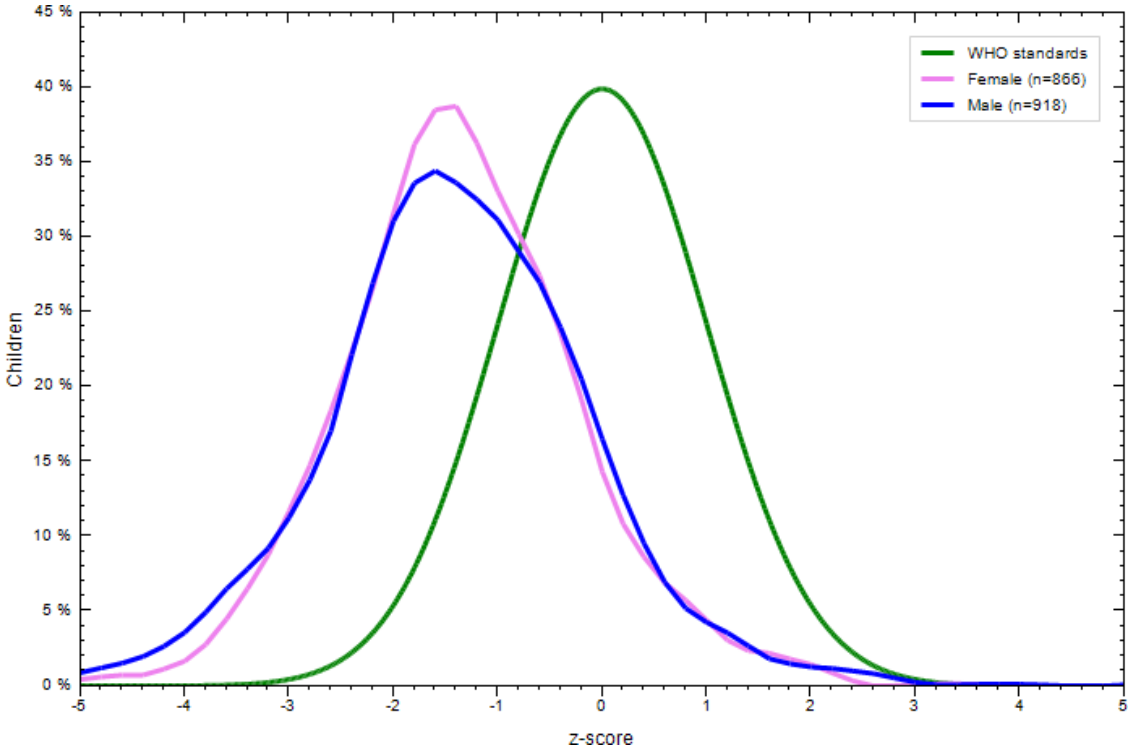


Figure 4.12 MUAC of Children

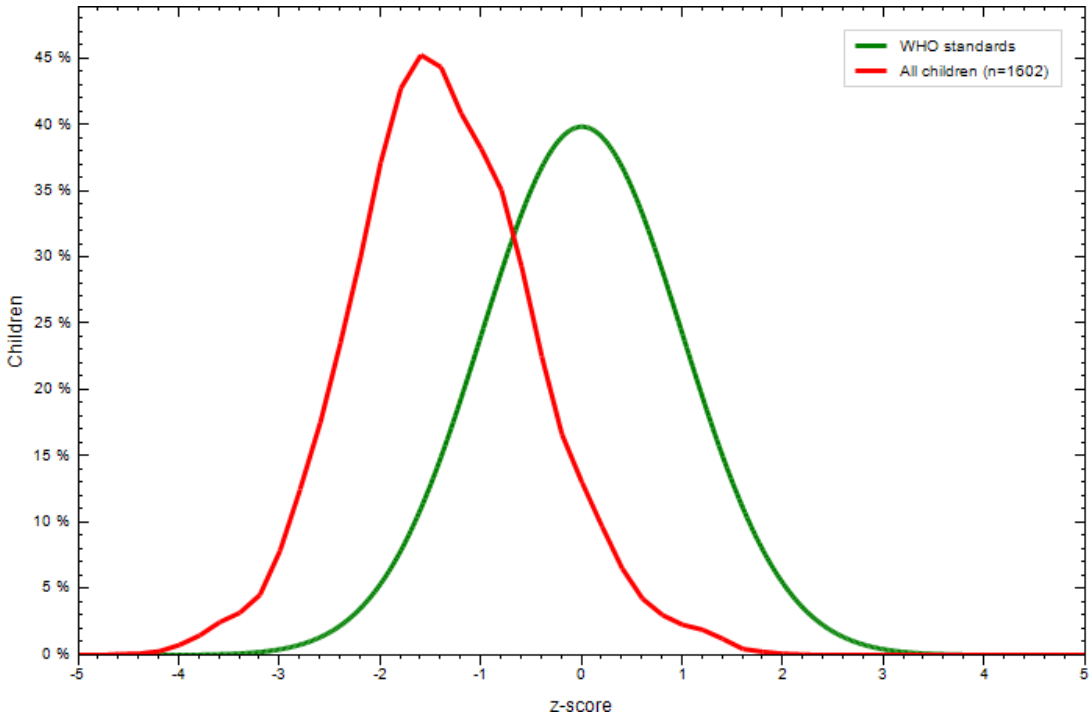


Figure 4.13 Age Wise MUAC

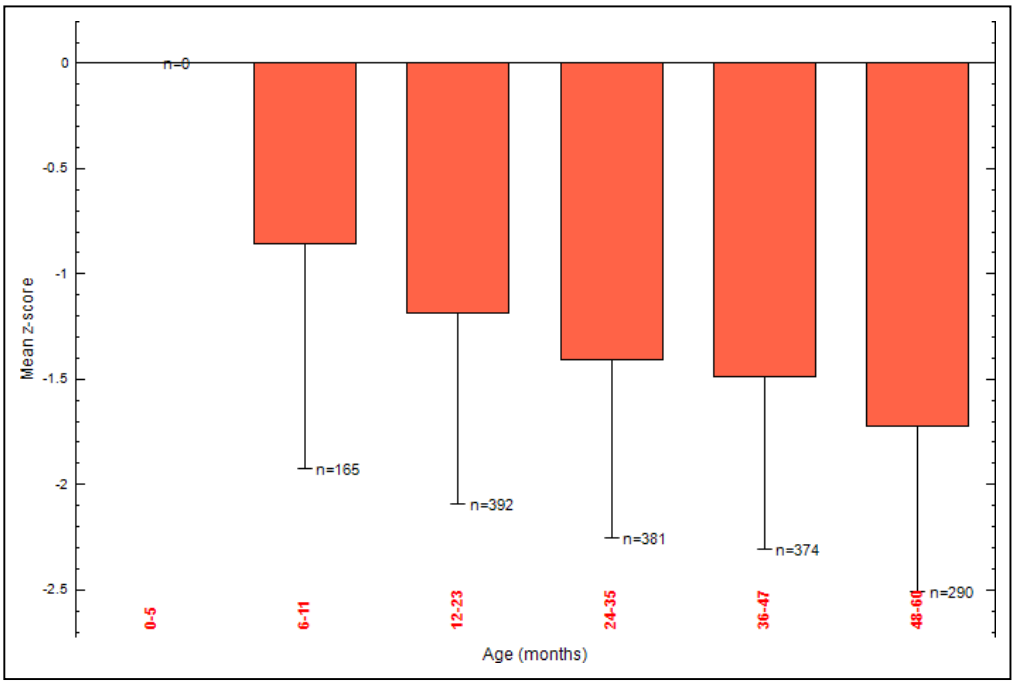


Figure 4.14 Gender wise MUAC of Children

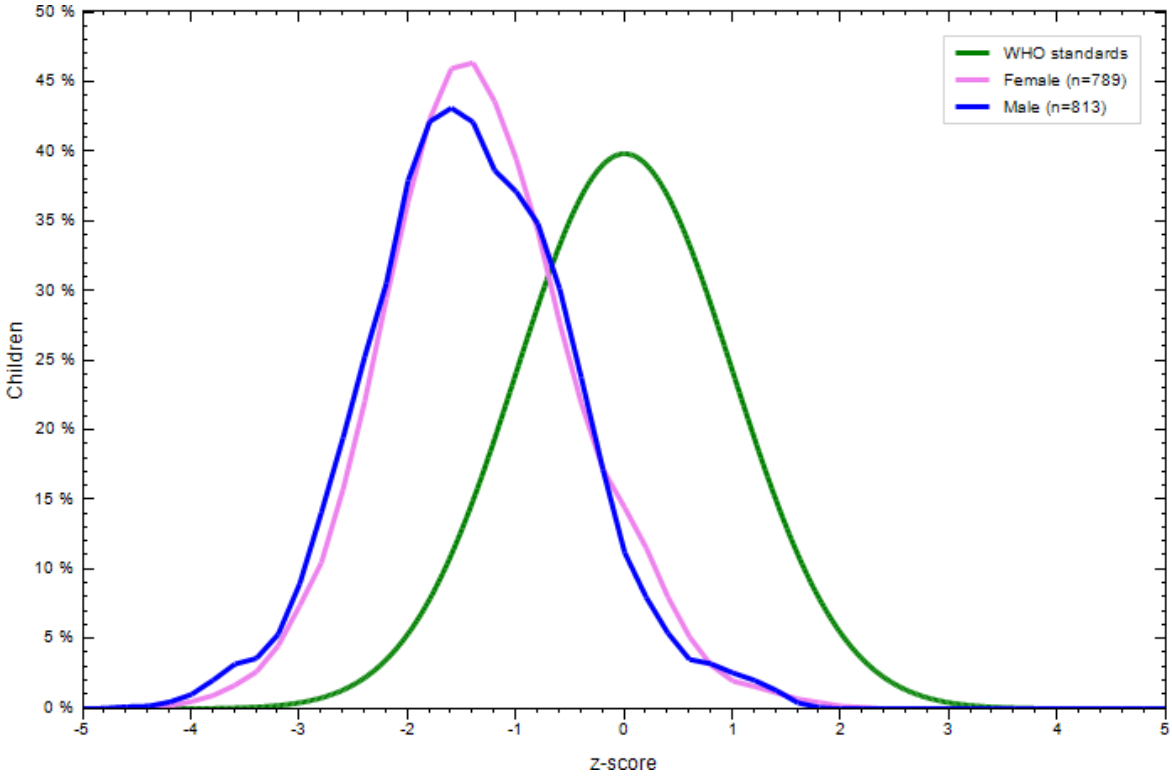


Table 4.6 Gender wise Mean Anthropometric Indices (N=1784)

	Sex	N	Mean	SD
WHZ	Male	918	-1.0	1.0
	Female	866	-0.9	1.0
HAZ	Male	918	-1.4	1.3
	Female	866	-1.4	1.1
WAZ	Male	918	-1.4	1.0
	Female	866	-1.4	1.0
MUACZ	Male	813	-1.4	0.9
	Female	790	-1.3	0.9
Recorded WHZ	Male	665	-0.1	2.4
	Female	655	-0.0	2.3
Recorded HAZ	Male	675	-2.6	2.5
	Female	662	-2.4	2.1
Recorded WAZ	Male	702	-1.7	1.2
	Female	689	-1.5	1.0

Prevalence of Undernutrition among Children

Acute Malnutrition: Low weight for height z-scores are used to identify severe acute malnutrition among children below 6 years of age. Anthropometric data collected in the study was used to identify

presence of malnutrition in the children. WHZ <-2SD is considered as acute malnutrition. Children having WHZ score between -2SD and -3SD are considered to be having moderate acute malnutrition (MAM) and those with WHZ<-3SD are considered to be having severe acute malnutrition (SAM). Children whose WHZ is below -1SD but ≥-2SD are labeled as at risk of acute malnutrition/ undernutrition. WHZ between -1SD and +1SD (WAZ≥-1SD and ≤+1SD) is normal. Children who has WHZ higher than +1SD and ≤+2SD area at a risk of overweight. Those with WHZ >+2SD and ≤+3SD are overweight.

Results of anthropometric screening showed that 223 (12.5%) out of 1784 children had acute malnutrition as per WHZ. Prevalence of MAM was 10.3% and that of SAM was 2.2% in the children. One third (33.2%) of the children were at risk of acute malnutrition. Only half (51.5%) of the screened children had normal WHZ. Prevalence of SAM (2.8% Vs 1.6%) and MAM (12.1% Vs 8.3%) was higher among boys as compared to girls. Higher percentage of girls (34.9%) were at risk of acute malnutrition as compared to boys (31.7%). The data showed that 2.4% (3.1% girls Vs 0.4% boys) of the children were at possible risk of overweight and 0.4% (0.1% girls Vs 0.7% boys) were overweight. These differences were statistically significant (Table 4.7)

Age wise prevalence of wasting using WHZ z-score (Table 4.8) showed that 2% were SAM of which majority were aged 0-6 months followed by 7-35 months. However, prevalence of moderate wasting was 10% and age wise analysis revealed that highest prevalence was seen among children aged 36-59 months (12%) followed by 0-6 months (10%) and 7-35 months (9%). Prevalence of overweight and risk of overweight among children was highest in children aged 0-6 months.

Acute Malnutrition according to MUAC: MUAC cut-offs were also used to identify severe acute malnutrition among children below 6 years of age in this study. MUAC <-12.5 cm is considered as acute malnutrition. Children having MUAC between 11.5 cm and 12.5 cm are considered to be having moderate acute malnutrition (MAM) and those with MUAC<11.5 are considered to be having severe acute malnutrition (SAM).

Results of anthropometric screening showed that 10.2% children had acute malnutrition as per MUAC. Prevalence of MAM was 9 % and that of SAM was 1.1% in the children. Prevalence of

SAM (0.7% in boys Vs 1.5% in girls) and MAM (7.2% in boys Vs 9.0% in girls) was higher among girls as compared to boys. However, this difference was not statistically significant (Table 4.9).

Using MUAC cutoffs, age wise prevalence of severe wasting was 1%, moderate wasting was 8% and 80% children were normal. MUAC was not done for children below 6 months of age. Prevalence of severe wasting and moderate wasting was more in children aged 7-35 months (Table 4.10)

Analysis of anthropometric measurements done by the AWW showed that that 176 (13.3%) children had acute malnutrition. According to the secondary data, prevalence of MAM was 9.5% and that of SAM was 3.8% in the children. Less than one fourth of the children (23.7%) were at risk of acute malnutrition. Only 42% of the screened children had normal WHZ. Prevalence of risk of overweight and overweight were 8.9% and 12.1% respectively. The secondary data reported higher prevalence of both acute malnutrition as well as overnutrition as compared to the data collected under this study. This was primarily because of the difference in the measurements taken by the AWW and the investigator. Another important point to be kept in mind here is that, AWWs were taking height measurements every three months but weight was measured every months. This could have contributed to the higher prevalence of overweight when the secondary data was analysed.

Genderwise difference in the prevalence of malnutrition as per the recorded data showed a similar pattern to that reflected in the primary data, i.e. higher prevalence of SAM and MAM among boys and higher prevalence of overnutrition among girls. (Table 4.11).

Table 4.7 Genderwise Prevalence of Acute Malnutrition (Wasting) (N=1784)

Categories	Male		Female		Total		Chi-square	'p' Value
	n	%	n	%	n	%		
SAM	26	2.8	14	1.6	40	2.2	17.353	0.004
MAM	111	12.1	72	8.3	183	10.3		

At risk	291	31.7	302	34.9	593	33.2		
Normal	468	51.0	450	52.0	918	51.5		
Possible risk of overweight	16	1.7	27	3.1	43	2.4		
Overweight	6	0.7	1	0.1	7	0.4		

Table 4.8 Age wise Prevalence of Wasting

	0-6 months		**7-35 months**		**36- 59 months**		**Total**	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
AT RISK	36	20.6%	308	32.7%	249	37.3%	593	33.2%
MAM	18	10.3%	83	8.8%	82	12.3%	183	10.3%
NORMAL	98	56.0%	500	53.1%	320	47.9%	918	51.5%
OVERWEIGHT	2	1.1%	4	0.4%	1	0.1%	7	0.4%
POSSIBLE RISK OF OW	12	6.9%	27	2.9%	4	0.6%	43	2.4%
SAM	9	5.1%	19	2.0%	12	1.8%	40	2.2%

Table 4.9 Gender wise Prevalence of Acute Malnutrition according to MUAC (N=1784)

Categories	**Male**		**Female**		**Total**		**Chi-square**	**'p' Value**
	n	**%**	**n**	**%**	**n**	**%**		
SAM	6	0.7	13	1.5	19	1.1	7.708	0.052^{NS}
MAM	66	7.2	78	9.0	144	8.1		
Normal	742	80.8	699	80.7	1441	80.8		

Table 4.10 Age wise Prevalence of Wasting using MUAC

	0-6 months		7-35 months		36- 59 months		Total	
	N	%	N	%	N	%	N	%
NA	175	100.0%	1	0.1%	4	0.6%	180	10.1%
MAM	0	0.0%	121	12.9%	23	3.4%	144	8.1%
NORMAL	0	0.0%	801	85.1%	640	95.8%	1441	80.8%
SAM	0	0.0%	18	1.9%	1	0.1%	19	1.1%

Table 4.11 Gender wise Prevalence of Acute Malnutrition (Wasting) according to Recorded Data by AWW (N=1320)

Categories	Male		Female		Total		Chi-square	'p' Value
	n	%	n	%	n	%		
SAM	34	5.1	16	2.4	50	3.8		
MAM	67	10.1	59	9.0	126	9.5		
At risk	164	24.7	149	22.7	313	23.7	19.034	0.004**
Normal	259	38.9	295	45.0	554	42.0		
Possible risk of overweight	49	7.4	68	10.4	117	8.9		
Overweight	92	13.8	68	10.4	160	12.1		

Stunting: Low height for age z-scores are used to identify stunting among children below 6 years of age. It is an indicator for chronic malnutrition among children. HAZ <-2SD is considered as Stunting. Children having HAZ score between -2SD and -3SD are considered to be moderately stunted and those with HAZ<-3SD are considered as severely stunted. Results of anthropometric screening showed that 257 (27.5%) out of 1784 children were stunted. Prevalence of moderate

stunting was 19.8% and that of severe stunting was 7.7% in the children. More than one third (35.8%) of the children were at risk of being stunted. Only 36.7% of the screened children had normal HAZ. Severe stunting was more prevalent (9% Vs 6.2%) among boys as compared to girls. Prevalence of moderate stunting between boys and girls was comparable (19.0% in boys and 20.8% in girls). Higher percentage of girls (36.8%) were at risk of stunting as compared to boys (34.7%). There was no statistical significance in the prevalence of stunting between the genders (Table 4.12)

Age wise prevalence of stunting is shown in (Table 4.13). The prevalence of severe stunting was highest among children aged 7-35 months (10%) followed by children aged 36-59 months (6%) and children 0-6 months (3%). The prevalence of moderate stunting was highest among children aged 36-59 months (23%) followed by children aged 7-35 months (21%) and children 0-6 months (5%).

Analysis of anthropometric measurements done by the AWW showed that that 53.3% children were stunted. According to the secondary data, prevalence of moderate stunting was 31.6% and that of severe stunting was 21.7% in the children. Less than one fourth of the children (22.4%) were at risk of stunting. Only 23.9% of the screened children had normal HAZ according to the secondary data. The secondary data reported a very high prevalence of stunting as compared to the data collected under this study. This could have been because of the fact that AWWs were taking height measurements every three months.

Genderwise difference in the prevalence of malnutrition as per the recorded data showed a similar pattern to that reflected in the primary data, i.e. higher prevalence of severe stunting among boys and higher prevalence of moderate stunting among girls (Table 4.14).

Table 4.12 Genderwise Prevalence of Stunting (N=1784)

Categories	Male		Female		Total		Chi-square	'p' Value
	n	%	n	%	n	%		
Severe Stunting	83	9.0	54	6.2	137	7.7	6.014	0.111^{NS}
Moderate Stunting	174	19.0	180	20.8	354	19.8		
At risk	319	34.7	319	36.8	638	35.8		
Normal	342	37.3	313	36.1	655	36.7		

Table 4.13 Agewise Prevalence of Stunting

	0-6 months		7-35 months		36- 59 months		Total	
	N	%	N	%	N	%	N	%
AT RISK	39	22.3%	318	33.8%	281	42.1%	638	35.8%
MODERATE STUNTING	9	5.1%	195	20.7%	150	22.5%	354	19.8%
NORMAL	122	69.7%	338	35.9%	195	29.2%	655	36.7%
SEVERE STUNTING	5	2.9%	90	9.6%	42	6.3%	137	7.7%

Table 4.14 Genderwise Prevalence of Stunting according to Recorded Data by AWW (N=1320)

Categories	Male		Female		Total		Chi-square	'p' Value
	n	%	n	%	n	%		
Severe Stunting	235	34.8	188	28.4	423	31.6	10.206	0.037*

Moderate Stunting	132	19.6	158	23.9	290	21.7		
At risk	145	21.5	159	24.0	304	22.7		
Normal	163	24.1	157	23.7	320	23.9		

Underweight: Low weight for age z-scores are used to identify underweight among children below 6 years of age. WAZ <-2SD is considered as underweight. Children having WAZ score between -2SD and -3SD are considered to be having moderate underweight and those with WAZ<-3SD are considered to be having severe underweight Children whose WAZ is below -1SD but ≥-2SD are labeled as at risk of underweight. WAZ between -1SD and +1SD (WAZ≥-1SD and ≤+1SD) is normal. Children who has WAZ higher than +1SD and ≤+2SD have a possible risk of overweight.

Results of anthropometric screening showed that 485 (27.5%) out of 1784 children had acute malnutrition as per WAZ. Prevalence of moderate underweight was 21.9% and that of severe underweight was 5.3% in the children. More than One third (37.8%) of the children were at risk of underweight. Only one third (34%) of the screened children had normal WAZ. Prevalence of severe underweight (5.6 % in boys and 5.1% in girls) and moderate underweight (22.1% in boys and 21.7% in girls) was comparable between the genders. Almost equal percentage of boys and girls were at risk of underweight and at possible risk of overweight. Thus, there was no significant difference in the prevalence of underweight between boys and girls (Table 4.15)

Age wise prevalence of underweight is shown in (Table 4.16) The prevalence of severe underweight and moderate underweight was highest among children aged 36-59 months (6% and 27% respectively) followed by 7-35 months (5% and 20% respectively). Thus, indicates that prevalence of underweight increased with the age.

Analysis of anthropometric measurements done by the AWW showed that that 398 (28.7%) children were underweight. According to the secondary data, prevalence of moderate underweight was 21.1% and that of severe underweight was 7.6% in the children. A total of 43.9% children were at risk of underweight. Only one fourth (26.8%) of the screened children had normal WAZ. Prevalence of risk

of overweight was only 0.7%. The secondary data reported higher prevalence of both underweight as compared to the primary data collected under this study. The difference reflected in the secondary data showed high statistical significance.

Unlike primary data, secondary data reported considerably higher prevalence of underweight among boys as compared to girls. Possible Risk of Overweight was also higher among boys than girls as per the secondary data. (Table 4.17)

Table 4.15 Genderwise Prevalence of Underweight (N=1784)

Categories	Male		Female		Total		Chi-square	'p' Value
	n	%	n	%	n	%		
Severe Underweight	51	5.6	44	5.1	95	5.3	0.891	0.926
Moderate Underweight	199	21.7	191	22.1	390	21.9		
At Risk	348	37.9	326	37.6	674	37.8		
Normal	312	34.0	294	33.9	606	34.0		
Possible Risk of Overweight	8	0.9	11	1.3	19	1.1		

Table 4.16 Age wise Prevalence of Underweight (N=1784)

	0-6 months		7-35 months		36- 59 months		Total	
	N	%	N	%	N	%	N	%
AT RISK	54	30.9%	353	37.5%	267	40.0%	674	37.8%
MODERATE UNDERWEIGHT	20	11.4%	190	20.2%	180	26.9%	390	21.9%
NORMAL	90	51.4%	336	35.7%	180	26.9%	606	34.0%

POSSIBLE RISK OF OW	5	2.9%	13	1.4%	1	0.1%	19	1.1%
SEVERE UNDERWEIGHT	6	3.4%	49	5.2%	40	6.0%	95	5.3%

Table 4.17 Genderwise Prevalence of Underweight according to Recorded Data by AWW (N=1391)

Categories	Male (N=702)		Female (N=689)		Total (N=1391)		Chi-square	'p' Value
	n	%	n	%	n	%		
Severe Underweight	76	10.8	29	4.2	105	7.6		
Moderate Underweight	159	22.6	134	19.4	293	21.1	29.189	0.000***
At Risk	290	41.3	321	46.6	611	43.9		
Normal	173	24.6	200	29.0	373	26.8		
Possible Risk of Overweight	4	0.6	5	0.7	9	0.7		

Phase II

ASSESS THE IYCF PRACTICES FOLLOWED BY MAM CHILDREN

(Table 4.18) shows the demographic profile of the MAM children. A total of 247were identified as MAM in Phase I, of which 16 were not contacted due to relocation of the children and time constrain. Thus, mothers of 231 MAM children were interviewed in Phase II. Demographic information revealed that 79% of the children were Hindus followed by 18% Muslim, and 3% Christian. According to caste classification, 46% of children belonged to the OBC category accompanied by 24% SC, 15% ST and 15% in the General category. Around 45% of children lived in the extended family followed by 40% lived in the nuclear family and only 14% in joint family. The distribution was similar in both males and females. Majority of the families owned their house. According to Kuppuswami classification, majority belonged to Upper Lower class (50%) followed by Lower Middle class (47%). Only one family of male child belonged to Lower class. Majority had monthly family income in the range of Rs. 9308-27882 followed by rupees less than 9307. No significant difference was observed among males and females.

EDUCATION OF MOTHER

One of the key elements influencing IYCF practices is the education of the mothers. As shown in (Table 4.19) of the total mothers, only 4% of working mothers were illiterate. Majority of the mothers had completed High school (36%) followed by Middle school (35%). The trend was similar among males and females. However, a greater number of mothers among females had completed primary school compared to male

EDUCATION AND OCCUPATION OF HEAD OF THE FAMILY

Similar observations were seen in education of the head of the family. Majority had completed high school (42%) followed by middle school (24%) and primary schooling (12%). Only 9.5% of head of the family had completed graduation while 8% were illiterate. Looking at the occupational status of head of the family, majority of them were skilled workers, shop and market sales workers (61%), 23% had an elementary occupation, 6% were clerks, 5% were Plant & Machine Operators & Assemblers (Table 4.19)

Table 4.18 **Socio Demographic Information**

	Female		Male		Total	
	N	%	N	%	N	%
Religion						
Christian	3.0	2.5%	4.0	3.6%	7.0	3.0%
Hindu	91.0	75.8%	92.0	82.9%	183.0	79.2%
Muslim	26.0	21.7%	15.0	13.5%	41.0	17.7%
Caste						
general	18.0	15.0%	16.0	14.4%	34.0	14.7%
other backward class	53.0	44.2%	54.0	48.6%	107.0	46.3%
scheduled caste	28.0	23.3%	27.0	24.3%	55.0	23.8%
scheduled tribe	21.0	17.5%	14.0	12.6%	35.0	15.2%
Type of family						
Extended	55.0	45.8%	49.0	44.1%	104.0	45.0%
Joint	15.0	12.5%	18.0	16.2%	33.0	14.3%
Nuclear	50.0	41.7%	44.0	39.6%	94.0	40.7%
Own the house						
No	29.0	24.2%	27.0	24.3%	56.0	24.2%
Yes	91.0	75.8%	84.0	75.7%	175.0	75.8%
Income cat						
≤9307	54.0	45.0%	54.0	48.6%	108.0	46.8%
27883-46474	2.0	1.7%	.0	0.0%	2.0	0.9%
46475-69534	.0	0.0%	1.0	0.9%	1.0	0.4%
92951-185894	1.0	0.8%	2.0	1.8%	3.0	1.3%

9308-27882	63.0	52.5%	54.0	48.6%	117.0	50.6%
Kuppuswami Classification						
Lower (V)	.0	0.0%	1.0	0.9%	1.0	0.4%
Lower middle (III)	55.0	45.8%	54.0	48.6%	109.0	47.2%
Upper lower (IV)	64.0	53.3%	51.0	45.9%	115.0	49.8%
Upper middle (II)	1.0	0.8%	5.0	4.5%	6.0	2.6%

Table 4.19 EDUCATIONAND OCCUPATION STATUS

	Female		Male		Total	
	N	%	N	%	N	%
Education of MOTHER						
Graduate	7.0	5.8%	18.0	16.2%	25.0	10.8%
High School Certificate	45.0	37.5%	38.0	34.2%	83.0	35.9%
Intermediate or Diploma	2.0	1.7%	1.0	0.9%	3.0	1.3%
Middle School Certificate	40.0	33.3%	40.0	36.0%	80.0	34.6%
Primary School Certificate	20.0	16.7%	11.0	9.9%	31.0	13.4%
Illiterate	6.0	5.0%	3.0	2.7%	9.0	3.9%
Education of head						
Graduate	7.0	5.8%	15.0	13.5%	22.0	9.5%
High School Certificate	52.0	43.3%	46.0	41.4%	98.0	42.4%
Intermediate or Diploma	5.0	4.2%	5.0	4.5%	10.0	4.3%
Middle School Certificate	28.0	23.3%	28.0	25.2%	56.0	24.2%
Primary School Certificate	17.0	14.2%	10.0	9.0%	27.0	11.7%
Illiterate	11.0	9.2%	7.0	6.3%	18.0	7.8%
Occupation of head						
Clerks	8.0	6.7%	6.0	5.4%	14.0	6.1%
Craft & Related Trade Workers	5.0	4.2%	1.0	0.9%	6.0	2.6%
Elementary Occupation	24.0	20.0%	28.0	25.2%	52.0	22.5%

Legislators, Senior Officials & Managers	.0	0.0%	1.0	0.9%	1.0	0.4%
Plant & Machine Operators & Assemblers	8.0	6.7%	4.0	3.6%	12.0	5.2%
Professionals	.0	0.0%	1.0	0.9%	1.0	0.4%
Skilled Agricultural & Fishery Workers	2.0	1.7%	.0	0.0%	2.0	0.9%
Skilled Workers and Shop & Market Sales Workers	71.0	59.2%	69.0	62.2%	140.0	60.6%
Technicians and Associate Professionals	2.0	1.7%	1.0	0.9%	3.0	1.3%

WATER AND SANITATION HYGIENE (WASH) PRACTICES

All the households had safe drinking facilities available, with most of the household having piped water facilities available inside their house. 95% of the families treat their water before consuming. Majority strained the water through a cloth (64%), while 20% boiled the water for safe consumption. Only 11% had water filters at their home. All the families used LPG gas as fuel for cooking, only one male child's mother used wood for cooking. With regards to toilet facility, all the families had toilet facility available at their home. Only one family used common public toilet (Table 4.20)

Table 4.20 **WASH PRACTICES OF THE FAMILY**

	Female		Male		Total	
	N	%	N	%	N	%
Source of drinking water						
Piped water	120.0	100.0%	110.0	99.1%	230.0	99.6%
Well water	.0	0.0%	1.0	0.9%	1.0	0.4%
Treat drinking water						
No	8.0	6.7%	5.0	4.5%	13.0	5.6%
Yes	112.0	93.3%	106.0	95.5%	218.0	94.4%
If yes, what						
Boil	26.0	21.7%	21.0	18.9%	47.0	20.3%
Strain through a cloth	73.0	60.8%	73.0	65.8%	146.0	63.2%
Use water filter	13.0	10.8%	12.0	10.8%	25.0	10.8%
Fuel used for cooking						
LPG/natural gas	120.0	100.0%	110.0	99.1%	230.0	99.6%
Wood	.0	0.0%	1.0	0.9%	1.0	0.4%
Toilet facility						
Community toilet	1.0	0.8%	.0	0.0%	1.0	0.4%
Home toilet	119.0	99.2%	111.0	100.0%	230.0	99.6%

Table 4.21 Sanitation and hygiene

	Female		Male		Total	
	N	%	N	%	N	%
Wash their hands with soap	120.0	100.0%	111.0	100.0%	231.0	100.0%
After toilet	120.0	100.0%	111.0	100.0%	231.0	100.0%
Before cooking	112.0	93.3%	102.0	91.9%	214.0	92.6%
Before eating	119.0	99.2%	111.0	100.0%	230.0	99.6%
After cleaning baby's backside	3.0	2.5%	4.0	3.6%	7.0	3.0%
Before feeding baby	16.0	13.3%	26.0	23.4%	42.0	18.2%

With respect to hand washing practices, all the mothers responded that they washed their hands with soap. When inquired when they washed their hands, all responded after using washroom, and before eating, 92% before cooking, only 3% washed their hands after cleaning baby's clothes and only 18% before feeding the baby. Thus, indicating poor sanitation and hygiene practices followed by the mother or caregivers. (Table 4.21)

Storage Practices of Complementary food

The majority of mothers (42.0%) did not store supplemental food to feed their children later, followed by 45.0% of women who kept the food for consumption later and only a few moms kept the food for more than 4 hours to feed their children. Most of the mother practiced to cut the vegetables before washing the vegetable (Table 4.22)

Table 4.22 Storage Practices

	Female		Male		Total	
	Count	Column N %	Count	Column N %	Count	Column N %
Store complementary food						
Doesn’t store	41.0	34.2%	56.0	50.5%	97.0	42.0%
For 2 – 3 hours	54.0	45.0%	47.0	42.3%	101.0	43.7%
More than 4 hours	25.0	20.8%	8.0	7.2%	33.0	14.3%
Cut the vegetables						
After washing	46.0	38.3%	52.0	46.8%	98.0	42.4%
Before washing	74.0	61.7%	59.0	53.2%	133.0	57.6%

Information regarding supplementary nutrition

(Table 4.23) displays how "Bal Shakti" (THR), provided by the ICDS for children ages 6–59 months, is accessed and used. If ingested as directed, it may improve one's nutritional state. Only 71.0% of children were receiving extra nutrition (double ration) from ICDS. Some families refused to consume Bal Shakti for various reasons, including the fact that their children disliked the flavour and refused to eat it, or the mother refused to take packets to feed her child and also found a newly registered one. Children older than 3 years received hot cooked meals from the AWCs, while infants younger than 6 months did not receive bal shakti as their mothers received matrushakti. It was found that all of them received Bal Shakti once a month. On Mamta Divas, Bal Shakti packages were given out. 78.5 percent of mothers said they received seven packets. On average, 4 packets were consumed by kids (10.4%). When a child is MAM and older than 3 years old, they occasionally receive 4 packets to ingest. Only 51.8% of mothers said they regularly offered their children Bal Shakti to eat. 69.5% of children alone consumed THR. Although the majority of children (62.2%) prefer the taste of THR, it was shown that 37.8% of children didn't like the taste. Mothers prepare several types of

meals for their children from the packets. Porridge was the most popular food among the children (67.1%), followed by Halwo, Sheero, Sukhadi (34.1%), and other dishes. The majority of mothers believed that Bal Shakti was beneficial for children's health (42.7%) and helped with weight gain (36.0%) (Table 4.24).

Table 4.23 Information regarding supplementary nutrition

	Female		Male		Total	
	Count	Column N %	Count	Column N %	Count	Column N %
Receive Balshakti						
No	27.0	22.5%	40.0	36.0%	67.0	29.0%
Yes	93.0	77.5%	71.0	64.0%	164.0	71.0%
If no, why						
Child receives HCM in AWC	23.0	19.2%	24.0	21.6%	47.0	20.3%
Mother receives Matrushakti	3.0	2.5%	14.0	12.6%	17.0	7.4%
Not going to take balshakti	.0	0.0%	2.0	1.8%	2.0	0.9%
Register today	1.0	0.8%	.0	0.0%	1.0	0.4%

Table 4.24 Bal shakti packets

	Female		Male		Total	
	N	%	N	%	N	%
How often do you get Bal Shakti						
Once a month	89.0	95.7%	68.0	95.8%	157.0	95.7%
Twice a month	4.0	4.3%	3.0	4.2%	7.0	4.3%

How many packets are received						
2.0	2.0	2.2%	.0	0.0%	2.0	1.2%
3.0	4.0	4.3%	1.0	1.4%	5.0	3.0%
4.0	9.0	9.7%	8.0	11.3%	17.0	10.4%
5.0	.0	0.0%	2.0	2.8%	2.0	1.2%
6.0	1.0	1.1%	.0	0.0%	1.0	0.6%
7.0	73.0	78.5%	56.0	78.9%	129.0	78.7%
8.0	1.0	1.1%	.0	0.0%	1.0	0.6%
9.0	1.0	1.1%	.0	0.0%	1.0	0.6%
10.0	2.0	2.2%	4.0	5.6%	6.0	3.7%
Do you receive it regularly						
No	5.0	5.4%	5.0	7.0%	10.0	6.1%
Yes	88.0	94.6%	66.0	93.0%	154.0	93.9%
Does your child consume it regularly						
No	41.0	44.1%	38.0	53.5%	79.0	48.2%
Yes	52.0	55.9%	33.0	46.5%	85.0	51.8%
How are the packets consumed						
Shared by other family members	9.0	9.7%	9.0	12.7%	18.0	11.0%
Shared by the siblings	20.0	21.5%	11.0	15.5%	31.0	18.9%
Solely by the child	63.0	67.7%	51.0	71.8%	114.0	69.5%
Does your child like the taste						
No	32.0	34.4%	30.0	42.3%	62.0	37.8%
Yes	61.0	65.6%	41.0	57.7%	102.0	62.2%
Porridge	62.0	66.7%	48.0	67.6%	110.0	67.1%

Roti/Thepla	9.0	9.7%	6.0	8.5%	15.0	9.1%
Halwo/Sheero/Sukhadi	34.0	36.6%	22.0	31.0%	56.0	34.1%
As it is	1.0	1.1%	1.0	1.4%	2.0	1.2%
Muthiya	1.0	1.1%	1.0	1.4%	2.0	1.2%
Upma	.0	0.0%	1.0	1.4%	1.0	0.6%
Don't make anything	1.0	1.1%	1.0	1.4%	2.0	1.2%
Do you find any benefit in your child consuming Bal Shakti						
No	51.0	54.8%	43.0	60.6%	94.0	57.3%
Yes	42.0	45.2%	28.0	39.4%	70.0	42.7%
Weight gain	35.0	37.6%	24.0	33.8%	59.0	36.0%
Active & Healthy	14.0	15.1%	11.0	15.5%	25.0	15.2%
Satiety	3.0	3.2%	.0	0.0%	3.0	1.8%

Immunization Coverage

The children's immunization records are displayed in this table (Table 4.24). It was reported that all newborns received the BCG vaccine in full (100%) followed by the OPVO, OPV/IPV12&3, and Pentavalent12&3 vaccines (99.1%). Rotavirus vaccinations were given to 64.5% of children. Almost all children have had their first dosage of vitamin A (Table 4.25).

Morbidity profile

The morbidity profile of the kids is shown in this table. More than half of the kids had experienced some kind of illness. Children with fever in the past two weeks (21.2%) were significantly more likely to have acute respiratory infections in the past 15 days (41.1%). Children also have vomiting and diarrhea (2.6%). In the past 15 days, none of the children had malaria or the measles (Table 4.26).

Diet Quality of Children

The DQQ consists of yes/no questions on meals consumed the day previous day and the night relate to 29 different categories of food. The following are the food groups: 1) foods made from grains; 2) whole grains; 3) white roots, tubers, and plantains; 4) legumes; 5) vitamin A–rich orange vegetables; 6) dark green leafy vegetables; 7) other vegetables; 8) vitamin A–rich fruits; 9) citrus; 10) other fruits; 11) baked/grain-based sweets; 12) other sweets; 13) eggs; 14) cheese; 15) yogurt; 16) processed meats; 17) unprocessed red meat (ruminant, for example, beef, lamb, and goat); 18) unprocessed red meat (nonruminant, for example, pork); 19) poultry; 20) fish and seafood; 21) nuts and seeds; 22) packaged ultra-processed salty snacks; 23) instant noodles; 24) deep fried foods; 25) fluid milk; 26) sugar-sweetened beverages (soft drinks); 27) fruit juice and fruit-flavored drinks; 28) sweet tea/coffee/cacao; and 29) fast food.

Table 4.25 Immunization

		Female		Male		Total	
		N	%	N	%	N	%
BCG	Yes	120.0	100.0%	111.0	100.0%	231.0	100.0%
Hepatitis-B	No	7.0	5.8%	9.0	8.1%	16.0	6.9%
	Yes	113.0	94.2%	102.0	91.9%	215.0	93.1%
OPVO	No	.0	0.0%	2.0	1.8%	2.0	0.9%
	Yes	120.0	100.0%	109.0	98.2%	229.0	99.1%
OPV/IPV-12&3	No	.0	0.0%	2.0	1.8%	2.0	0.9%
	Yes	120.0	100.0%	109.0	98.2%	229.0	99.1%
Penta12&3	No	1.0	0.8%	4.0	3.6%	5.0	2.2%
	Yes	119.0	99.2%	107.0	96.4%	226.0	97.8%
Rotavirus vaccine	No	12.0	10.0%	19.0	17.1%	31.0	13.4%
	not applicable	30.0	25.0%	21.0	18.9%	51.0	22.1%
	Yes	78.0	65.0%	71.0	64.0%	149.0	64.5%

Measles MMR 1stdose	No	4.0	3.3%	6.0	5.4%	10.0	4.3%
	Not applicable	10.0	8.3%	20.0	18.0%	30.0	13.0%
	Yes	106.0	88.3%	85.0	76.6%	191.0	82.7%
VitaminA 1stdose	No	5.0	4.2%	7.0	6.3%	12.0	5.2%
	Not applicable	10.0	8.3%	20.0	18.0%	30.0	13.0%
	Yes	105.0	87.5%	84.0	75.7%	189.0	81.8%
DPT Booster shot	No	11.0	9.2%	11.0	9.9%	22.0	9.5%
	Not applicable	44.0	36.7%	43.0	38.7%	87.0	37.7%
	Yes	65.0	54.2%	57.0	51.4%	122.0	52.8%
Measles MMR 2nddose	No	11.0	9.2%	9.0	8.1%	20.0	8.7%
	Not applicable	44.0	36.7%	43.0	38.7%	87.0	37.7%
	Yes	65.0	54.2%	59.0	53.2%	124.0	53.7%
OPV Booster shot	No	10.0	8.3%	8.0	7.2%	18.0	7.8%
	Not applicable	44.0	36.7%	43.0	38.7%	87.0	37.7%
	Yes	66.0	55.0%	60.0	54.1%	126.0	54.5%
VitaminA 2ndto9th dose	No	15.0	12.5%	11.0	9.9%	26.0	11.3%
	Not applicable	38.0	31.7%	41.0	36.9%	79.0	34.2%
	Yes	67.0	55.8%	59.0	53.2%	126.0	54.5%
Number of VitaminA doses recorded	1	52.0	77.6%	40.0	66.7%	92.0	72.4%
	2	14.0	20.9%	20.0	33.3%	34.0	26.8%
	8	1.0	1.5%	.0	0.0%	1.0	0.8%

Table 4.26 Morbidity profile of the children

	Female		Male		Total	
	N	%	N	%	N	%
Fever	26.0	21.7%	23.0	20.7%	49.0	21.2%
Diarrhea	4.0	3.3%	2.0	1.8%	6.0	2.6%
Vomiting	5.0	4.2%	1.0	0.9%	6.0	2.6%
ARI	50.0	41.7%	45.0	40.5%	95.0	41.1%
Measles	0.0	0.0%	0.0	0.0%	0.0	0.0%
Malaria	0.0	0.0%	0.0	0.0%	0.0	0.0%

Almost all the children (90%) had consumed whole grains the previous day (Table 4.26). 36% children consumed white roots and tubers but only 2.6% had consumed millets in their diet. Pulses was consumed by 83% of the children, nuts and oilseed (14%), eggs was consumed by only 9% of the children, whereas other non-vegetarian foods like meat, fish and poultry was consumed by 8%. Overall animal source was consumed by 75% of the children. Poor consumption of Vitamin A rich foods was observed as 4% consumed Vitamin A rich orange vegetables, 2% dark GLVs, and 8% vitamin A rich fruits. 58% children consumed other fruits whereas Vitamin C rich fruits was not consumed by many children. 43% consumed other vegetables. 71% of the children consumed dairy previous day.

Baked grain-based sweets was consumed by 71% of the children. Packaged ultra-processed salty snacks was consumed by 57% of the children. Other sweets like mithai, ice cream, milkshake, toffees, or chocolates was consumed by 45% of the children. 44% consumed tea or coffee previous day. Instant noodles was consumed by 6% of the children. Gender wise no difference was observed in the consumption pattern of both males and females (Table 4.26).

Assessing the diet quality of children using seven food groups, the most commonly consumed food group was grains, white roots and tubers (96%) and pulses, lentil and nuts and oilseeds (90%). Least consumed foods were flesh foods which was consumed by only 8% of the children. Only 10% children consumed eggs previous day. The consumption of other fruits and vegetables and dairy products was 76% respectively. Gender wise no difference was observed in the consumption pattern (Table 4.27).

Table 4.27 **Different Food Group Consumed by Children**

DQQ food group	Female		Male		Total	
	N	%	N	%	N	%
Wholegrains	114.0	95.0%	94.0	84.7%	208.0	90.0%
Millets	4.0	3.3%	2.0	1.8%	6.0	2.6%
White roots tubers & plantains	45.0	37.5%	38.0	34.2%	83.0	35.9%
Pulses	102.0	85.0%	90.0	81.1%	192.0	83.1%
Vitamin-A rich orange vegetables	6.0	5.0%	4.0	3.6%	10.0	4.3%
Dark green leafy vegetables	1.0	0.8%	3.0	2.7%	4.0	1.7%
Other vegetables	56.0	46.7%	44.0	39.6%	100.0	43.3%
Vitamin-A rich fruits	11.0	9.2%	7.0	6.3%	18.0	7.8%
Citrus fruits	9.0	7.5%	6.0	5.4%	15.0	6.5%
Other fruits	75.0	62.5%	59.0	53.2%	134.0	58.0%
Animal source food consumption	96.0	80.0%	77.0	69.4%	173.0	74.9%
Eggs	13.0	10.8%	8.0	7.2%	21.0	9.1%
Meat poultry and fish	10.0	8.3%	8.0	7.2%	18.0	7.8%

Dairy	90.0	75.0%	75.0	67.6%	165.0	71.4%
Nuts and seeds	18.0	15.0%	14.0	12.6%	32.0	13.9%
Baked grain-based sweets	90.0	75.0%	74.0	66.7%	164.0	71.0%
Other sweets	61.0	50.8%	43.0	38.7%	104.0	45.0%
Packaged ultra-processed salty snacks	74.0	61.7%	57.0	51.4%	131.0	56.7%
Instant noodles	9.0	7.5%	4.0	3.6%	13.0	5.6%
Deep fried foods	9.0	7.5%	14.0	12.6%	23.0	10.0%
Sweet tea coffee cocoa	57.0	47.5%	45.0	40.5%	102.0	44.2%
Fruit juice and fruit flavoured drinks	7.0	5.8%	9.0	8.1%	16.0	6.9%
Sugar sweetened beverages	2.0	1.7%	2.0	1.8%	4.0	1.7%
Fast food	1.0	0.8%	.0	0.0%	1.0	0.4%

Table 4.28 Gender wise 7 Food Groups Consumed by the Children

Food Groups	Female		Male		Total	
	N	%	N	%	N	%
Grains white roots and tubers and plantains	114.0	97.4%	94.0	94.9%	208.0	96.3%
Pulses beans peas lentils nuts and seeds	105.0	89.7%	90.0	90.9%	195.0	90.3%
Dairy products	90.0	76.9%	75.0	75.8%	165.0	76.4%
Flesh foods	10.0	8.5%	8.0	8.1%	18.0	8.3%
Eggs	13.0	11.1%	8.0	8.1%	21.0	9.7%
Vitamin-A rich fruits and vegetables	16.0	13.7%	13.0	13.1%	29.0	13.4%

Other fruits and vegetables	91.0	77.8%	72.0	72.7%	163.0	75.5%

Age wise analysis revealed that 6 children less than 6 months were introduced complementary foods early. Consumption of more food groups was observed among older children compared to the younger ones (Table 4.28)

Table 4.29 Age wise 7 Food Groups Consumed by the Children

Food Groups	0-6 months (N=6)		7-35 months (N=137)		36-59 months (N=78)		Total (N=221)	
	N	%	N	%	N	%	N	%
Grains, white roots and tubers and plantains	4.0	66.7%	131.0	95.6%	73.0	100.0%	208.0	96.3%
Pulses, beans, peas, lentils nuts and seeds	.0	0.0%	127.0	92.7%	68.0	93.2%	195.0	90.3%
Dairy products	2.0	33.3%	100.0	73.0%	63.0	86.3%	165.0	76.4%
Flesh foods	.0	0.0%	10.0	7.3%	8.0	11.0%	18.0	8.3%
Eggs	.0	0.0%	16.0	11.7%	5.0	6.8%	21.0	9.7%
Vitamin-A rich fruits and vegetables	.0	0.0%	18.0	13.1%	11.0	15.1%	29.0	13.4%
Other fruits and vegetables	1.0	16.7%	100.0	73.0%	62.0	84.9%	163.0	75.5%

Gender wise no difference was observed as the mean MDD of the males was 37% and of females was 33% (Table 4.29). Age wise data revealed that there was significant difference between the age group as the all the children less than 6 months had not met MDD and children age 7-35 months had significantly lower MDD met than children aged 36-59 months (Table 4.30).

Table 4.30 Gender wise MDD met by the Children

	Female		Male		Total	
	N	%	N	%	N	%
MDD not met	38.0	32.5%	37.0	37.4%	75.0	34.7%
MDD met	79.0	67.5%	62.0	62.6%	141.0	65.3%

Table 4.31 Age wise MDD met by the Children

	0-6		7-35		36-59		Total	
	N	%	N	%	N	%	N	%
MDD not met	6.0	100.0%	52.0	38.0%	17.0	23.3%	75.0	34.7%
MDD met	.0	0.0%	85.0	62.0%	56.0	76.7%	141.0	65.3%

In relation to breastfeeding practices, one child was not breastfed at all. Among 230 children, more than half i.e., 57% were breastfed within 1 hour of birth, 29% were breastfed within first day of birth. 9% were breastfed after 24 hours, 3% after 48 hours and 2% after 72 hours of birth.

Table 4.32 Initiation of Breastfeeding

Initiation of breastfeeding after birth	Female (N=119)		Male (N=111)		Total (N=230)	
	N	%	N	%	N	%
Within 1 hour	69.0	58.0%	62.0	55.9%	131.0	57.0%
Within 1 day	37.0	31.1%	30.0	27.0%	67.0	29.1%
After 1 day	7.0	5.9%	13.0	11.7%	20.0	8.7%
After 2 days	5.0	4.2%	2.0	1.8%	7.0	3.0%

After 3 days	1.0	0.8%	4.0	3.6%	5.0	2.2%

An attempt was made assess IYCF indicators among MAM children aged 0-23 months (Table 4.32) and age wise (Table 4.34). The study revealed that 99% children were breastfed. Early initiation of breastfeeding with 1 hour of birth was observed in 58% of children. 79% of the children were exclusively breastfed for first two days after birth. Exclusive breastfeeding among under six months was 86.7% while mixed feeding was seen in 13.3% children. Bottle feeding was seen in 10.5% of children. Continued breastfeeding among children aged 12-23months showed that 44% of the mothers continued breastfeeding in the second year of their children life. Continued breastfeeding above 1 year was significantly higher among females as compared to males.

Table 4.33 **IYCF INDICATORS AMONG CHILDREN AGED 0-23 MOTNHS**

	Female		Male		Total	
	N	%	N	%	N	%
Ever breastfed	58.0	98.3%	55.0	100.0%	113.0	99.1%
Early initiation of breastfeeding	35.0	59.3%	31.0	56.4%	66.0	57.9%
Exclusively breastfed for the first two days after birth	45.0	76.3%	45.0	81.8%	90.0	78.9%
Exclusive breastfeeding under six months	3.0	100.0%	10.0	83.3%	13.0	86.7%
Mixed milk feeding under six months	.0	0.0%	2.0	16.7%	2.0	13.3%
Continued breastfeeding12-23 months	31.0	52.5%	19.0	34.5%	50.0	43.9%
Bottle feeding 0-23 months	8.0	13.6%	4.0	7.3%	12.0	10.5%
Introduction of solid semi-solid or soft foods 6-8 months	7.0	11.9%	8.0	88.9%	15.0	93.8%

Egg and or flesh food consumption 6-23 months	7.0	11.9%	4.0	7.3%	11.0	9.6%
Sweet beverage consumption 6-23 months	18.0	30.5%	12.0	21.8%	30.0	26.3%
Unhealthy food consumption 6-23 months	28.0	47.5%	17.0	30.9%	45.0	39.5%
Zero vegetable or fruit consumption 6-23 months	16.0	27.1%	19.0	34.5%	35.0	30.7%
Minimum dietary diversity 6-23 months	33.0	55.9%	17.0	30.9%	50.0	43.9%
Minimum milk feeding frequency for non-breastfed children 6-23 months	9.0	15.3%	4.0	7.3%	13.0	11.4%

94% of children aged 6-8 mothers were introduced to solid and semi-solid foods. Animal foods such as eggs or flesh foods were consumed by only 10% of the children. Consumption of animal foods was significantly higher among females than males. Sweet beverage consumption among children aged 6-23 months was 26%. Nearly 40% children had consumed unhealthy foods previous day of the interview. 31% of the children aged 6-23 months had not consumed any vegetable or fruit a prior to the interview and the prevalence was significantly higher among males. 44% of the children met Minimum dietary diversity of which 55% were females and 31% males and the difference was significant.

Table 4.34 **AGE WISE IYCF INDICATORS**

	0-6 months		7-23 months		Total	
	N	%	N	%	N	%
Ever breastfed	20.0	100.0%	93.0	98.9%	113.0	99.1%
Early initiation of breastfeeding	12.0	60.0%	54.0	57.4%	66.0	57.9%

Exclusively breastfed for the first two days after birth	15.0	75.0%	75.0	79.8%	90.0	78.9%
Exclusive breastfeeding under six months	13.0	86.7%	.0	0.0%	13.0	86.7%
Mixed milk feeding under six months	2.0	13.3%	.0	0.0%	2.0	13.3%
Continued breastfeeding12-23 months	.0	0.0%	50.0	53.2%	50.0	53.2%
Bottle feeding 0-23 months	2.0	10.0%	10.0	10.6%	12.0	10.5%
Introduction of solid semi-solid or soft foods 6-8 months	4.0	20.0%	11.0	11.7%	15.0	13.2%
Egg and or flesh food consumption 6-23 months	.0	0.0%	11.0	11.7%	11.0	9.6%
Sweet beverage consumption 6-23 months	.0	0.0%	30.0	31.9%	30.0	26.3%
Unhealthy food consumption 6-23 months	.0	0.0%	45.0	47.9%	45.0	39.5%
Zero vegetable or fruit consumption 6-23 months	4.0	20.0%	31.0	33.0%	35.0	30.7%
Minimum dietary diversity 6-23 months	.0	0.0%	50.0	53.2%	50.0	43.9%
Minimum milk feeding frequency for non-breastfed children 6-23 months	.0	0.0%	13.0	13.8%	13.0	11.4%

DISCUSSION

To eradicate all kinds of hunger and malnutrition by 2030 and achieve internationally agreed-upon targets for stunting and wasting in children under the age of five, eradicating malnutrition remains a key goal of the UN Sustainable Development Goals (UN SDGs)(UN 2020). Nearly half of all preventable deaths in children under the age of five are caused by malnutrition. Millions of infants and young children in India are at risk of losing their lives, which is a serious worldwide problem.

Exclusive breastfeeding for the first six months of life provides the complete nutritional requirements for healthy infants. Continued breastfeeding along with complementary foods provides optimum growth and development which is essential for a child in the second year and beyond (Nkrumah, 2017).

Children with acute malnutrition can be diagnosed and admitted using the weight-for-height Z-score (WHZ) and mid-upper arm circumference (MUAC), two independent anthropometric measures. In the present study, children were identified as SAM and MAM using both the measurements.

In the present study, 1784 children were screened of which 918 were males and 866 females.175 children were 0-6 months age, 941 were 7-35 months and 668 children were more than 36 months. Prevalence of moderate acute malnutrition was 10% and severe acute malnutrition was 2.2% with 12.5% prevalence of acute malnutrition using WHZ scores. The findings of the study are similar to findings of NFHS-5. Another study in two blocks of Meerut district with 70 villages found the prevalence of SAM (WFH *Z* scores <−3SD) to be 2.2%, 13.7% were suffering from moderate acute malnutrition (WFH Z scores <−3 to −2 SD). A total of 7160 (38.8%) children had WFH <−2 to −1 SD, and 8376 (45.3%) children had WFH Z score <−1SD (Bhadoria ASet.al,2017). According to the authors of a similar community-based study from Puducherry, 3.6% of slum children in the age range of 6 months to 5 years had SAM (Shewade et. al, 2013).

Using MUAC, 10.2% children had acute malnutrition. Prevalence of MAM was 9% and of SAM was 1.2% in the children showing a lower prevalence than WHZ z scores. MUAC categorized a larger proportion of girls and young children as severely wasted compared with WHZ. Similar trend was observed in a study in Southern Ethopia (Tadesse AW et.al,2017)

Prevalence of moderate underweight was 21.9% and severe underweight was 5.3% While 19.8% were moderately stunted and 7.7% were severe stunted. In a study conducted in Satkhira district in Bangladesh reported 49.1% of the children were moderately malnourished on weight for age (Underweight) Z-score, 22.7% height for age (stunting) Z-score, 39% on weight for height (Wasting) Z-score and more than 95% children were moderately malnourished according to mid upper arm circumference (MUAC) classification (Miah, M. A. S., & Sarder, M. H. (2019).

Moderate acute malnutrition was associated with male child, older children, however, using MUAC it was more in young children, more nuclear families, more in children belonging to backward castes, lesser monthly income and belonging to lower socio-economic class. Poor WASH practices are also associated with high incidence of child to be malnourished.

A study in Hawassa Zuria, South Ethiopia revealed that the prevalence of wasting was significantly higher among female children (31.10%) than male children (24.20%). Prevalence of wasting was greatest among children aged between 48-60 months (35.6%). Wasting was significantly associated with poor /lower wealth rank households' socio-economic conditions. Those children between 36-47 months of age were 2.87 times more likely to be wasted than 48-60 months (Tsedeke et.al 2016). Another study in Afghanistan revealed that 35.0% the children had acute malnutrition (wasting). A significant association of acute malnutrition among U5 children was found with the education level of household heads, age of household heads, income, education level of mothers, age of children, history of children with diarrhea in the last two weeks of data collection, feeding frequency, water sources, and iodized salt. An increase in education level of parents, household income, and quality of WASH would result in a significant decrease in prevalence of wasting among U5 children (Frozanfar et.al (2016)).

SUMMARY AND CONCLUSION

SUMMARY AND CONCLUSION

The first 1,000 days of life are critical for forming the brain's architecture, which is becoming more and more related to potential for lifelong achievement. Long-term advantages for human development result from investments made in the first 1,000 days. During the first 1,000 days of a child's life, inadequate nutrition can have negative effects such as stunting, wasting, being overweight or underweight. Children who eat well and stay healthy are less likely to develop chronic diseases. The Infant and Young Child Feeding Practices (IYCF) are a set of accepted guidelines for feeding infants and young children who are under the age of two. While age-appropriate supplemented feeding can significantly lessen stunting and the associated disease load, nursing still offers the kid the best nutrition possible and avoids infections. Diversified eating habits, food fortification, and supplementation are the answers to the problem of undernutrition. It's crucial to change up their diets. Dietary diversity is a qualitative indicator of food intake that shows availability to a variety of foods in the home and serves as a stand-in for a person's diet's nutrient sufficiency. complementary foods from various food groups supply the micro and macronutrients required for children's growth and development. Food resources are unavailable and poorly utilized due to inadequate knowledge, harmful beliefs, and practices. People in metropolitan areas appear to be the most exploited and overlooked, making them more susceptible to starvation, sickness, and disorder, as well as morbidity and death. Their desperation is brought on by illiteracy, poverty, lack of access to safe drinking water, widespread ignorance about diseases, and hostile environments. These factors make urban children particularly susceptible to malnutrition.

Methodology

Phase 1: Anthropometric Measurement

The investigation was conducted in Vadodara's urban area. The 439 AWCs in urban Vadodara, which are separated into four ghataks— East zone, West zone, North zone, and South zone—have data on children. Then, 9 AWCs were chosen at random from each ghatak. As a result, 36 AWCs in all were included in the study. However, only 6 AWCs in the west zone of ghatak II were completed due to time restrictions. As a result, 33 AWCs in all were included in the study. The study included all anganwadi-registered children between the ages of 0 and 59 months. All children between the ages

of 0 and 59 months had their anthropometrics measured. Each anganwadi had three visits in a row to cover the kids.

PHASE 2 :

For the Phase II, all kids who were classified as MAMs—moderately wasted—were enrolled. A semi-structured questionnaire was used to conduct interviews with MAM mothers who agreed to take part. Data on socioeconomic status, children's anthropometric measurements, dietary diversity, IYCF practices, immunization rates, and morbidity profiles were gathered.

Highlight of phase 1

- The majority of the child (52.7%) were between the ages of 6 and 35 months, while 36.4% were between the ages of 36 and 59 months.
- According to WHZ, anthropometric testing revealed that 223 (12.5%) of the 1784 child exhibited acute malnutrition. In child, MAM prevalence was 10.3% and SAM prevalence was 2.2%.
- WHZ z-score age-specific prevalence of wasting revealed that 2% of cases were SAM, with the majority occurring in children aged 0 to 6 months and the next-oldest group, 7 to 35 months.
- Acute malnutrition is defined as MUAC -12.5 cm. Severe acute malnutrition (SAM) is defined as having a MUAC 11.5, whereas moderate acute malnutrition (MAM) is defined as having a MUAC between 11.5 and 12.5 cm.
- Using MUAC cutoffs, 1% of children in each age group had severe wasting, 8% had moderate wasting, and 80% had normal growth. MUAC was not performed on infants less than 6 months.
- Z-scores with low values indicate stunting in children under the age of six. It serves as a warning sign for childhood chronic malnutrition. Stunting is regarded as HAZ -2SD. Moderately stunted children are those with a HAZ score between -2SD and -3SD.. Severely stunted people are individuals who are both stunted and have HAZ-3SD.
- Children had a prevalence of moderate stunting of 19.8% and severe stunting of 7.7%. 35.8% of the child were at risk of stunting, which is more than one third of them.
- Z-scores with low values indicate underweight in children under the age of six.

- Underweight is defined as WAZ -2SD. Children with a WAZ score of -2SD to -3SD are categorized as having moderate underweight, while those with a WAZ score of -3SD are categorized as having severe underweight.
- According to WAZ, anthropometric examination revealed that 485 (27.5%) of the 1784 children exhibited acute malnutrition. Children had a prevalence of moderate underweight of 21.9% and severe underweight of 5.3%.
- Both genders had similar rates of moderate underweight (22.1% in boys and 21.7% in girls) and severe underweight (5.6% in males and 5.1% in girls).
- The incidence of severe underweight and moderate underweight was highest among children aged 36 to 59 months, according to data on age-specific prevalence of underweight.
- Secondary data, as opposed to primary data, showed a much higher frequency of underweight in males than in girls. According to secondary data, the possible risk of becoming overweight was likewise higher in males than in girls.

Highlight of phase 2

- The majority belonged to the Lower Middle class (47%), which was followed by the Upper Lower class (50%) in Kuppuswami's classification.
- When looking at the occupation of the family head, skilled workers made up the majority (61%), followed by people with elementary occupations (23%), clerks (6%), and plant and machine operators & assemblers (5%).
- All of the houses had access to safe drinking water, with the majority of them also having indoor plumbing. Families in 95% of the cases treat their water before drinking it. The majority (64%) strained the water using a cloth.,
- Regarding restrooms, all the families had access to them at their residence.
- The ICDS offers "Bal shakti" (THR) for kids 6 to 59 months old, and it is used.
- For a number of reasons, some families refused to eat Bal Shakthi, such as the fact that their child didn't like the flavour and wouldn't eat it, or the mother wouldn't take packages to feed her child and also wouldn't register a new one.
- Infants younger than 6 months receive matrushakti for mother instead of Bal shakti, while children older than 3 years old receive hot cooked meals from the AWCs. A youngster who is MAM and older than 3 receives 4 packets to swallow on occasion.

- Only 51.8% of mothers reported feeding their children Bal shakti on a daily basis. The child preferred porridge above other foods (67.1%), Halwo/Sheero/Sukhadi (34.1%), and other dishes. Bal shakti was regarded by most moms (42.7%) as being advantageous for children's health and weight gain (36.0%).
- The BCG vaccine was administered to all newborn infants in its whole (100%) before being followed by the OPVO, OPVIPV12, and Penta12 vaccines (99.1%). 64.5% of children received rotavirus vaccines. practically all children have received their first vitamin A dose.
- 90% of the children reported eating whole grains the day before. Only 2.6% of youngsters consumed millets in their diet, compared to 36% who ate white roots and tubers.
- We found that just 4% of people drank vitamin A-rich orange vegetables, 2% of people ingested vitamin A-rich dark GLVs, and 8% of people consumed vitamin A-rich fruits.
- 71% of the child consumed baked desserts made of grains. Intake of packaged, highly processed, salty snacks by kids was 57%.
- When seven food groups were used to evaluate the quality of children's diets, cereals, white roots and tubers (96%) and pulses, legumes, nuts and oilseeds (90%) were the most often consumed food groups.
- Six infants under six months were given supplemental foods before they were even born, according to a review of their ages.
- There was no difference in the mean MDD between the gender (37% for male and 33% for female), but age-related data showed that there was a significant difference between the age groups as all infants younger than 6 months did not meet the MDD, and children aged 7 to 35 months had significantly lower MDD met than infants aged 36 to 59 months.
- One child was not nursed at all in terms of nursing techniques. More than half of the 230 children, or 57%, were nursed within an hour of birth and 29% within the first day. After 24 hours, 48 hours, and 72 hours of birth, 9%, 3%, and 2% of babies were breastfed, respectively.
- the 0–23 month IYCF indicators for newborns and young children. Most children that have ever breastfed (99.1)
- Only 57.9% of female who began nursing earlier did so for the full 12 to 23-month period.

Conclusion

Disparities between the anthropometric measures taken by investigator and those the AWW reported was observed. Hence, can be concluded, a need to educate the AWW for data input into the software and ongoing monitoring.

A child is predisposed to acute malnutrition by being younger in age, growing up in a small nuclear household, having less educated parents, having a poorer job of the family's head, and having a lower socioeconomic level.

Childcare and feeding practices were the main factors influencing the prevalence of acute malnutrition. Improved food security, integrated programming, social and behaviour change communication techniques aimed at families at risk of undernutrition are all advised to prevent acute malnutrition.

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ANNEXURES

ANNEXURE 1

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.8733 /2022-23.
Date : 14-10- 2022.

To,
Dr. Swati Dhruv [Asst. Professor],
Dept. of Food & Nutrition,
Faculty of Family & Community Sciences,
The M.S. University of Baroda,
Vadodara – 390 002.

Sub. ::- Permission to conduct research in Anganwadi Centres of Urban Baroda.
Ref ::- Your letter No. F.C.Sc./FND/....., Dt. 12/10/2022.

With reference to above cited subject & the matter stated in your letter, the students of Dept. of Food & Nutrition namely - Ms. Tanvi and Ms. Hazel are hereby permitted to conduct research in "ASSESMENT OF ACUTE MALNUTRITION AMONG CHILDREN 0-59 MONTHS IN URBAN BARODA" at the 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 students.

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

ANNEXURE 2

सत्यं शिवं सुन्दरम्
Estd. 1949

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. Tanvi Prajapati's study titled, "**Assessing the prevalence and factors associated with Moderate Acute Malnutrition among Children 0-59 months in Urban Slums of 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/2022/44.**

Prof Mini Sheth
Member Secretary
IECHR

Prof Shagufa Kapadia
Chairperson
IECHR

ZONE WISE AGANWADI

Sr.no	Zone wise
East zone	
1	Warsiya -08
2	Sawad -04
3	Kishanwadi -04
4	Kishanwadi -05
5	Sudamapuri -01
6	Sudamapuri -06
7	Ramdevnagar -02
8	Ramdevnagar -03
9	Vemali -01
West zone	
10	Jetalpur – 01
11	Tandalja – 02
12	Tandalja – 03
13	Tandalja – 06
14	Tandalja – 09
15	Diwalipura – 05
North zone	
16	Ektanagar – 03
17	Navayard – 06
18	Navayard – 09
19	Channi -01
20	Karelibagh – 06
21	Channi -02
22	Navapura -10
23	Shiabagh – 02
24	Shiabagh - 01
South zone	
25	Gajarawadi – 10
26	Danteshwar -03
27	Maneja – 04
28	Danteshwar -02
29	Maneja – 05
30	Manjalpur – 10
31	Vadsar – 02
32	Vadsar – 04
33	Tarsali - 07

ANNEXURE 3

QUESTIONNAIRE PHASE 1

QUESTIONNAIRE : SCREENING FORM

Date : _____

CHILD NAME:

DATE OF BIRTH: _____ **GENDER:** _____

MEASURED

WEIGHT (kg): HEIGHT (cm): _____ MUAC (cm): _____

_____

WHZ: CLASSIFICATION: _____

_____

EDEMA: ***Yes / No*** GRADE: _____

ANGANWARDI CENTRE NAME: _____

RECORDED

WEIGHT (kg): HEIGHT (cm): _____ MUAC (cm): _____

_____

WHZ: WAZ: _____ HAZ: _____

_____

PHASE 2 QUESTIONNAIRE: ASSOCIATED FACTORS

IDENTIFICATION
ANGANWARDI CENTRE NAME: _____
NAME OF INTERVIEWEE: _____
NAME OF THE HOUSEHOLD HEAD: _____
ADDRESS OF HOUSEHOLD: _____
CONTACT NUMBER: _____
CHILD'S NAME: _____

SOCIO-ECONOMIC STATUS

1. How old are you? _____
2. How many children do you have? _____
3. What is your religion?

   1. Hindu 2. Muslim 3. Sikh
   4. Christian 5. Jain 6. Others
4. What is the caste of the household?

   1. Scheduled caste 2. Scheduled tribe
   3. Other backward class 4. General
5. What is the type of family?

   1. Nuclear 2. Joint 3. Extended
6. Does your family own the house you live in?

   1. Yes 2. No
7. What is your education level?

   1. Illiterate 2. Primary School Certificate
   3. Middle School Certificate 4. High School Certificate
   5. Intermediate or Diploma 6. Graduate
   7. Profession or Honours
8. What is the educational level of the household head?

Illiterate 2. Primary School Certificate
3. Middle School Certificate 4. High School Certificate
5. Intermediate or Diploma 6. Graduate
7. Profession or Honors

9. What is the occupation of the household head?

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

10. What is the total monthly income of the family? _____

WATER, SANITATION AND HYGIENE

11. What is your source of drinking water?
1. Piped water 2. Ground water
3. Well water 4. Spring water

12. Do you do anything to the water to make it safer to
1. Yes 2. No 3. Don't know

13. What do you usually do to make the water safer to drink?
1. Boil 2. Add bleach/chlorine 3. Strain through a cloth
4. Use water filter 5. Solar disinfection 6. Let it stand and settle
7. Cover the water container

14. What type of fuel do you use?
1. Electricity 2. LPG/natural gas 3. Biogas
4. Kerosene 5. Coal/lignite 6. Charcoal
7. Wood

15. What type of toilet facility do you have?
1. Home toilet 2. Community toilet 3. No facility

16. Do members of your household wash their hands with soap?
1. Yes 2.No

17. When do they wash their hands?
1. After toilet 2. Before cooking 3.Before eating
4. After cleaning baby's backside 5. Before feeding baby

18. For how long do you store cooked complementary foods?

1. Doesn't store
2. For 2-3 hours
3. More than 4 hours
4. More than 1 day

19. When do you cut the vegetables?
1. Before washing 2. After washing

CHILD PROFILE

20. What is the gender of the child?

1. Male 2. Female

21. How old is (NAME)? _____

22. When was the child born? _____

23. What is the birth order of (NAME)? _____

24. What was the weight of (NAME) at birth? _____

SUPPLEMENTARY NUTRITION

25. Do you get Bal Shakti?

1. Yes 2. No

If no, why? _____

26. How often do you get Bal Shakti?

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

27. How many packets are received in a month?

28. Do you receive it regularly?

1. Yes 2. No

29. Does your child consume it regularly?

1. Yes 2. No

30. How are the packets consumed?

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

31. Does your child like the taste?

1. Yes 2. No

32. In which form do you give Bal Shakti? _____

33. Do you find any benefit in your child consuming Bal Shakti?

a. Yes
b. No

IMMUNIZATION

NO	VACCINATION	YES/NO
34.	BCG	
35.	Hepatitis B	
36.	OPV – 0	
37.	OPV 1,2 & 3	
38.	DPT 1,2 & 3	
39.	Hep B 1,2 & 3	
40.	Measles 1st dose	
41.	Vitam in A (1st dose)	
42.	DPT booster	
43.	Measles 2nd dose	
44.	OPV booster	
45.	Vitam in A (2nd to 9th dose)	
45 a.	Number of Vit. A doses record ed _____	

MORBIDITY PROFILE

No	ILLNESS/DISEASE	PRESENCE IN THE LAST 15 DAYS (Y/N)
46.	Fever	
47.	Diarrhea	
48.	Acute Respiratory Infection (ARI)	
49.	Measles	
50.	Malaria	

IYCF PRACTICES & DIETARY DIVERSITY

If child is between 0-35 months use the table questions below. If between 36-59 months, use the later table of questions.

0-35 months

No.	QUESTION	YES or NO	DON'T KNOW (DK)
51.	Was (NAME) ever breastfed?		
52.	How long after birth was (NAME) first put to the breast?		
	If immediately, indicate "000"		
	If less than one hour, record "00" hours		
	If less than 24 hours, record hours		
	Otherwise, record days		
53.	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, condensed milk, cinnamon water, or sugar water?		
54.	Was (NAME) breastfed yesterday during the day or at night?		
55.	Did (NAME) drink anything from a bottle with a nipple yesterday during the day or at night?		

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...*			
56.	Plain water?		
57.	Infant formula or baby milk such as Amul, Lactogen, or Dexolac?		
45a.	IF YES: How many times did (NAME) drink infant formula? (IF 7 OR MORE TIMES, RECORD'7').		
58.	Milk from animals, including fresh, packaged or powdered?		
46a.	IF YES: How many times did (NAME) drink milk? (IF 7 OR MORE TIMES, RECORD '7').		
46b.	IF YES: Was any of the milk a sweet or flavored type of milk?		
59.	Bournevita, Horlicks, or Boost?		
60.	Fruit juice, packet juice such as Rasna or Frooti, sugarcane juice, or nannari sarbath?		
61.	Soft drinks such as Sprite, Pepsi, Mirinda, or energy drinks?		
62.	Tea, coffee, or herbal drinks?		
51a.	IF YES: was the drink sweetened?		
63.	Clear broth or clear soup?		
64.	Any other liquids?		
52a.	IF YES: What was the liquid or what were the liquids?		
52b.	IF YES: Was thedrink sweetened?		
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..0 *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 flavor to a dish.* Yesterday during the day or at night, did [NAME] eat:			
65.	Curd, lassi, buttermilk, or raita?		
53a.	IF YES: How many times did (NAME) have curd, lassi, buttermilk, or raita?		
53b.	IF YES: Did (NAME) have any lassi or buttermilk to drink?		
53c.	IF YES: Was it a sweet type of drink? YES or NO DK		
	Yesterday, did (NAME) eat any of the following foods:		
66.	Rice, idli, dosa, poha, naan, kulcha, paratha, upma, Cerelac, or Farex?		
67.	Chapati, roti, dalia, roasted maize?		
68.	Pearl millet, finger millet, or ragi malt?		
69.	Potato, sweet potato, turnip, arum root, tapioca, or raw banana?		
70.	Daal, sambar, chickpeas, kidney beans, soya, or khichdi?		
	Yesterday, did (NAME) eat any of the following vegetables:		

71.	Carrots, or pumpkin that is orange inside?		
72.	Mustard leaves, spinach, radish leaves, cassava leaves, taro leaves, drumstick leaves, amaranth leaves, or wild greens/other greens?		
73.	Tomatoes, eggplant, okra/lady finger, French beans, cauliflower, cabbage, or beetroot?		
74.	Bitter gourd, bottle gourd, pointed gourd, ivy gourd, apple gourd, ridged gourd, or snake gourd?		
75.	Cucumber, radish, capsicum, German turnip, or drumstick?		
	Yesterday, did (NAME) eat any of the following fruits:		
76.	Ripe papaya, ripe mango, orange musk melon, or apricots?		
77.	Orange, tangerine, or grapefruit?		
78.	Ripe banana, apple, pear, watermelon, guava, custard apple, pomegranate, or pineapple?		
79.	Grapes, kiwi, peaches, jackfruit, chickoo, jamun, palmyra palm fruit, or other wild fruits?		
	Yesterday, did (NAME) eat any of the following sweets:		
80.	Cakes, cream biscuits, biscuits, suji halwa / kesari bath, jalebi, or ladoo?		
81.	Other mithai, rice pudding, kulfi, ice cream, milkshake, toffees, or chocolates?		
	Yesterday, did (NAME) eat any of the following foods of animal origin:		
82.	Eggs?		
83.	Paneer or cheese?		
84.	Liver or kidney?		
85.	Sausages or salami?		
86.	Mutton, beef, or lamb?		
87.	Pork or wild meat?		
88.	Chicken, duck, or turkey?		
89.	Fish, prawn, crab, or seafood?		
90.	Termites, ants, or locusts?		
	Yesterday, did (NAME) eat any of the following other foods:		
91.	Peanuts, cashews, almonds, pistachios, walnuts, pumpkin seeds, or sunflower seeds?		
92.	Potato chips, namkeen or mixture?		
93.	Instant noodles such as Maggi noodles or Wai Wai?		
94.	Samosa, pakora, puri, vada, mathri, kachori, murukku, or bonda?		
95.	Any other solid, semi-solid, or soft food?		
83a.	IF YES: What was the food?		
	Yesterday, did (NAME) eat food from any place like...		

96.	McDonald's, KFC, Pizza Hut, Domino's, Burger King, or other places that serve pizza or burgers?		
74.	Bitter gourd, bottle gourd, pointed gourd, ivy gourd, apple gourd, ridged gourd, or snake gourd?		
75.	Cucumber, radish, capsicum, German turnip, or drumstick?		
	Yesterday, did (NAME) eat any of the following fruits:		
76.	Ripe papaya, ripe mango, orange musk melon, or apricots?		
77.	Orange, tangerine, or grapefruit?		
78.	Ripe banana, apple, pear, watermelon, guava, custard apple, pomegranate, or pineapple?		
79.	Grapes, kiwi, peaches, jackfruit, chickoo, jamun, palmyra palm fruit, or other wild fruits?		
	Yesterday, did (NAME) eat any of the following sweets:		
80.	Cakes, cream biscuits, biscuits, suji halwa / kesari bath, jalebi, or ladoo?		
81.	Other mithai, rice pudding, kulfi, ice cream, milkshake, toffees, or chocolates?		
	Yesterday, did (NAME) eat any of the following foods of animal origin:		
82.	Eggs?		
83.	Paneer or cheese?		
84.	Liver or kidney?		
85.	Sausages or salami?		
86.	Mutton, beef, or lamb?		
87.	Pork or wild meat?		
88.	Chicken, duck, or turkey?		
89.	Fish, prawn, crab, or seafood?		
90.	Termites, ants, or locusts?		
	Yesterday, did (NAME) eat any of the following other foods:		
91.	Peanuts, cashews, almonds, pistachios, walnuts, pumpkin seeds, or sunflower seeds?		
92.	Potato chips, namkeen or mixture?		
93.	Instant noodles such as Maggi noodles or Wai Wai?		
94.	Samosa, pakora, puri, vada, mathri, kachori, murukku, or bonda?		
95.	Any other solid, semi-solid, or soft food?		
83a.	IF YES: What was the food?		
	Yesterday, did (NAME) eat food from any place like...		
96.	McDonald's, KFC, Pizza Hut, Domino's, Burger King, or other places that serve pizza or burgers?		

	Note for interviewer: If not a single "yes" for foods is recorded, ask 85. If at least one "yes" for foods, skip to 86..		
97.	Did (NAME) eat any solid, semi-solid, or soft food yesterday during the day or night?		
98.	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"		

36-59 months

No.	QUESTION	YES / NO	DON'T KNOW (DK)
99.	Was (NAME) ever breastfed?		
100.	How long after birth was (NAME) first put to the breast?		
	If immediately, indicate "000"		
	If less than one hour, record "00" hours		
	If less than 24 hours, record hours		
	Otherwise, record days		
101.	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, condensed milk, cinnamon water, or sugar water?		

No.	Question	YES or NO
	Now I'd like to ask you some yes-or-no questions about foods and drinks that (NAME) consumed yesterday during the day or night, whether he/she had it at home or somewhere else. *First, I would like you to think about yesterday, from the time (NAME) woke up through the night. Think to yourself about the first thing they ate or drank after they woke up in the morning … Think about where they were when they had any food or drink in the middle of the day … Think about where they were when they had any evening meal … and any food or drink they may have had in the evening or late-night... and any other snacks or drinks they may have had between meals throughout the day or night.* *I am interested in whether they had the food items I will mention even if they were combined with other foods.* Please listen to the list of foods and drinks, and if they ate or drank ANY ONE OF THEM, say yes.	
	Yesterday, did (NAME) eat any of the following foods:	
102.	Rice, idli, dosa, poha, naan, kulcha, paratha, or upma?	
103.	Chapati, roti, dalia, or roasted maize?	

104.	Pearl millet or finger millet?	
105.	Potato, sweet potato, turnip, arum root, tapioca, or raw banana?	
106.	Daal, sambar, chickpeas, kidney beans, soya, or khichdi	
	Yesterday, did (NAME) eat any of the following vegetables:	
107.	Carrots, or pumpkin that is orange inside?	
108.	Mustard leaves, spinach, radish leaves, cassava leaves, taro leaves, drumstick leaves, amaranth leaves, or wild greens/other greens?	
109.	Tomatoes, eggplant, okra/lady finger, French beans, cauliflower, cabbage, or beetroot?	
110.	Bitter gourd, bottle gourd, pointed gourd, ivy gourd, apple gourd, ridged gourd, or snake gourd?	
111.	Cucumber, radish, capsicum, German turnip, or drumstick?	
	Yesterday, did (NAME) eat any of the following fruits:	
112.	Papaya, mango, orange musk melon, or apricots?	
113.	Orange, tangerine, or grapefruit?	
114.	Ripe banana, apple, pear, watermelon, guava, custard apple, pomegranate, or pineapple?	
115.	Grapes, kiwi, peaches, jackfruit, chickoo, jamun, palmyra palm fruit, or other wild fruits?	
	Yesterday, did (NAME) eat any of the following sweets:	
116.	Cakes, cream biscuits, biscuits, suji halwa / kesari bath, jalebi, or ladoo?	
117.	Other mithai, rice pudding, kulfi, ice cream, milkshake, toffees, or chocolates?	
	Yesterday, did (NAME) eat any of the following foods of animal origin:	
118.	Eggs?	
119.	Paneer or cheese?	
120.	Curd, lassi, buttermilk, or raita?	
121.	Sausages or salami?	
122.	Mutton, beef, lamb, or liver?	
123.	Pork or wild meat?	
124.	Chicken, duck, or turkey?	
125.	Fish, prawn, crab, or seafood?	
	Yesterday, did (NAME) eat any of the following other foods:	
126.	Peanuts, cashews, almonds, pistachios, walnuts, pumpkin seeds, or sunflower seeds	
127.	Potato chips, namkeen or mixture?	

128.	Instant noodles such as Maggi noodles or Wai Wai?	
129.	Samosa, pakora, puri, vada, mathri, kachori, murukku, or bonda?	
	Yesterday, did (NAME) have any of the following beverages:	
130.	Milk, flavored milk, chai with milk, or coffee with milk?	
131.	Tea with sugar, coffee with sugar, milk with sugar, flavored milk, Bournevita, Horlicks, or Boost?	
132.	Fruit juice, packet juice such as Rasna or Frooti, sugarcane juice, or nannari sarbath?	
133.	Soft drinks such as Sprite, Pepsi, Mirinda, or energy drinks?	
	Yesterday, did (NAME) get food from any place like...	
134.	McDonald's, KFC, Pizza Hut, Domino's, Burger King, or other places that serve pizza or burgers?	

ANNEXURE 4

INFORMATION LETTER

I, Tanvi Prajapati 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 "Assessing the prevalence and factors associated with moderate acute malnutrition among children 0-59 months in urban Baroda". This letter containsthe information regarding the research.

Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/ornutrients. Many children are lacking to meet their nutritional requirements and have compromised physical growth because of faulty dietary practices, inappropriate knowledge, dislikes for particular food etc.

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, weight and MUAC of the child. If you do not want to answer certainquestions 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)

Dr. Shruti Kantawala (+919898516439)

(Student)

Tanvi. P. Prajapati (+916352635674)

Department of Foods and Nutrition,

The Maharaja Sayajirao University of Baroda

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 :

Age :

Gender:

Date :

Mo No.:

Signature of the parent

માહિતી પત્ર

હું, તન્વી પ્રજાપતિ સિનિયર M.Sc.ની વિદ્યાર્થીની. મહારાજા સયાજીરાવ યુનિવર્સિટીમાં ખોરાક અને પોષણ વિભાગમાં ડૉ. શ્રુતિ કાંટાવાલાના માર્ગદર્શન હેઠળ સંશોધન કરી રહ્યા છે.

મારા સંશોધનનો સૂચિત વિષય છે "શહેરી બરોડામાં 0-59 મહિનાના બાળકોમાં મધ્યમ તીવ્ર કુપોષણ સાથે સંકળાયેલા વ્યાપ અને પરિબળોનું મૂલ્યાંકન". આ પત્રમાં સંશોધન સંબંધિત માહિતી છે.

કુપોષણ એ વ્યક્તિની ઉર્જા અથવા પોષક તત્વોના વપરાશમાં ઉણપ, અતિરેક અથવા અસંતુલનનો ઉલ્લેખ કરે છે. ઘણા બાળકો તેમની પોષણની જરૂરિયાતોને પહોંચી વળવામાં અભાવ હોય છે અને ખામીયુક્ત આહાર વ્યવહાર, અયોગ્ય જ્ઞાન, ચોક્કસ ખોરાક પ્રત્યે અણગમો વગેરેને કારણે શારીરિક વૃદ્ધિ સાથે ચેડાં કરે છે.

ઇન્ટરવ્યુની મદદથી, હું તમને કેટલાક પ્રશ્નો પૂછીશ, જેના જવાબો નોંધવામાં આવશે. પ્રશ્નો સામાજિક-આર્થિક સ્થિતિ, આહારની વિવિધતા, ખોરાક આપવાની પદ્ધતિઓ, રોગપ્રતિરક્ષા અને રોગિષ્ઠતા પ્રોફાઇલને લગતા હશે.

હું બાળકની ઊંચાઈ, વજન અને MUAC માપીશ. જો તમે અમુક પ્રશ્નોના જવાબ આપવા માંગતા નથી અથવા અમુક માહિતી જાહેર કરવા માંગતા નથી, તો તમે તેને છોડી દેવા માટે સ્વતંત્ર છો.

તમારા દ્વારા આપવામાં આવેલી માહિતી ગોપનીય રહેશે અને તેનો ઉપયોગ ફક્ત અભ્યાસ હેતુ માટે જ કરવામાં આવશે.

સંશોધનના અંતે, પરિણામો તમારી સાથે શેર કરવામાં આવશે. આ સંશોધનમાં ભાગ લેવાથી, બાળકને કોઈ મહેનતાણું આપવામાં આવશે નહીં, ન તો તેનાથી બાળકને નુકસાન થશે.

આ સંશોધનમાં તમારી ઈચ્છા અને સહભાગિતા બદલ અમે તમારો આભાર માનીએ છીએ.

દ્વારા,

(માર્ગદર્શન)

ડૉ. શ્રુતિ કાંટાવાલા (+919898516439)

(વિદ્યાર્થી)

તન્વી. પી. પ્રજાપતિ (+916352635674)

ખાદ્ય અને પોષણ વિભાગ,

મહારાજા સયાજીરાવ યુનિવર્સિટી ઓફ બરોડા

સંમતિપત્રક

હું મારા બાળકને આ સંશોધનમાં ભાગ લેવા અનુમતિ આપું છું . મારે આ ઇન્ટરવ્યુમાં કુટુંબ વિશે ની સામાન્ય માહિતી આપવાની રહેશે અને મારા બાળકનું વજન, ઉંચાઇ અને બાવડાનું માપ આપવાનું રહેશે. મેં આ સંશોધન સંબંધિત તમામ માહિતી વાંચી છે. મને આ અંગે પ્રશ્નો પૂછવાની તક મળી છે અને મને મારા પ્રશ્નોના સંતોષકારક જવાબો મળ્યા છે.

તેથી હું સ્વેચ્છાએ ભાગ લેવા માટે અનુમતિ આપું છું.

નામ : ઉંમર :

જાતિ :

તારીખ : મો. નં :

વાલીની સહીં :