



**WOMEN EMPOWERMENT: COMPARISON OF CHILD UNDERNUTRITION AGED
6-59 MONTHS AND ITS PERCEIVED CONTRIBUTION IN CHIRO TOWN, WEST
HARARGHE ZONE, OROMIA REGION, ETHIOPIA: A MIXED STUDY METHOD**

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**Women Empowerment: Comparison of Child undernutrition aged 6-59 month and its
Perceived contribution in Chiro Town, West Hararghe Zone, Oromia Region Ethiopia:
A Mixed study method**

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Nutrition**

Elsabet Teshager

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HARAMAYA UNIVERSITY SCHOOL OF GRADUATE STUDIES

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DEDICATION

This thesis is dedicated to my beloved daughter Meron Ashebir. Though the demands of my research and work nature often kept me apart from you, your unwavering presence remained my greatest source of strength. Your resilience has inspired me through every challenge, and your future has remained my deepest motivation.

Though I may not have always been able to give you the time and support you truly deserve, know that my love, pride, and admiration for you are boundless. May this achievement serve as a testament that no dream is too distant, and no challenge is insurmountable? You are my greatest joy, and it is my hope that this milestone inspires you to pursue your own aspirations with courage, determination, and the unwavering belief I have in you.

STATEMENT OF THE AUTHOR

By my signature below, I declare and affirm that this Thesis is my own work. I have followed all ethical and technical principles of scholarship in the preparation, data collection, data analysis, and compilation of this Thesis. Any scholarly matter that is included in the Thesis has been given recognition through citation.

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ACRONYMS AND ABBREVIATIONS

ASF	Animal Source Food
BCC	Behavioural Communication Change
CED	Chronic Energy Deficiency
CN	Child's Nutritional
DDS	Dietary Diversity Score
DHS	Demographic and Health Survey
EDHS	Ethiopian Demographic and Health Survey
EPI	Ethiopian Public Health Institute
FAO	Food and Agriculture Organization
FMOH	Federal Minister of Health
HEW	Health Extension Workers
IHRERC	Intutional Health Research and Ethics Review Committee
LM	Lactating Mother
MUAC	Mid -Upper Arm Circumference
PI	Principal Investigator
PLW	Pregnant and Lactating Women
NGOs	Non-Governmental Organizations
SDG	Sustainable Development Goal
TEM	Technical Error Measurement
UNICEF	United Nation International Children's Emergency Fund
WASH	Water and Sanitation Hygiene
WHO	World Health Organization

TABLE OF CONTEN

STATEMENT OF THE AUTHOR.....	v
BIOGRAPHICAL SKETCH.....	vi
ACKNOWLEDGEMENTS	vii
ACRONYMS AND ABBREVIATIONS	viii
TABLE OF CONTEN	ix
LIST OF TABLES	xiii
LIST OF FIGURES.....	xiv
1.INTRODUCTION	1
1.1.Background.....	1
1.2.Statement of the problem.....	2
1.3.Significance of Study.....	4
1.4.Objectives of the study	5
1.4.1. General objective.....	5
1.4.2. Specific objective	5
2.LITERATURE REVIEW	5
2.1.Overview of Nutritional Status of Children	6
2.2.Nutritional status among children aged 6 to 59 months	6
2.3.Effect of Women Empowerment on Nutritional Status of Children	7
2.4.Socio-demographic related factors	8
2.5.Other Factors Associated with Nutritional Status of Children	9
2.5.1. Reproductive health and health service utilization related factors.....	9
2.5.2. Health status and nutritional habit related factors	9
2.5.3. Water, Sanitation and Hygiene (WaSH)	10
2.6.Conceptual Framework.....	11
3.MATERIALS AND METHODS.....	12
3.1.Study Area and Period.....	13
3.2.Study Design.....	13
3.3.Sources Population	13
3.4.Study Population.....	13

3.5.Inclusion and Exclusion Criteria	13
3.5.1. Inclusion criteria.....	14
3.5.2. Exclusion criteria.....	14
3.6.Sample Size Determination	14
3.6.1. Quantitative study	14
3.6.2. Qualitative study	15
3.7.Sampling Procedures	15
3.7.1. Quantitative	16
3.7.2. Qualitative	17
3.8.Data Collection Method.....	18
3.8.1. Data collection tool	18
3.8.1.1. Anthropometric measurements	18
3.8.1.2. Dietary Assessment.....	19
3.8.1.3. Water Sanitation and Hygiene (WaSH) Assessment	20
3.8.2. Data Collection procedure.....	20
3.8.3. Data Collectors.....	21
3.9.Study Variables.....	21
3.9.1. Dependent variable (Outcome variable)	21
3.9.2. Independent variables.....	21
➤Sociodemographic related variables	21
➤Women empowerment.....	21
➤Other confounding factors related nutritional status include Health status, nutritional habits, Reproductive health, health service utilization and WASH	21
3.10. Operational Definition.....	21
3.11. Data Quality Control	22
3.12. Data processing and analysis.....	24
3.13. Ethical Consideration	25
3.14. Information Dissemination.....	25
4.RESULTS	26
4.1.Socio-demographic characteristics.....	26
4.2.Maternal and Child Health Service.....	28

4.3. Water Sanitation and Hygiene status (WaSH).....	30
4.4. Dietary diversity, consumption of ASF, and HHFI	31
4.4.1. Comparison by women empowerment status.....	32
4.5. Prevalence of Under Nutrition status.....	33
4.7. Qualitative Findings.....	35
4.7.2. Qualitative Findings from Empowered Women	35
Theme 2: Diverse approaches to introducing solid foods.....	37
Theme 3: Shared decision making and autonomy in family planning.....	37
Sub-theme 3.1: Collaborative decision making.....	37
Sub-theme 3.2: Individual authority	38
Theme 4: Prioritizing child nutrition through shared financial responsibility	38
Theme 5: Empowerment through financial Independence in child nutrition.....	38
Theme 6: Effect of maternal education on child nutrition	38
4.7.3 Qualitative findings from non-empowered women	38
Theme 1: Decision making dynamics in marital relationships	38
Theme 2: Gender roles and autonomy in health service utilization	39
Theme 3: Financial autonomy and resource access	39
Theme 4: impact of education on child care	39
Theme 5: Diverse practices in infant feeding timing and choices	39
Theme 6: Autonomy and financial dependency in household nutrition decisions	39
4.8. Qualitative Findings from non-Empowered women.....	39
Theme 1: Collaborative Decision-Making in Household Management.....	40
Theme 2: Gender Roles and autonomy on health service utilization.....	40
Theme 3: Financial Autonomy and Resource Access.....	40
Theme 4: Impact of Education on Child Care	41
Theme 5: Diverse Practices in Infant Feeding Timing and Choices.....	41
Theme 6: Autonomy and Financial Dependency in Household Nutrition Decisions	41
4.9. Perceived contribution of women’s empowerment to child nutrition	42
4.10. Factors associated with nutritional status of <5 children of non- empowered women..	43
4.11. Factors associated with the nutritional status of < 5 children of empowered women.....	46

5.DISCUSSIONS	49
6.STRENGTH AND LIMITATION	55
6.1.Strength of the study	55
6.2.Limitations of the study	55
7.CONCLUSION AND RECOMMENDATIONS	56
7.1.Conclusion	56
7.2.Recommendation	56
8.REFERENCES.....	59
9.ANNEXES	65
9.1.Participant Information Sheet and Informed Voluntary Consent Form Introduction:...	65
Appendixes I: Participant Information Sheet and assent Form of the Study	67
9.2.Questionnaire English version	68
Field guideline.....	77

LIST OF TABLES

Table 1 The sample size calculation using a single population proportion for nutritional status.	14
Table 2 Sample size determination for factors associated with nutritional status (Stunting, Wasting, and underweight) among children aged 6 to 59 months in chiro town, west Hararghe, Ethiopia.	15
Table 3. Socio-demographic characteristics of participants among empowered and non-empowered mothers at Chiro Town in West Hararghe Zone Oromia, Ethiopia, 2024 (N=400)..	27
Table 4. Maternal and Child health service of study participants among empowered and non-empowered mothers at Chiro Town in West Hararghe Zone Oromia, Ethiopia, 2024	29
Table 5. Water, sanitation, and hygiene status of study participants at Chiro Town in West Hararghe Zone Oromia, Ethiopia, 2024 (n= 400).....	31
Table 6. Dietary diversity, consumption of ASF and HH food Insecurity status of study participants at Chiro Town in West Hararghe Zone Oromia, Ethiopia, 2024	32
Table 7. Qualitative Findings from Empowered Women	36
Table 8. Qualitative Findings from Non-Empowered Women	42
Table 9. Ordinal logistic regression analysis for nutritional status of children aged 6-59 months among non-empowered women in Chiro Town, West Hararghe Zone, Oromia, Ethiopia, 2024	45

LIST OF FIGURES

Figure 1. Conceptual model from women's empowerment to children's nutritional status (Tesfay, Organization, 2017, Mohammed et al., 2020, Kebede and Aynalem, 2021, Gebreegziabher and Sidibe, 2024)	12
Figure 2. Schematic diagram sampling for nutritional status and its associated factors among children aged 6 to 59 months	17
Figure 3. Types of undernutrition among children of empowered and non-empowered women in Chiro Town, West Hararghe Zone, Oromia, Ethiopia, 2024	33
Figure 4. Nutritional status of under-five children (non-empowered women left and empowered women right) in Chiro Town, West Hararghe Zone, Oromia, Ethiopia, 2024.	34

ABSTRACT

Background: Women's empowerment is a recognized determinant of child nutrition, yet the specific pathways through which it influences nutritional outcomes remain unclear. Cultural and religious factors influence empowerment levels, making finding from other locations difficult to generalize.

Objective: This study aimed to assess women Empowerment and Child undernutrition aged 6-59 Months and its perceived contribution in Chiro Town, Oromia region Ethiopia:

Methods: A community-based comparative cross-sectional with Quantitative and a Phenomenological with qualitative study, was conducted. A total of 400 mother-child pairs (132 empowered and 268 non-empowered women) were selected. Using a two-stage sampling technique. Data were collected via structured questionnaires, anthropometric measurements, and dietary assessments. Qualitative data were gathered through FGD and KII. Data analysis involved descriptive statistics, chi-square tests, and multinomial logistic regression using SPSS, with qualitative data analyzed thematically.

Results: Result: Study revealed that there was a high burden of malnutrition among children aged 6-59 months. The prevalence of stunting, underweight and wasting was 31.25% 24.75% and 16% respectively. Children of non-empowered women had higher rates of stunting (33.96% vs 25.76%) underweight (25.76% vs 16.67%) and wasting (17.16 vs 13.64). Empowered women had higher rate of health facility delivery (84.85% vs 64.18%) and better latrine availability (59.8% vs 40.9). Empowered household exhibited significantly higher dietary diversity (90.91% vs 51.49%) and consumption of ASF (59.85% vs 24.25%). Finding demonstrate that women's empowerment is significantly associated with improved nutritional outcome of children.

Conclusion and Recommendation: While optimal nutrition is predominant, children of non-empowered mothers face a slightly higher risk of under-nutrition. Maternal empowerment through decision-making, economic agency and education is pivotal for improving child nutrition.

Keywords: *Malnutrition, Women's Empowerment, Child Nutrition, Antenatal Care, Ethiopia*

1. INTRODUCTION

1.1. Background

Nutritional status is defined as an individual's overall health condition specifically relating to the diet and nutrients they intake (White and Saran, 2022). It can be considered via various aspects, such as adequacy of nutrient intake, body composition, growth and development, health conditions, biochemical markers, and clinical signs (Abdella et al., 2022). Nutritional status can be categorized into under nutrition includes wasting, stunting, being underweight, and inadequate vitamins or minerals. Ending all forms of child malnutrition, including stunting, wasting and underweight, is a global priority (Abdella et al., 2022). On a global scale, the current trend indicates an annual average reduction rate (AARR) for stunting of merely 1.65 percent from 2012 to 2022. However, to meet the global target of reducing the number of children with stunting to 88.9 million by 2030, an AARR of 6.08 percent is necessary. It's noteworthy that the majority of children affected by malnutrition reside in Africa and Asia (Umijati and Kardjati, 2021).

Under nutrition stands as the prevalent nutritional challenge among children especially within the critical developmental window of 6 to 59 months. This period is paramount for fostering healthy brain development and linear growth. Under nutrition obstructs children from reaching their maximum physical and mental capacities, thereby compromising their health status and potential for productivity (Megersa et al., 2021).

Severe nutritional status of children can be measured and identified by a weight-for-height ratio of less than 3 standard deviations below the median reference population or WFH of below 70% or mid-upper arm circumference (MUAC) less than 115mm among children aged 6-59 months or presence bilateral nutritional edema 115mm (Makamto Sobgui et al., 2018).

Women's empowerment refers to the process of giving women more autonomy over their life, the ability to make educated decisions, and the ability to actively engage in the social, political, and economic arenas (Sharaunga et al., 2019). Women's empowerment entails granting women greater autonomy in their lives, enabling them to make informed decisions, and actively participating in social, political, and economic spheres (Sharaunga et al., 2019).

Empowering women through education and decision-making leads to a positive impact on child nutrition. With greater autonomy over choices regarding food, hygiene, and healthcare, women

can effectively manage the well-being of both themselves and their children(Siddiqui et al., 2020).

Various studies have shown that women's empowerment is positively linked to child nutritional status, with both direct and indirect measures of empowerment demonstrating an association with child anthropometry .Recent robust evidence from sub- Saharan Africa has revealed the correlation between women's empowerment and children's nutritional outcome(Kahsay et al., 2015, Christian et al., 2023).

When women are empowered, it results in a more equitable distribution of resources within households. This can alleviate challenges related to food and nutrition, making food more readily available and accessible. Consequently, improved nutritional status among children can observed(Nounkeu and Dharod, 2021).

Therefore, tackling under nutrition among children necessitates a comprehensive approach involving families or caregivers, communities, and healthcare systems collectively. Despite numerous studies examining the relationship between women's empowerment and children's nutritional status, none have specifically investigated the association between women's empowerment and wasting, stunting, and underweight among children aged 6-59 months in Chiro Town, Oromia region, Ethiopia. It's worth noting that women's empowerment levels can be influenced by cultural and religious factors, making findings from other locations challenging to generalize and apply in this context.

1.2. Statement of the problem

Globally, estimates of stunted children under five were 149 million, wasting children were 45 million, and overweight children were 37 million. In this regard, more than half of all children affected by wasting live in Southern Asia and Africa as a whole, and the number of children with stunting is declining in all regions except African countries(Organization, 2024). The magnitude of stunting among sub-Saharan Africa children was 41% and overweight was 3.6. In Ethiopia, estimates of magnitude of stunting, underweight, and wasting were 42%, 33%, and 15%, respectively (White and Saran, 2022, Quamme and Iversen, 2022, Mohammed et al., 2020). Malnutrition is a significantly a global public health problem that affecting a life of individuals particularly has serious impact in children 6 to 59 months of age. It is the most important public health issue causing health, economic and social crisis at both individuals and countries level(Wells et al., 2020, Shafiq et al., 2019).

Globally almost 8 million children under 5 years are at risk of death from severe wasting. A person's

physiological and mental capacity are negatively impacted by malnutrition, which lowers productivity and increases the likelihood of poverty for both the individual and their country(White and Saran, 2022, Siddiqui et al., 2020). In Ethiopia, the burden of malnutrition remains a significant challenge with far-reaching consequences for child survival and long-term well-being. On top of this nationally, 37% of Ethiopian children under 5 years of age are stunted which impacts physical and cognitive development, whereas approximately 7% of children under five are acutely malnourished or wasted and require urgent intervention(White and Saran, 2022).

The causes for under nutritional status of children are mainly related to poor diets and insufficient food intake, infections that weaken the body, maternal health and nutrition, and inappropriate infant and young child feeding practices were those brought poor nutritional status to children aged 6-59 months. In addition, poverty and food insecurity, poor water quality and inadequate sanitation facilities, gender disparities, cultural beliefs, and traditional practices, lack of awareness about nutrition, and childcare practices and environmental factors can lead children to poor outcomes of nutritional status(Aboagye et al., 2021, Govender et al., 2021).

The common factors affecting nutritional status in children includes availability of food, food purchasing power of households, fulfilling nutritional dietary for diversity requirements, frequency of meal that caregivers provided for child, age of child, access to healthcare, sanitation and hygiene of meal. Child maternal related factors such as knowledge, attitude and practice toward child feeding, environmental and socioeconomic factors are directly and indirectly determine the nutritional status of children(Gebreegziabher and Sidibe, 2024, Makamto Sobgui et al., 2018)

In addition, there is a favorable correlation between the nutritional status of children and empowered women. This is because when women are autonomous and actively involved in household decision-making, they are more likely to make informed nutritional decisions, which can result in better food choices for their kids(Onah, 2021).

The child nutritional issues are one of the 2030 Agenda for Sustainable Development aims to guarantee children's access to nourishing diets and to end child malnutrition in all of its forms. In addition, UNICEF emphasized on the issue of nutrition for every child and developed the strategy to protect and promote diets, services, and practices that support optimal nutrition, growth, and development for all children to improve the nutritional status of children(Organization, 2017, Grosso et al., 2020).

In Ethiopia, several strategies have been implemented to improve the nutritional status of children under 5 years of age. Those strategies including community-based approaches activities, behavioral Change Communication (BCC) interventions on nutrition, food supplemental programs activities, health

interventions strengthening child health services, providing WASH interventions to children and the infant and young child nutrition given the priority in developing the national nutritional strategies(Ahmed et al., 2023). However, there is no empirical study that simultaneously investigates the role of women empowerment and nutritional status for 6–59 month-old children in Ethiopia.

To identify factors that may affect wasting, stunting, and underweight in Ethiopia as well as in study area, further investigation on the association between women empowerment and nutritional status of children aged 6-59 month is very important. Despite a range of sociolect-economic, demographic, and related factors of poor nutritional status have been investigated in Ethiopia, little is known about nutrition status of children aged 6- 59 months and its associated factors among empowered and non-empowered women in Chiro Town, West Hararghe Zone, Oromia Region, Ethiopia. Therefore, this study is needed to fill this contextual gap. Its primary purpose is to investigate the association between women’s empowerment and the nutritional status of children aged 6-59 months in Chiro town, Oromia Region, Ethiopia.

1.3. Significance of Study

Finding of the study will provides the first localized evidence on the relationship between women’s empowerment and child nutrition by conducting the research within this specific cultural and religious setting, the finding directly relevant and applicable to the community. The finding will generate a baseline understanding of how local empowerment dynamics influence child malnutrition, moving beyond generic assumption to provide actionable, context specific insights.

The finding also valuable for program and policy contribution. It can inform the design of more effective and targeted interventions since, the result can be used to advocate for and guide the integrations of women’s empowerment components in to existing nutrition and child health program in the study area. This could include initiatives focused on education, economic opportunity, and enhancing women’s decision making power regarding household resources.

The study provide empirical evidence that helps local health authorities and NGOs move beyond purely health focused intervention like feeding program to address the underlying socio- economic and gender based determinant of malnutrition. The study also tests an established theoretical link between women’s empowerment and improved child nutrition in a new and under studied context by examining whether this relationship holds true in the unique cultural fabric of the study area, potentially challenging the universality of existing models. The study add a new data point to the global and regional literature on this topic, enriching the understanding of how the relationship between empowerment and nutrition manifests across different settings. This can help refine

theoretical frameworks for similar context.

In general, this study adds value by translating a well-known global concept in to actionable local knowledge, thereby contributing to more effective and culturally sensitive, solution to combat child malnutrition in Chiro town, Oromia Region, Ethiopia.

1.4. Objectives of the study

1.4.1. General objective

- To assess Women Empowerment and Child undernutrition aged 6-59 month and its Perceived contribution in Chiro Town, West Hararghe Zone, Oromia Region, Ethiopia from October 15 to November 5, 2024.

1.4.2. Specific objective

1. To compare magnitude of undernutrition between 6-59 months aged children in empowered and non-empowered mothers with a Comparative cross-sectional quantitative study in selected kebele of Chiro Town, West Hararghe Zone, Oromia Region, Ethiopia
2. To explore perceived contribution of women empowerment to child nutrition among mothers with 6-59 months aged children with a qualitative phenomenological study in selected kebele of Chiro Town, West Hararghe Zone, Oromia Region, Ethiopia

2. LITERATURE REVIEW

2.1. Overview of Nutritional Status of Children

General terms of nutritional status refer to a child's general state of health and well-being with regard to nutrition, and it includes a range of factors pertaining to their physical condition, growth, and development. It is explained as stunting when a child's height-for-age is significantly below the median; height for their age group, which reflects chronic under nutrition. It often associated with inadequate food intake, poor feeding practices and infections. Wasting refers to acute malnutrition, where a child's weight-for- height is significantly below the median weight for their height that can result from severe food shortages, illness, or inadequate nutrient absorption. Underweight children have a weight-for- age below the median weight for their age group that indicated a combination of stunting and wasting, reflecting both chronic and acute malnutrition and sometimes overweight and obesity can occur, these conditions are associated with excessive calorie intake, poor dietary quality, and lack of physical activity(White and Saran, 2022, Organization, 2017).

2.2. Nutritional status among children aged 6 to 59 months

According to cross-sectional study design conducted in Sri Lanka revealed that, the nutritional status of children reported with the underweight, stunting and wasting was 35.6%, 26.9% and 32.9% respectively. Another study from Pakistan demographic and health survey showed that an estimated of 44.4% of 6 to 59 months of children were stunted, 29.4% were underweight and 10.7% were wasted. Further cross- sectional study from Bangladesh that conducted among under five children revealed that, about 36.2% children are stunted, 15% are wasted and 33% are underweight(Chipili et al., 2018, de Masi et al., 2017, Grosso et al., 2020).

The study from demographic and health survey of Nigeria revealed that the stunting magnitude was 36.7% and about 21.0% of children aged 0–59 months were in severe stunting. Similar findings from Tanzania indicated the nutritional status of children about 41% stunting, 18.8% underweight, and 7.3% wasting(Nicodemas et al., 2019). Another study from the Rwanda demographic and health survey reported that the number of children who are on nutritional status of stunting was 38 %(Nshimiyiryo et al., 2019). Further cross- sectional study from Namibia showed that the nutritional status of children was about 29.6% stunting, 4.5% wasting, 16.7% underweight and 2.4% overweigh(Akombi et al., 2017).

A study conducted on sub-Saharan Africa countries showed that, the highest magnitude of stunting was recorded by Burundi (51.8%), while the lowest magnitude was found in Ghana (13.6%), with

an overall regional magnitude of 28.6%. Whereas for wasting, magnitude from all countries was found to be 9.4%, South Africa recorded the lowest magnitude of wasting (2.1%) and Niger recorded the highest magnitude (27.3%). Finally, the magnitude of underweight ranged from 5.3% in South Africa to 41.8% in Niger, with an all-country magnitude of 16.4 % (Aboagye et al., 2021).

Evidence from the study of Afar Regional State, Northeast Ethiopia, among children aged between 6 to 59 months, wasting was 16.2, stunting was 43.1%, and underweight was 24.8. Another comparative cross-sectional study from Tigray showed that, nutritional status difference among children who from household food secure and not secured. Accordingly About 46.1%, 18.1%, and 7.1% of children from household food secured were stunted, underweight and wasted, whereas children from household Food in secured 52.1%, 20.5%) and 12.6% of the children were stunted, underweight and wasted respectively (Gebre et al., 2019, Kahsay et al., 2015).

The finding from East Badawacho District, South Ethiopia showed the nutritional status of children 6–59 Months was stunting, underweight, and wasting among children were 45.6%, 26.3%, and 14.6%, respectively. Further, according to cross-sectional study conducted in Wolaita Sodo Town, Southern Ethiopia, about 22.2 of children age between 6 to 59 months was stunted. Furthermore, a community based cross sectional study conducted in Mi'esso District, Oromia, Ethiopia revealed that underweight was a serious problem and accounting 24.0% and 26.7% of Children aged 6 to 59 months were in severe underweight and mild underweight respectively (Abdella et al., 2022, Eshete et al., 2017).

2.3. Effect of Women Empowerment on Nutritional Status of Children

Women's empowerment refers to the process of giving women more autonomy over their life, the ability to make educated decisions, and the ability to actively engage in the social, political, and economic arenas. On top of these, women's empowerment plays a crucial role in shaping the nutritional status of family, specifically children under five years. Because when women are empowered with education and decision-making, they positively influence child nutrition by having power over choices about food, hygiene, and healthcare utilization for both them and their children (Essilfie et al., 2020, Sharaunga et al., 2019).

In addition, empowering women on access to resources, led women to have better access to resources such as income, food, and healthcare and as a result they can prioritize their children's needs, ensuring adequate nutrition and timely medical attention, which have better nutritional

outcomes for children. Further, empowered women are less influenced by gender norms, in which they challenge harmful gender norms because they know that women have equal rights and opportunities with men, then it positively affects family dynamics and child well-being tool(Onah, 2021, Jones et al., 2019).

2.4. Socio-demographic related factors

A cross-sectional study design conducted in Sri Lanka revealed that, nutritional status of children was influenced by maternal employment status, high number of siblings, sex of children, condition of living in small houses, having large number of family members, those have low monthly income(Grosso et al., 2020). From multileveled study of Ethiopia, the higher odds of stunting were found among children whose mothers had no education with AOR of 1.58 and primary education with AOR of 1.42(Dessie et al., 2019)

Another study from Pakistan demographic and health survey showed that children whose mothers lived in rural areas with AOR of 0.67 and who were aged ≥ 18 years at marriage with AOR of 0.76 were less likely to be stunted. Mother's low educational level (AOR = 2.55) was significantly associated with child's underweight status. Children whose mothers had no education were more likely to be wasted (AOR = 3.61)(Kahsay et al., 2015).

According to study from Bangladesh, stunting and underweight is lowest amongst children aged 0–6 months and highest at the age of 18 to 23 months in which stunted 48% and underweight 37% but Wasting is highest only among 0–6months. Other point stunting was significantly associated with urban area (OR = 1.226), no or primary education of father (OR= 1.318), no or primary education of mother (OR = 1.22), underweight mothers (OR = 1.76) and wealth index poorest (OR= 2.892). Whereas wasting was determined by mother's occupation as physical labor (OR = 1.208), underweight mothers (OR = 2.145) and wealth index poorest (OR = 2.892). For underweight no or primary education of father (OR = 1.182), no or primary education of mother (OR = 1.214), mothers in physical labor (OR = 1.289), underweight mothers (OR = 2.625) and wealth index poorest (OR = 2.315) were significant factors among children(de Masi et al., 2017).

According to a community based comparative cross-sectional study Zege, North West Ethiopia, stunting and wasting were varying among sex, in which stunting was higher among male with AOR of 2.1, whereas wasting was higher among females with AOR of 2.4. Another study from Dubti District, Afar Region, and North East Ethiopia reported the odds of stunting were increased,

as age child increase. Further community based cross sectional study conducted in Mi'esso District, Oromia, Ethiopia revealed predictors significantly related to the child nutritional status were sex and age (Abdella et al., 2022, Dessie et al., 2019, Gebreayohanes and Dessie, 2022).

2.5. Other Factors Associated with Nutritional Status of Children

2.5.1. Reproductive health and health service utilization related factors

A study from Pakistan demographic and health survey showed that children whose mothers who had visited antenatal clinic more than 3 times during pregnancy (AOR = 0.61) were less likely to be stunted and child's small size at birth (AOR = 1.67) (Mya et al., 2019). From Several study of Ethiopia, higher odds of wasting were observed among children whose mother delivered at home with AOR of 1.31 and those who have lower than 24 months' birth interval (AOR = 1.31) (Dessie et al., 2019). Another community based comparative cross-sectional study in Zege, North West Ethiopia, reported that not fully- immunized was the predictors for child wasting with (AOR = 2.6) (Betebo et al., 2017).

A community-based cross-sectional study design was employed in Ethiopia showed that, overweight mothers increased the severity of stunting in their children AOR: 3.43, compared to normal BMI mothers and for each one-unit increase in maternal height, there is a 5% significant reduction in the child's odds of being severely stunted. The study from Bensa District, Sidama Region, South Ethiopia reported that, inappropriate exclusive breastfeeding (AOR = 2.07), having less than or equal to three under-five children in the household (AOR = 2.18), were significant factors that determine the nutritional status of children (Muche and Dewau, 2021, Tafesse et al., 2021).

2.5.2. Health status and nutritional habit related factors

The study from demographic and health survey of Nigeria revealed that duration of breastfeeding (more than 12 months), and children who were reported to having had diarrhea in the 2 weeks prior to the survey were the most consistent significant risk factors for stunting and severe stunting among children. A study conducted on sub-Saharan Africa countries showed that, children who had adequate minimum dietary diversity had 12% less likelihood of being stunted, compared to those who had inadequate minimum dietary diversity. Having an adequate minimum dietary diversity significantly lowered the risk of being underweight among children by 17%. Having an adequate minimum dietary diversity was associated with 13% reduced odds of wasting among

children, compared to those who had inadequate minimum dietary diversity(Aboagye et al., 2021, Akombi et al., 2017).

Nutritional status of children was influenced with multifaceted factors, accordingly the multilevel study from Ethiopia reported that the higher odds of stunting were found among children who were anemic with AOR = 1.16, and similarly, higher odds of wasting were observed among children whose mother had underweight nutritional status with AOR of 2.34. Another community based comparative cross-sectional study in Zege, North West Ethiopia showed stunting and wasting of children age of 6 to 59 months were significantly influenced by having low dietary diversity (AOR = 2.7), feeding frequency < 3/day (AOR = 1.7), and presence of diarrhea (AOR = 2.6)(Derso et al., 2017, Dessie et al., 2019).

A community-based cross-sectional study conducted in Dubti District, Afar Region, North East Ethiopia reported the odds of stunting were increased, initiating breastfeeding after 1 hour after birth, not exclusively breastfeeding for at least 6 months, poor dietary diversity feeding of child. Another, community based cross sectional study conducted in Mi'esso District, Oromia, Ethiopia reveled households food security status was the predictors significantly related to the child nutritional status(Ahmed et al., 2021, Gebreayohanes and Dessie, 2022).

Evidence from the study of Afar Regional State, Northeast Ethiopia, among children aged between 6 to 59 months, prelacteal feeding (AOR = 3.81), and diarrhea in the past two weeks (AOR = 4.57), were associated with wasting. In addition, the immunization status of child (AOR = 3.34), were predictors for stunting and with underweight. Further comparative cross-sectional study from Tigray, North Ethiopia showed there was a nutritional status difference between household food secured and not secured. On top of this, duration of continued breast feeding were the factors associated with stunting in food secure households as well as for food insecure households. Similarly, first complementary food given to the child was the main predictors of underweight in the food insecure households as well as for food insecure households(Gebre et al., 2019, Kahsay et al., 2015).

2.5.3. Water, Sanitation and Hygiene (WaSH)

A community based comparative cross-sectional study in Zege, North West Ethiopia reported that the odd being stunting was 2.1 times higher than among children who had drunk unprotected water compared with those drunk protected. Another community- based cross-sectional study conducted in Dubti District, Afar Region, North East Ethiopia reported the odds of stunting were increased, using unprotected water for drinking (AOR = 1.68). Further community based cross sectional study conducted in Mi'esso District, Oromia, Ethiopia reveled toilet using status of family was the predictors significantly related to the child nutritional status. Further, comparative cross-sectional study from Tigray, North Ethiopia showed there was a nutritional status difference between household food secured and not secured; in this main source of water to the household were the main predictors of underweight in the food insecure households as well as for food insecure households(Abdella et al., 2022, Betebo et al., 2017, Gebreayohanes and Dessie, 2022).

Evidence showed that Mentoring on care giving was very effective in increasing mothers' abilities to care for their children's nutrition. Hence, the mentoring method could empower mothers to care for their children. Mothers who are already empowering will be aware of any deviation in their children's nutritional status. In South-Central Asia, study reported that, to reduce stunting wasting and underweight rates, empowering women through improving their social independence and decision- making power might be important. Furthermore, targeting poorer women for empowerment in social independence and decision-making appears to confer positive benefits towards the reduction of stunting, wasting, and underweight rates in children. However, the main and interaction effects of women's empowerment and wealth index on children's nutrition outcomes vary across the countries examined(Onah, 2021, Utter et al., 2018).

Indicate access to safe drinking water and poor sanitation put women and children at increased risk of illness, malnutrition, and death, Research indicates that undernutrition is significantly associated with hygiene and environmental sanitation practices. For instance, study done in Adama indicated that lactating mothers disposed household wastes on open field more than three times (AOR, 3.63; 95%) as likely to be underweight compared to those who disposed to disposal pit. In addition, underweight among lactating mothers is significantly associated with poor hand washing practices after toilet(Galgamuwa et al., 2017, Thomas et al., 1993).

2.6. Conceptual Framework

Different category of factors associated with nutritional status of children was assessed from different literature conducted previously this factor include, women empowerment, socio-demographic characteristics, obstetric characteristics and health care utilization, feeding practice and dietary diversity and sanitation status(WASH).

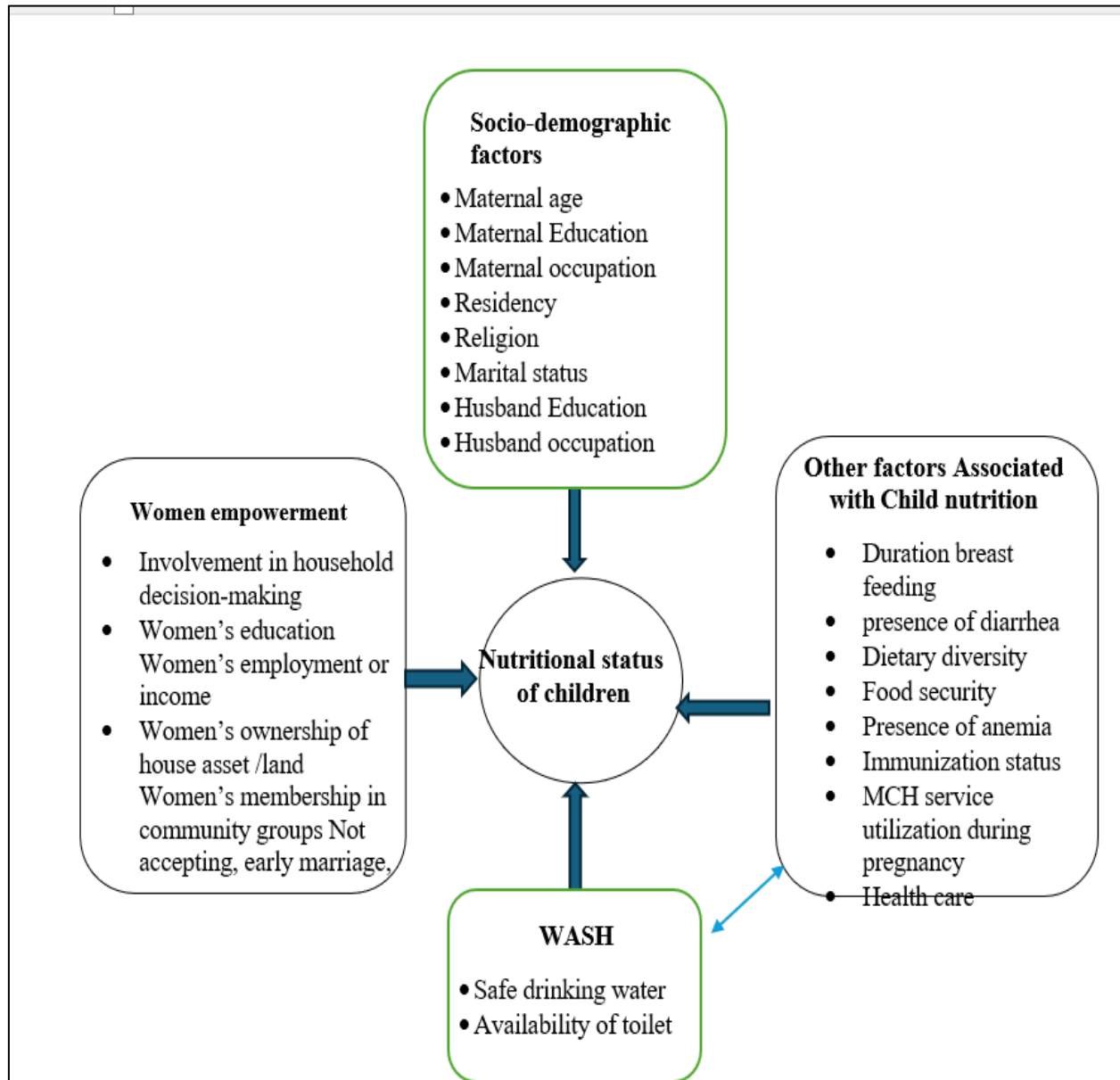


Figure 1. Conceptual model from women's empowerment to children's nutritional status (Tesfay, Organization, 2017, Mohammed et al., 2020, Kebede and Aynalem, 2021, Gebreegziabher and Sidibe, 2024)

3. MATERIALS AND METHODS

3.1. Study Area and Period

This study was conducted in chiro town, West Hararghe Zone of Oromia regional State, Ethiopia. Chiro town is the capital city of west Hararghe zone, which is located around 321 km away from Addis Ababa. It has a latitude and longitude of 9°05'N 40°52'E and an altitude of 1826 meters above sea level. In the town there are ten kebeles and the total population living those kebeles was 104,621. In this town there were around 23,153 reproductive aged women, about 17,190 under five children of these 15,693 children aged between 6-59 months were living in the area (chiro Town 2024). The study was conducted from October 15 to November 5, 2024.

3.2. Study Design

A community based comparative cross-sectional study design with quantitative and phenomenological with Qualitative study were carried out.

3.3. Sources Population

All mothers or caregivers who have children between 6 and 59 months of age who are residents of Chiro town were considered as the source population.

For qualitative study, - mothers or caregivers who have children between 6 and 59 months of age, community leaders, and health extension workers were included in the town.

3.4. Study Population

The study populations were all randomly selected mothers or caregivers with children aged 6–59 months who was living in the randomly selected kebele.

For qualitative study, - mothers or caregivers who have children between 6 and 59 months of age, community leaders, health extension workers living in the randomly selected kebele were included.

3.5. Inclusion and Exclusion Criteria

3.5.1. Inclusion criteria

All mothers or caregivers with their children aged 6-59 who residing in the selected kebeles of Chiro town were included.

3.5.2. Exclusion criteria

Mothers or caregivers whom their children were seriously ill to take anthropometric measurements during data collection in the selected kebele were excluded.

3.6. Sample Size Determination

3.6.1. Quantitative study

Based on the specific objectives, the sample size was determined by using both single and double population proportion. For the first specific objective, a single population proportion formula was considered with the proportion of nutritional status and different factors associated with this nutritional status among children aged 6 to 59 months from previous studies.

The sample size for the first objective (nutritional status) was calculated using single population proportion formula with the following assumptions:

$$n = \frac{(\frac{Z\alpha}{2})^2(1-P)}{d^2}$$

With a 95%CI (confidence interval), Z=1.96, D=Standard Error or Precision=0.05; n= sample size; p= estimated proportion of nutritional status (wasting, stunting and underweight) among children aged 6 to 59 months from previous studies.

Table 1 The sample size calculation using a single population proportion for nutritional status

Nutritional status	Sample size calculation	Proportion (P) of Nutritional status	After adding non reference	References
Stunting	$= \frac{(1.96)^2 0.395(1 - 0.395)}{(0.05)^2} = 367$	P=39.5%	n = 404	(de Masi et al., 2017).
Wasting	$= \frac{(1.96)^2 0.252(1 - 0.252)}{(0.05)^2} = 290$	P=25.2%	n = 319	(Siddiqui et al., 2020).
Underweight	$n = \frac{(1.96)^2 0.28(1 - 0.28)}{(0.05)^2} = 310$	P= 28%	n = 341	(Betebo et al., 2017).

For specific objective 2 that related to factors associated with nutritional status (Stunting,

Wasting, and underweight) among children aged 6 to 59 months; the sample size was calculated using Epi-info software version 7(stat Cal) using two-sided confidence level ratio (unexposed to exposed) =1 and adding 10% non-response rate.

Table 2. Sample size determination for factors associated with nutritional status (Stunting, Wasting, and underweight) among children aged 6 to 59 months in chiro town, west Hararghe, Ethiopia.

Factors	CI	Power	Non-Exposed%	Of Exposed %	OR	CSS	CSS 10%	Reference
Exclusive breast feeding(stunting)	95	80	31.5 (until 6 M)	68.5(not until 6 M)	4.7	66	73	(Gebreyohanes and Dessie, 2022)
Maternal (Wasting)	ES	95	80	06.0 (FE)	53.2(no FE)	5.5	36	40 (Roba et al., 2021)
History of diarrhea (underweight)	95	80	36.0(no diarrhea)	64.0 (had diarrhea)	2.8	111	122	(Derso et al., 2017)

Note: CSS = Calculated Sample size, CSS10percentage = Calculated Sample size when 10% is added, M=month, ES = educational status, FE= Formal education.

The sample size calculates for first specific object using nutritional status of stunting was larger than sample size calculated for other nutritional status and for second specific objectives. Therefore, it was selected as final sample size and it was 367. Finally, after adding 10% non- response rate (367+37) the final sample size = 404.

3.6.2. Qualitative study

Six In-depth interview and Four focus group discussions (FGDs) who consisting of 8-10 mothers and care givers of 6- 59 month in the selected kebeles were conducted to solicit participant's attitude and perception, knowledge and experience which could support the quantitative data. Health extension workers and community leaders were included in in-depth interviews.

3.7. Sampling Procedures

3.7.1. Quantitative

A two-stage sampling procedure was used to identify study participants. In Chiro town there are 10 kebeles (Local administrative unit). First from these 10 kebeles by considering the WHO Guideline of 30% sample representative of the target population, 3 kebele were selected via lottery method. In the second stage, systematic random sampling was utilized to select households with mothers and children aged 6-59 months from each randomly selected kebele. Eligible households with mothers and children aged 6-59 months were selected as women in a 1:2 ratio of empowered to non-empowered mothers. Empowerment status was determined using the standard empowerment tool and eligible mothers were classified as empowered or Non-Empowered. For everyone of empowered mother identified, two non-empowered mothers from the same community were systematically selected.

This data was be obtained from Health Extension workers, who keep track of all mothers and children in their kebele under 'the family folder'. Then, proportional allocation were used to calculate samples to each selected kebele. When a compound has more than one household with mothers and children aged 6-59 months, a simple random sampling technique was used to identify the participant.

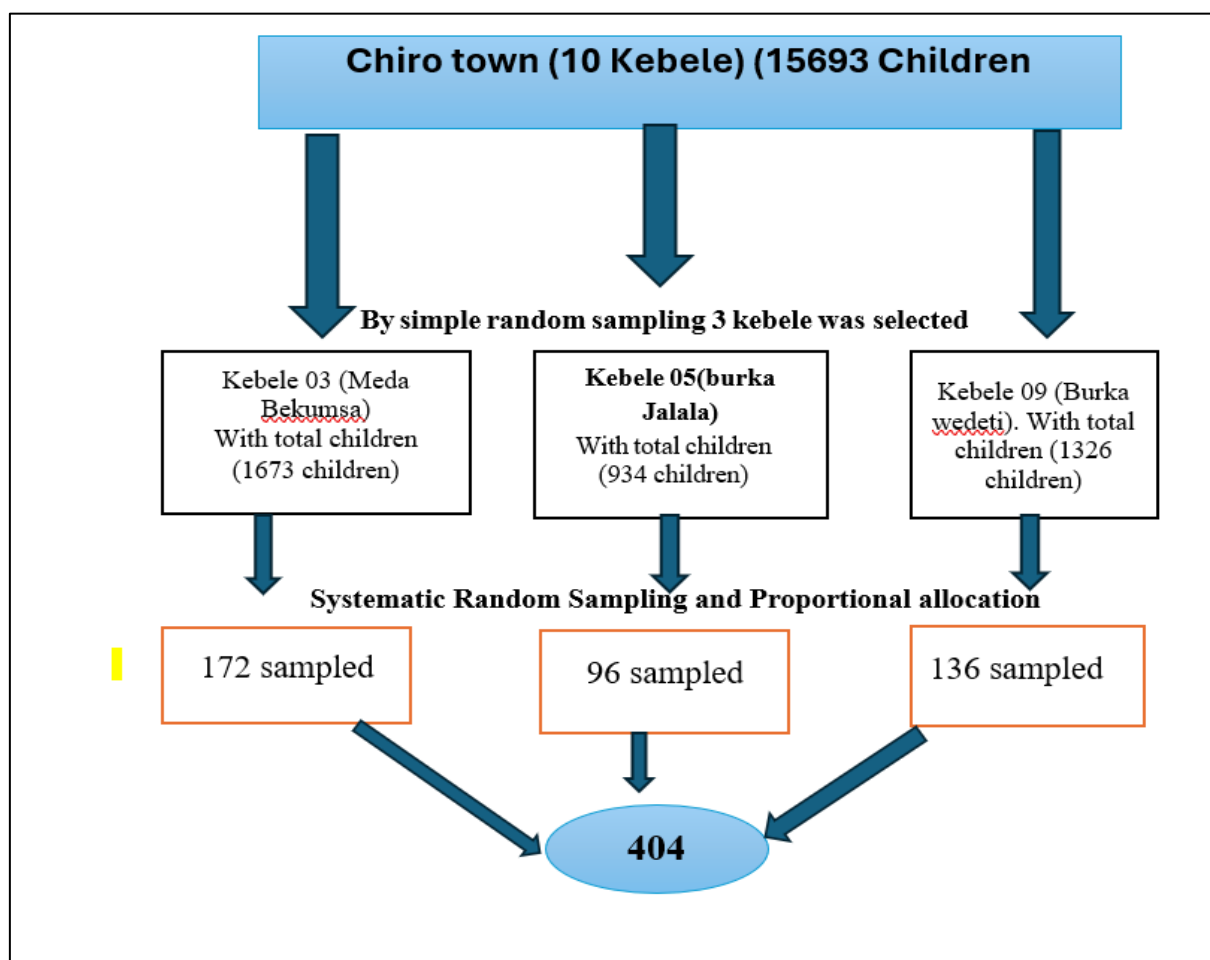


Figure 2. Schematic diagram sampling for nutritional status and its associated factors among children aged 6 to 59 months

3.7.2. Qualitative

Generally, FGD were conducted with one FGD per kebele, and each consisting of 8-10 mothers and care givers of 6-59 month in the selected kebele. The participants were selected purposively for the focus group discussions to provide information related to the impact of women empowerment on nutrition status of children aged 6-59 months and ensure to strengthen the reliability of the questionnaire. 6 In-depth interview was selected with considering the saturation principle and included one health extension worker and one community leader in each kebeles. Mother for FGD was selected based on their willingness. The qualitative data collection were carried out simultaneously with the quantitative data collection period.

3.8. Data Collection Method

3.8.1. Data collection tool

The data was collected using a validated interview-administered semi-structured questionnaire adapted from different related literature. The questionnaire consists nine sections and it included sociodemographic-related factors; reproductive health, maternal condition and health service utilization-related factors, Health status and nutritional habit-related factors, and Water sanitation and hygiene (WaSH) related factors and women empowering related characteristics. More relating the outcome variables, the women empowerment questionnaire that related more with nutrition, anthropometric measurement of child and mothers, and dietary assessment of child were assessed by using direct interview of mothers with last 24-hour recalls household Food Insecurity Access Scale (HFIAS). The empowered and non-empowered women were assessed using the empowerment tool. Anthropometric measurements such as height/length, weight and Mid Upper Arm Circumference (MUAC) was taken by measuring children during data collection. The questionnaire were translated into the local language in Amharic and Afan Oromo in order to make the interview easy and maintain quality data collection.

3.8.1.1. Anthropometric measurements

Height/length: - The height was measured with an SECA portable audiometer (SECA 213). The audiometer was installed with the backboard supported by a wall. Children were measured with the head, back, buttocks, and heels touching the backboard; heels together; knees extended; head in the Frankfort horizontal plane; hairstyles and hair accessories that impede with the measurement process were undone, corrected or removed. It was measured to the closest 0.1 cm(Humphries et al., 2021).

Weight: - It was measured using SECA electronic weighing scale (UNICEF) and recorded to the nearest 0.1 kg. Weight was measured barefoot wearing a light cloth. To ensure measurement accuracy, the scale were checked for zero reading before each participant and calibrated daily with an iron bar of 5 kg(Jeyaseelan and Lakshman, 1997).

MUAC: - It was measured on the non-dominant arm using UNICEF (United Nations Children's Fund) adult MUAC, non-stretchable plastic tape at the midpoint between the acromion process of the scapula and the olecranon process (elbow). Measurement was taken when the arm is relaxed

(hang loosely by the study participant side). The MUAC tape was placed around the designated midpoint of the arm, neither too loose nor too tight, and the measurement value is recorded to the nearest 0.1 cm(Aboagye et al., 2021).

Height/Length for Age: Based on WHO Child growth standards of children were classified as chronic malnutrition Length/height-for-age ≤ -2 SD and ≥ -3 SD of the median and severe stunting is defined as a height /length for age less than or equal to -3SD from the median(Gebreayohanes and Dessie, 2022)

Weight for height/length: Based on Global Acute Malnutrition, children were classified as the level of childhood wasting (WHZ < -2), Moderate Acute Malnutrition (WHZ between -2 and -3), and Severe Acute Malnutrition (WHZ < -3)(Organization, 2017).

Weight for age: Based on WHO Multicenter Growth Reference Study weight-for-age of the children were computed, then nutritional status determined. Consequently, those children whose weight-for-age found below minus two standard deviations (-2 SD) and minus three standard deviations (-3 SD) from the median of the reference population were categorized as moderately and severely malnourished respectively(Organization, 2017).

3.8.1.2. Dietary Assessment

Meal frequency: It determines the dietary practice of lactating mothers and measure it by two components. (1) a list of foods and (2) a set of frequency-of-use response categories which consists of a total of food 10 groups, then the mother or care giver were asked about the frequency of consumption of each food per day, per week or per month in the prior to 3 months(Organization, 2017).

HFIAS: The HFIAS status of the household were assessed using 27 with nine “frequency-of-occurrence” questions that measures the severity of food insecurity in the last four weeks in terms of four Likert scale responses [0 = never, 1 = rarely (once or twice), 2 = sometimes (three to ten times), 3 = often (more than ten times)]. The respondents were asked with the expectation to answer these questions on behalf of all household members. The cumulative score of the nine items ranged between 0-27, and a higher HFIAS score indicated more food insecurity the household experienced (in terms of access to food). The cumulative HFIAS score were categorized into four levels of household food insecurity: food secured (0-2), and mild (2-10), moderate (11- 17), and

severe food insecurity (>17), following HFIAS guidelines. The tool was previously validated for use in developing countries (Organization, 2017, Shafiq et al., 2019).

Dietary diversity score (DDS): The dietary diversity score (DDS) of the children were measured by using 24 hours' dietary recall following the guidelines. The Dietary Diversity were consisted of twelve food groups, including starchy and staple foods and grains, beans and peas, nuts and seeds, dairy, fleshy foods, eggs, vitamin A-rich dark green leafy vegetables, other vitamin A-rich fruits and vegetables, other vegetables, and other fruits. The sum of each food group consumed by pregnant women for one week were calculated and converted to tertiles. Then, the tertile DDS score was grouped to construct a dichotomized outcome variables high dietary diversity. Based on the recent recommendation by Dietary Diversity Project Study Group, the higher tertile of the DDS, the greater the diversity in the food intakes were indicated a better nutrient intake among the children and the low tertile of the DDS, indicates the low dietary diversity or dietary monotony (Jeyaseelan and Lakshman, 1997, Lokossou et al., 2022).

Animal source food (ASF): were estimated by calculating the frequency of each animal-derived food consumed by women during the reference period. ASF scores were also converted to tertiles, with the highest tertile defined as 'high' (Karki et al., 2021).

3.8.1.3. Water Sanitation and Hygiene (WaSH) Assessment

Water, sanitation and Hygiene (WaSH) were summarized into standard binary variables as recommended by the world health organization (WHO, 2006). Hand washing scores for the child and caretaker were created by assigning no=0 and yes=1 for seven hand washing questions, totaling the scores and dividing into three categories with the lowest category containing scores 0-2, the middle one containing scores 3-5 and the highest category containing scores 6 and 7 (Organization, 2024).

3.8.2. Data Collection procedure

Data were collected through face-to-face interviews among selected kebele, and who signed informed consent. Based on the systematic selection of the household, data collectors visit the selected household, on the ratio of 1:2 (one empowered and two non-empowered mothers/caregivers) using the empowerment tool to identify the empowered and non-empowered women. All data were collected based on interview and anthropometric measurement tool by selecting the

appropriate place.

Qualitative Data: was collected using field FGD guideline developed from review of different literatures and used as a tool for data collection. Tape recorder were used during data collection and note was taken. In addition, field notes were used for addressing contexts, behaviors, challenges, field-based decisions and reflection on daily activities with supervisor. The data quality were managed through documenting decisions, methods and interactions with the field under study.

3.8.3.Data Collectors

Quantitative data were collected by 6-health extension worker and supervised by one BSc Nurses professional while qualitative data was collected by health experts/professionals who have an experience of qualitative data collection.

3.9. Study Variables

3.9.1. Dependent variable (Outcome variable)

- Nutritional status of child aged 6 to 59 months

3.9.2. Independent variables

- Sociodemographic related variables
- Women empowerment
- Other confounding factors related nutritional status include Health status, nutritional habits, Reproductive health, health service utilization and WASH

3.10. Operational Definition

Nutritional status: It is being Undernutrition (Stunting, Wasting & Underweight), Normal and Over nutrition among children aged 6-59 month(Poudel, 2021).

Obese: Children with z-scores of greater than 3 standard deviations (SDs) for WFH by using anthropometry measurements(Nicodemas et al., 2019).

Overweight: Children with z-scores in between 2-3 standard deviations (SDs) for WFH by using anthropometry measurements(Wells et al., 2020).

Stunting Children with z-scores of less than -2 standard deviations (SDs) for HFA by using anthropometry measurement(Myra et al., 2019).

Underweight: Children with z-scores of less than -2 standard deviations (SDs) for WFA by using anthropometry measurements(Siddiqui et al., 2020).

Wasting: Children with z-scores of less than -2 standard deviations (SDs) for WFH by using anthropometry measurements(Ray and Suri, 2021).

Wealth index: was computed using principal component analysis (PCA) as a composite indicator of household living standards based on ownership of fixed assets including cattle, sheep, radio/watch, table/chair, mobile, and others. Finally, wealth index were determined and categorized as a higher, medium, and lower(White and Saran, 2022).

Power on access in the wealth of HH: Authority for access to, control over and decision making over the HH resources(Mukuku et al., 2019).

Empowered Women: were those who can make strategic life choices. This empowerment can manifest in the forms such as having access to education, economic opportunity, and the ability to participate in decision-making processes(Jones et al., 2019).

Non-Empowered Women: were those who lack the ability to make these strategic life choices due to different constraints. They were limited access to economic resources, education, and restricted to participate in decision-making process(Jones et al., 2019).

3.11. Data Quality Control

Quantitative data: The standard questionnaire were prepared in English and translated to the local language (Amharic and Afan Oromo) for data collection and then translated back into English. Data collectors and supervisors were received two days of training on the purpose and procedure of data collection related to this research. They were assigned to each selected kebele with the collaboration of women HDA in selected kebeles of small village (got) and supervised by the principal investigator.

Trained data collectors were performed anthropometric measurements (weight, height and MUAC) using standard techniques and procedures. All anthropometric measurements were obtained twice, and the average of the two measurements were taken for analysis. The

measurement was repeated when the difference between the two measurements were exceeds the maximum tolerable difference of >200 g for weight, > 0.5 cm for MUAC and height. Additionally, the percentage of technical error measurement (percentage of TEM) and coefficient of variation (% CV) were computed. The inter-observer technical errors of measurement for each anthropometric surrogates' measurement were calculated. In order to check whether within the acceptable range, all the technical errors of measurements were compared.

The questionnaires were pre-tested in a similar study population in Hirna Town taking five percent of the actual sample size before the final work and appropriate measures were taken before it finalized. The supervisor were monitored the completeness and consistency of the collected data along with the principal investigator on daily basis at the spot during the data collection time. The possible errors were returned to the collectors for correction. Double data enter were done by two data clerks and consistency of the entered data cross-checked by comparing the two separately entered data.

For qualitative data, an interview guide were developed in line with the objective of the study. Experienced and trained data collectors facilitated the discussion. Ten (10) open-ended questions were used to guide and facilitate FGD. Conducting debriefing and discussion sessions each day during the entire fieldwork was encouraged to deal with any emerging issues. Facilitators and note takers were document the impression for each data source. In order to ensure that the interpretation of the finding was make sense; debriefing discussion with advisors, supervisors and data collectors were done.

Accordingly, to keep the credibility of our data, persistent observation, debriefing and member check was done, transparency was maintained by purposively selecting the participants and as much as possible thick description were done. Dependability and confirmability were kept by doing dependability and confirmability audit among the participants. The data quality will be managed through documenting decisions, methods, and interactions with the field under study which ensures transparency and allows for the replication of studies and is a cornerstone of scientific validity. By keeping detailed records, it can be get a clear trial of research process, which aid in the verification of results and supports the credibility.

3.12. Data processing and analysis

Quantitative Data: All collected data were checked for completeness and internal consistency and coded. After cleaning for internal inconsistency, it was exported to SPSS version 26 for analysis. Descriptive analysis were performed, and results presented by tables, graphs, and charts. A chi-square test were done among women empowerment and nutritional status of children. Anthropometric data analysis were performed with WHO Anthro. An initial multinomial logistic regression analysis were performed to assess associations between the dependent variable and each independent variable. The independent variables with p values less than 0.25 in the initial multinomial logistic regression analysis were considered for further analysis by the final multinomial logistic regression analysis to control for potential confounders and to detect the predictors of nutritional status among children. Multicollinearity were checked to determine the linear correlation among the independent variables by using standard error (SE) and Variables with a SE of ≥ 2 will be dropped from the multinomial analysis. The strength of associations between the nutritional status variable and independent predictor variables were assessed by using final multinomial logistic regression at 5% significance level. Adjusted odds ratios (AORs) with 95% confidence intervals and a P value less than 0.05 were used to declare the statistical significance of the observed associations. All tests were done in two-sided and variables with P-values <0.05 in the multinomial analysis were considered statistically significant. Finally, the fitness of the model were tested.

For qualitative data audio records and field notes were transcribed in Amharic and Afaan Oromo language by verbatim, and then after cleaning all and checking grammar as well contextualized the data were translated to English by Language expert. The translated documents were thematically analyzed. Then, formatting, Coding and categorization were done to form primary themes through both inductively and based on predetermined concepts/objectives of the study. Besides, quotes of participants' expressions that exemplify key concepts were used directly during analysis and interpretation. Finally, the result from qualitative themes or categories were triangulated with that of the quantitative results and discussions based on complimentary way. Participants' expressions that exemplify key concepts were used directly during analysis and interpretation. Finally, the result from qualitative themes or categories were triangulated with that of the quantitative results and discussions based on complimentary way.

3.13. Ethical Consideration

Ethical approval were obtained from the Intuitional Health Research and Ethics Review Committee (IHRERC) of Haramaya University, College of Health, and Medical Science prior to data collection. A formal letter from Haramaya University, College of Health and Medical sciences was submitted to the chiro town administrative and health office. In addition, a support letter was obtained from the administration office to each kebeles. Informed, voluntarily written and signed consent were also obtained from participants after explanation. An additional assent form were obtained for children and those participants under the age of 18 years. All study participants were informed about the purpose of the study and the benefits and risks of the study. Participant's right to self-determination and autonomy were respected. To protect the confidentiality of the information, names and any identity record numbers were not recorded on the questionnaire and recorded data were kept in secure.

3.14. Information Dissemination

The results of this study were disseminated to Haramaya University College of Health and Medical Sciences, School of Public Health, Department of Health and Health Policy. The report was also submitted to concerned bodies including the chiro town administrative and health office. Efforts will be made to publish the findings in a reputable journal.

4. RESULTS

4.1. Socio-demographic characteristics

Of the total of 400 children under the age of five with their caregivers were participated, with a response rate of 99%. Among participants, 268 (67%) came from families with non-empowered women, while the majority of mothers among the non-empowered women were aged between 25 and 29 years. Related to child age, 78(29.1%) children from non-empowered and 36(27.27%) empowered women between aged 24-35 months. Regarding to educational status, 151 participants (56.34%) of non-empowered women were and 74 empowered women (56.06%) had achieved primary-level education. On the other hand, 134 parents of children from non-empowered women had no formal education (Table 3).

Table 3 presents the sociodemographic characteristics of mothers, children, and households among empowered and non-empowered group. Mother's age did not differ significantly between the groups ($p=0.816$). The majority of mothers were aged 25-29 years (41.0% non-empowered vs. 42.4% empowered), followed by 30-34 years (25.4% vs. 21.2%), 20-24 years (17.5% vs. 18.1%), and ≥ 35 years (16.0% vs. 18.2%). Child's age also showed no significant difference ($p=0.963$). Children aged 24-35 months were the largest group in both non-empowered (29.1%) and empowered households (27.3%). Concerning religion distribution, it was no significant difference between groups ($p=0.772$). Marital status did not differ significantly ($p=0.191$) between two groups, with most mothers being married (90.7% non-empowered vs. 86.4% empowered). Mother's education level was significantly difference between groups ($p=0.003$). Secondary education or higher was more common among empowered households (26.5%) compared with non-empowered households (23.1%). Father's education level did not show a significant difference ($p=0.506$) between two groups. The majority of fathers had no formal education (50.0% non-empowered vs. 47.7% empowered). Regarding to mother's occupation was not significantly different between groups ($p=0.081$), although housewives were more common among empowered households (67.4% vs. 54.9%). Although, father's occupation did not differ significantly ($p=0.081$). Farmers were more common among empowered households (39.0% vs. 29.1%). Concerning, family wealth index showed a significant difference between the groups ($p=0.006$). A higher proportion of empowered households were classified as rich (31.7% vs. 16.0%).

Table 3. Socio-demographic characteristics of participants among empowered and non-empowered mothers at Chiro Town in West Hararghe Zone Oromia, Ethiopia, 2024 (N=400)

Variables	Categories	Non-Empowered (n=268) (%)	Empowered (n=132) (%)	P-value
Mother's age in years	20-24	47 (17.5)	24 (18.1)	0.816
	25-29	110 (41.0)	56 (42.4)	
	30-34	68 (25.4)	28 (21.2)	
	>=35	43 (16.0)	24 (18.2)	
Child's age in months	<11	41 (15.3)	24 (18.2)	0.963
	12_23	59 (22.0)	28 (21.2)	
	24-35	78 (29.1)	36 (27.3)	
	36-47	48 (17.9)	24 (18.2)	
	48-59	42 (15.7)	20 (15.2)	
Religion	Muslim	159 (59.3)	77 (58.3)	0.772
	Orthodox	79 (29.5)	37 (28.0)	
	Protestant	30 (11.2)	18 (13.6)	
Marital status	Married	243 (90.7)	114 (86.4)	0.191
	Divorced/widowed	25 (9.3)	18 (13.6)	
Mother's education level	Secondary & above	62 (23.1)	35 (26.5)	0.003
	Primary education	151 (56.3)	74 (56.1)	
	No formal education	55 (20.5)	23 (17.4)	
Father's education level	Secondary & above	35 (13.1)	23 (17.4)	0.506
	Primary education	99 (36.9)	46 (34.9)	
	No formal education	134 (50.0)	63 (47.7)	
Mother's occupation	Merchant	42 (15.7)	15 (11.4)	0.081
	Civil servant	57 (21.3)	11 (8.3)	
	Daily laborer	22 (8.2)	17 (12.9)	
	Housewife	147 (54.9)	89 (67.4)	
Father's occupation	Farmer	78 (29.1)	48 (39.0)	0.081
	Daily laborer	20 (7.5)	17 (13.8)	
	Merchant	104 (38.8)	42 (34.2)	
	Civil servant	66 (24.6)	25 (20.3)	
Family wealth index	Rich	43 (16.0)	39 (31.7)	0.006
	Medium	87 (32.5)	40 (32.5)	
	Poor	138 (51.5)	53 (43.1)	

4.2. Maternal and Child Health Service

Majority women (225, or 83.96%) of women from non-empowered women were received antenatal care (ANC) follow-up. About one-fourth of mothers from non-empowered families (55, or 24.44%) were attended ANC services twice or more.

Additionally, 64.18% (172) of mothers from non-empowered families were delivered their last child in a health institution. Nearly above two-third (214 (79.85%)) of non-empowered women practiced exclusive breastfeeding (EBF) for six months. Among empowered women 61.54% (82), were feed their children according to the recommended duration of EBF.

Regarding child immunization, 17.16% (46) children from non-empowered families were partially immunized (Table 4). Table 4 summarizes maternal and child health service utilization and child health outcomes among empowered and non-empowered households. Antenatal care (ANC) utilization was significantly higher in non-empowered households, with 83.96% reporting at least one ANC visit compared with 58.33% in empowered households ($p<0.001$). There was no statistically significant difference in ANC frequency, with 75.6% of non-empowered and 57.1% of empowered mothers attending only once ($p=0.142$).

Concerning place of delivery, it showed a significant difference between groups ($p<0.001$). A greater proportion of empowered mothers delivered in health facilities (84.85%) compared with non-empowered mothers (64.18%). Mode of delivery was also significantly different ($p<0.001$); all deliveries in empowered households were normal, whereas non-empowered households reported cesarean sections (11.63%) and episiotomies (33.14%). With regard postnatal care (PNC) utilization, it was higher among empowered households (63%) than non-empowered households (53%), with a statistically significant difference ($p=0.001$). Breastfeeding practices showed significant differences between two groups. Exclusive breastfeeding for six months was more common among non-empowered households (79.85%) compared with empowered households (39.39%; $p<0.001$). Duration of exclusive breastfeeding also differed significantly ($p=0.001$), with a higher proportion of non-empowered mothers practicing six-month exclusive breastfeeding (55.61% vs. 61.54%). Regarding immunization coverage, there were a significantly higher among non-empowered children (82.84% fully immunized) compared with empowered children (62.88%; $p<0.001$).

Regarding child illness, empowered households reported fewer illnesses (20.45%) than non-

empowered households (45.90%; $p<0.001$). Specific illness symptoms varied significantly between groups ($p<0.001$). Fever (15.91%) and breathing problems (61.36%) were more frequently reported in empowered households, whereas vomiting (26.87%) and watery stool (55.22%) were more common in non-empowered households. Cough prevalence did not differ significantly.

Table 4. Maternal and Child health service of study participants among empowered and non-empowered mothers at Chiro Town in West Hararghe Zone Oromia, Ethiopia, 2024

Variables	Category	Non-Empowered (n=268) n (%)	Empowered (n=132)n(%)	P-value
ANC utilization (visit)	Used	225 (83.96)	77 (58.33)	<0.001
	Not used	43 (16.04)	55 (41.67)	
ANC frequency	Once	170 (75.56)	44 (57.14)	0.142
	Twice and above	55 (24.44)	33 (42.86)	
Place of delivery	Facility	172 (64.18)	112 (84.85)	<0.001
	Home	96 (35.82)	20 (15.15)	
Mode of delivery	Normal	95 (55.23)	132 (100)	<0.001
	Cesarean section	20 (11.63)	0 (0)	
	Episiotomy	57 (33.14)	0 (0)	
PNC service	No	126 (47)	49 (37)	0.001
	Yes	142 (53)	83 (63)	
Breastfeeding during 6 months	Exclusive	214 (79.85)	52 (39.39)	<0.001
	Non-exclusive	54 (20.15)	80 (60.61)	
Duration of exclusive BF	Four Month	95 (44.39)	20 (38.46)	0.001
	Six Month	119 (55.61)	82 (61.54)	
Immunization	Fully	222 (82.84)	83 (62.88)	<0.001
	Partially	46 (17.16)	49 (37.12)	
Illness	No	145 (54.10)	105 (79.55)	<0.001
	Yes	123 (45.90)	27 (20.45)	
Illness symptoms	Fever	14 (5.22)	21 (15.91)	<0.001
	Cough	26 (9.70)	10 (7.58)	
	Vomiting	72 (26.87)	9 (6.82)	
	Watery stool	148 (55.22)	11 (8.33)	
	Breathing problem	8 (2.99)	81 (61.36)	

4.3. Water Sanitation and Hygiene status (WaSH)

Table 5 presented that the comparison of water and sanitation related characteristics between empowered and non-empowered households. In this regards, All households in both groups reported pipe water as their main source (100.0%), and solid waste was disposed of in private pits (100.0%), indicating no variation between groups.

With regard to access water, the majority of households accessed water within 30 minutes, with 97.0% of non-empowered and 95.5% of empowered households reporting this timeframe; the difference was not statistically significant ($p=0.376$). Liquid waste disposal differed significantly between groups ($p<0.001$). In non-empowered households, the majority disposed of liquid waste in open spaces (81.7%), whereas most empowered households used septic tanks (92.4%). Disposal in seepage pits was reported by a small proportion of households in both groups (4.85% vs. 7.58%). Child waste disposal showed no significant difference ($p=0.376$), with most children using a toilet (90.3% non-empowered vs. 94.7% empowered). Disposal elsewhere was reported by 9.7% of non-empowered and 5.3% of empowered households. Latrine availability was significantly higher in empowered households (59.8%) compared with non-empowered households (40.9%; $p<0.004$). Handwashing facilities beside the toilet also differed significantly between groups ($p<0.001$). Only 18.3% of non-empowered households had a handwashing place, compared with 50.8% of empowered households.

Table 5. Water, sanitation, and hygiene status of study participants at Chiro Town in West Hararghe Zone Oromia, Ethiopia, 2024 (n= 400)

Variables	Category	Non-Empowered	Empowered (%)	n	P-value
Source of water	Pipe water	268 (100.0)	132 (100.0)		N/A (no
Time needed to access water	≤30 minutes	260 (97.01)	126 (95.45)		0.376
	>30 minutes	8 (2.99)	6 (4.55)		
Solid waste disposal	In a private pit	268 (100.0)	132 (100.0)		N/A (no
Liquid waste disposal	Septic tank	36 (13.43)	122 (92.4)		P<0.001
	In a seepage pit	13 (4.85)	10 (7.58)		
	Open space	219 (81.72)	0 (0)		
Child waste disposal	In toilet	242 (90.3)	125 (94.7)		0.376
	Everywhere	26 (9.7)	7 (5.3)		
Latrine available	No	158 (59.1)	53 (40.2)		P<0.004
	Yes	110 (40.9)	79 (59.8)		
Handwashing place beside toilet	No	219 (81.7)	65 (49.24)		P<0.001
	Yes	49 (18.28)	67 (50.76)		

4.4. Dietary diversity, consumption of ASF, and HHFI

Table 6 summarizes dietary and household indicators by empowerment status. Empowered women exhibited significantly higher dietary diversity and animal-source food (ASF) consumption than non-empowered women (HDDS high tertile: 90.91% vs. 51.49%, $p=0.001$; ASF high tertile: 59.85% vs. 24.25%, $p=0.001$). With regards Household food security (HHIS), there did not significant difference between groups (secured: 61.36% vs. 61.94%, $p=0.884$).

Table 6. Dietary diversity, consumption of ASF and HH food Insecurity status of study participants at Chiro Town in West Hararghe Zone Oromia, Ethiopia, 2024

Variables	Category	Non-Empowered (n=268)	Empowered (n=132)	p-value
HDDS	Low tertile	130 (48.51)	12 (9.09)	0.001
	High tertile	138 (51.49)	120 (90.91)	
ASF	Low tertile	203 (75.75)	53 (40.15)	0.001
	High tertile	65 (24.25)	79 (59.85)	
HHIS	Secured	166 (61.94)	81 (61.36)	0.884
	Insecured	102 (38.06)	51 (38.64)	

4.4.1. Comparison by women empowerment status

Socioeconomic and educational advantage of empowered mothers, Empowered household wealth were significantly classified as rich (31.7%vs 16.0 P=0.006) when compared to non-empowered mothers, maternal education had also significantly higher in empowered mother who achieved secondary education or above (26.5% vs 23.1%) p=0.003. Regarding WaSH still empowered mother had significantly better liquid waste disposal (92.4%vs 13.4%. p<0.001), latrine availability (59.8% vs40.0% p<0.004) and hand washing facility (50.76%vs18.28, p<0.001) when compared to non-empowered.

Regarding maternal and Child health service utilization of empowered mothers significantly higher rate of facility based delivery (84.85% vs. 64.18%, p<0.001), Postnatal Care (63% vs. 53%, p=0.001) fewer child illness 20.45% vs. 45.90%, p<0.001) were reported. While non empowered women higher rate of at least one ANC visit (83.96% vs. 58.33%, p<0.001) when compared to empowered women. However, frequency of visit was not statically significant. As well non empowered women much higher rate of Exclusive breast feeding of their child for six month (79.85% vs. 39.39%, p<0.001) and higher rate of immunization (82.84% vs. 62.88%, p<0.001) when compared to empowered mother. Related to the dietary diversity and quality, empowered women had significantly higher household dietary diversity score (90.91% in high tertile vs. 51.49%, p=0.001) and consumed more Animal Source Foods (ASF) (59.85% in high tertile vs. 24.25%, p=0.001). Statistically, the comparison reveals that maternal

empowerment is significantly associated with a lower burden of under nutrition including stunting, wasting and undermatron.

4.5. Prevalence of Under Nutrition status

Evaluation of the effect of nutritional status children under five years of age in the study area revealed a substantial prevalence of underweight, with 24.75% (n=99) of sampled children affected. Notably, 69 (25.75%) children suffering from underweight belong to non-empowered women, whereas the rate of underweight among children of empowered women affected 22 children. In addition, the overall waste rate in the study area is 16.0%, affecting 64 children. Of this group, 46(17.16%) are children of non-empowered women, while 18(13.64%) of children from empowered women are affected by wasting. Furthermore, the study identifies that 125 children, or 31.25 %, are stunted. Within this alarming statistic, 33.96% are from the non-empowered women group, in contrast to 25.76% from the empowered women group.

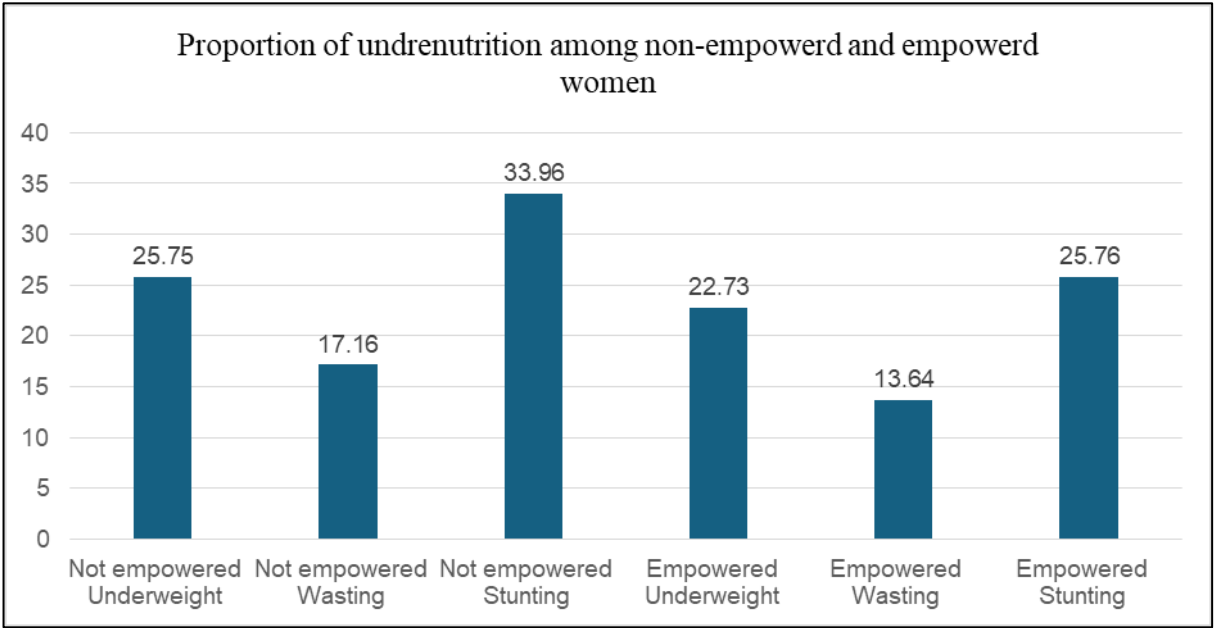


Figure 3.Types of undrenutrition among children of empowered and non-empowered women in Chiro Town, West Hararghe Zone, Oromia, Ethiopia, 2024

4.6. Nutritional status of Children (Undernutrition, Normal, and overweight)

The study found that a substantial majority of children, 70.75% (95%CI: 66.11-75.02), exhibit normal nutritional levels. However, significant proportions demonstrate either undernutrition (19.75%, 95%CI: 16.12-23.96%) or over-nutrition (9.5%, 95%CI: 6.98-12.80). While both empowered and non-empowered women have a similar percentage of children with normal nutritional status (71.97% and 70.15% respectively), differences emerge in under and over-nutrition prevalence. A slightly higher percentage of children from non-empowered women are undernourished (21.27%) compared to those from empowered women (16.67%). Conversely, over-nutrition is slightly more prevalent among children of empowered women (11.36%) compared to non-empowered women (8.58%)

The findings reveal that women's empowerment has a role in reducing child undernutrition by improving access to nutritious food and health care. However, it also presents a paradoxical risk of increasing over nutrition, likely due to dietary misconception on less healthy food options. This underscores the necessity of combining empowerment initiatives with targeted nutritional education to ensure balanced and healthy dietary practice for children. (Figure 4)

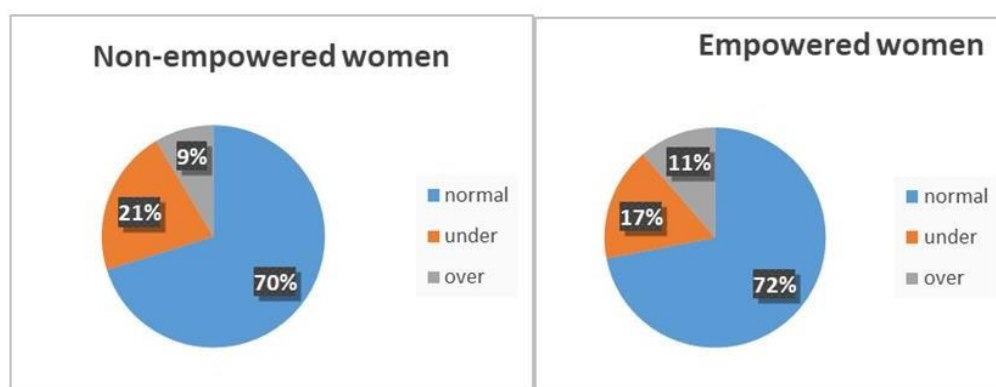


Figure 4. Nutritional status of under-five children (non-empowered women left and empowered women right) in Chiro Town, West Hararghe Zone, Oromia, Ethiopia, 2024.

4.6.1. Comparison of undernutrition status among children of Empowered vs non-Empowered mothers.

The study revealed that a clear and statistically significant association between maternal empowerment and the nutritional status of children aged 5-59 month. Children of non-empowered mothers suffer from higher rate of under nutrition while children of empowered mother show a tendency towards over nutrition. The difference in the prevalence of underweight is statistically significant ($p=0.041$). This strongly suggest that maternal empowerment is a protective factor

against being underweight. While stunting and wasting were more common in the non-empowered group.

Children across the three nutritional categories (underweight, Normal, overweight) is significantly different between the two groups ($p=0.025$). This confirms that maternal empowerment has statistically significant relationship with children overall nutritional status.

4.7. Qualitative Findings

4.7.1. The Sociodemographic of participants

The study involved 56 female participants distributed across six Focus Group Discussions (FGDs), stratified by empowerment status. Three groups of empowered women ($n=27$) and three groups of non-empowered women ($n=29$) participated, with 8-10 participants per group. Additionally, twelve Key Informant Interviews (KIIs) were conducted with one Health Extension Worker (HEW) and one community leader from each of the six kebele ($n=12$). This approach ensured balanced representation of women's nutritional decision-making roles across different empowerment contexts while integrating perspectives from both community members and healthcare providers.

4.7.2. Qualitative Findings from Empowered Women

Qualitative data reveals complex dynamics in decision-making regarding family planning and child nutrition, where collaboration and shared responsibilities exist alongside individual agency. Women are translating their economic contributions into parental autonomy while navigating traditional societal norms. Their understanding of nutrition underscores the importance of education in making informed choices for childcare and feeding practices. Overall, these findings suggest that fostering women's economic empowerment and education can significantly enhance family dynamics and the well-being of children.

Table 7. Qualitative Findings from Empowered Women

No.	Theme Title	Description	Illustrative Quote
1	Collaborative Decision-Making in Household Management	Mothers reported active engagement in joint decision making with their spouses, reflecting mutual respect and cooperation in managing household assets.	"In our household, we make decisions as a team. It feels good to work together and know that we're both on the same page." <i>24-year-old mother</i>
2	Diverse Approaches to Introducing Solid Foods	Mothers adopted varied practices for introducing solid foods, based on personal beliefs, peer influence, and infant readiness.	"I started giving solids to my baby at 6 months. Some of the other moms I know started at 4 months." <i>34-year-old mother</i>
3	Shared Decision-Making and Autonomy in family Planning	Highlights both collaborative and autonomous reproductive choices among mothers, showing diverse dynamics in family planning decisions.	See sub-themes below.
	Sub-Theme 3.1 Collaborative Decision-Making	Most participants reported joint discussions with their spouses regarding family planning, emphasizing mutual understanding and agreement.	"We discussed and decided together when to start and stop using contraceptives." <i>Implied from theme synthesis</i>
	Sub-Theme 3.2 Individual Authority	Some women made independent decisions regarding contraceptive use, reflecting personal autonomy in reproductive health.	"I chose the method by myself. I know my body best and what works for me."
4	Prioritizing Child Nutrition through Shared Financial Responsibility	Demonstrates how mothers prioritize child nutrition while contributing financially to the household, balancing caregiving and income generation.	"I prioritize buying fresh fruits. At the same time, I work hard to contribute to our family's income." <i>34-year-old mother</i>
5	Empowerment through Financial Independence in Child Nutrition	Economic independence empowers mothers to make independent choices about their children's diet, ensuring quality and self-reliance.	"We can buy our child food by ourselves because we have our own income. It is empowering to contribute financially." <i>24-year-old mother</i>
6	The Effect of Maternal Education on Child Nutrition	Education equips mothers with knowledge to make informed and balanced nutritional choices, strengthening their role as advocates for child health.	"Having that knowledge allows me to make informed decisions. I feel empowered to advocate for my child's nutritional needs." <i>24-year-old mother</i>

Empowered women exhibited nuanced decision-making patterns in household management, family planning, and child nutrition. Findings indicate that economic independence and education strengthen maternal autonomy, while collaborative engagement with spouses reinforces shared household responsibilities. The interplay of these factors contributes to more informed childcare and feeding practices.

Theme 1: Collaborative decision making in household management

Most participants described active engagement with their spouses in household decisions, reflecting mutual respect and cooperative management of assets. One mother explained:

“In our household, we make decisions as a team. I consult my husband about everything because both our opinions matter, no matter how big or small the issue is. It feels good to work together and know that we’re both on the same page.” (24-year-old mother)

Theme 2: Diverse approaches to introducing solid foods

Participants reported varied practices regarding the introduction of solid foods, shaped by personal beliefs, peer influence, and infant readiness. A mother noted:

“I started giving solids to my baby at 6 months. Some other moms I know started at 4 months. I wanted to wait to ensure he was ready and to provide a balanced diet of porridge with proteins, fats, and vitamins.” (34-year-old mother).

Theme 3: Shared decision making and autonomy in family planning

Empowered women demonstrated both collaborative and independent approaches in reproductive health decisions.

Sub-theme 3.1: Collaborative decision making

Most participants reported joint discussions with spouses regarding family planning, highlighting mutual understanding and agreement.

“We discussed and decided together when to start and stop using contraceptives.” (Paraphrased from analysis).

Sub-theme 3.2: Individual authority

Some women independently decided on contraceptive use, reflecting personal autonomy.

“I chose the method by myself. I know my body best and what works for me.” (34-year-old mother).

Theme 4: Prioritizing child nutrition through shared financial responsibility

Mothers emphasized the importance of child nutrition while balancing income-generating activities. *“I prioritize buying fresh fruits and preparing nutritious meals while also contributing to our family’s income.” (34-year-old mother)*

Theme 5: Empowerment through financial Independence in child nutrition

Financial independence enabled mothers to make autonomous dietary decisions for their children. *“We can buy our child food by ourselves because we have our own income. It is empowering to contribute financially.” (24-year-old mother).*

Theme 6: Effect of maternal education on child nutrition

Education strengthened mothers’ ability to make informed feeding decisions and advocate for their children’s nutritional needs. *“Having that knowledge allows me to make informed decisions. I feel empowered to advocate for my child’s nutritional needs.” (24-year-old mother).*

4.7.3 Qualitative findings from non-empowered women

Non-empowered women demonstrated more constrained decision-making, reflecting persistent patriarchal norms. Nonetheless, autonomy emerged in specific areas, particularly regarding minor household resources, family planning, and when women possessed some personal income. Education remained a critical enabler of informed childcare practices.

Theme 1: Decision making dynamics in marital relationships

Many participants were consulted in household decisions, but final authority remained with their husbands. *“Most of the time, my husband and I discuss major decisions together. He usually asks for my opinion, but in the end, he makes the final decision.” (28-year-old mother).*

Theme 2: Gender roles and autonomy in health service utilization

Some women independently made reproductive health decisions without consulting their husbands. *“Now I make decisions that I believe are best for our family. If I want to space out our children, I do not feel the need to discuss it with my husband. It’s about my body and my choices.”* (36-year-old mother).

Theme 3: Financial autonomy and resource access

Women reported autonomy over minor household resources such as garden produce, reflecting partial control in daily life. *“I manage our hens, collect eggs, and tend the garden without consulting my husband. This gives me a sense of freedom and control over daily life.”* (32-year-old mother).

Theme 4: impact of education on child care

Education enhanced mothers’ confidence and knowledge in child feeding practices. *“The more mothers are educated, the more confident we feel in making decisions about what to feed our child.”* (22-year-old mother).

Theme 5: Diverse practices in infant feeding timing and choices

Variability in practices highlighted the influence of cultural norms and social networks. *“There was no one right answer. Each of us interprets our babies’ needs differently.”* (19-year-old mother).

Theme 6: Autonomy and financial dependency in household nutrition decisions

Limited financial independence restricted mothers’ ability to make nutrition decisions. *“Most of the time, I need to ask my husband for money to buy food. If I earned my own income, I would have more independence to decide what my children eat.”* (24-year-old mother).

4.8. Qualitative Findings from non-Empowered women

This finding explicitly highlights the complicated relationship among gender roles, financial independence, and educational empowerment in the realms of child nutrition care and family decision-making. Additionally, this finding showed that diverse practices in infant feeding highlight the complexity of maternal decision-making and the influence of both individual and cultural factors on infant nutrition. Further, although conventional power structures continue to

affect various decision-making areas, there are signs of growing autonomy among women, particularly when they possess their own income. Furthermore, education plays a vital role in providing mothers with the knowledge they need to effectively nurture their children and meet their needs.

Theme 1: Collaborative Decision-Making in Household Management

Many participants indicated that they may be consulted, but final decisions, particularly regarding significant issues, rest with their husbands. This suggests a patriarchal structure where men hold ultimate authority. *One mother noticed; "Most of the time, my husband and I discuss major decisions together. For things like buying a car or planning a trip, he usually asks for my opinion, but I know that in the end, he makes the final decision. Sometimes, he doesn't value my input, and he feels responsible for the big choices".* (A 28-year-old mother with 1 year),

Theme 2: Gender Roles and autonomy on health service utilization

A significant number of women reported making independent decisions regarding family planning (FP) without informing their husbands, especially when they desired a birth gap. This indicates a shift in personal autonomy, where women take control over reproductive health decisions.

A 36-year-old mother with a 6-month-old child said, in the past, I always felt like I had to consult my husband about family planning. Now, I have reached a point where I just make decisions that I believe are best for our family and myself. If I want to space out our children, I do not feel the need to discuss it with my husband. It's about my body and my choices."

Theme 3: Financial Autonomy and Resource Access

The study revealed that women expressed autonomy in managing minor household materials (e.g., hens, eggs, garden vegetables) without consulting their husbands. This reflects a level of agency in daily financial decisions and indicates that male authority governs not all aspects of household management. *A 32-year-old mother with a 3-year-old child said, "I've always taken charge of the little things around the house, like managing our hens, collecting eggs, and tending to the garden. I don't need to run these decisions by my husband, because this gives me a sense of freedom and control over our daily life".*

Theme 4: Impact of Education on Child Care

All participants acknowledged the importance of education in shaping their knowledge about proper child feeding and care. Educated mothers feel more empowered to make informed choices regarding recipes and child health implications. This explicitly suggests a correlation between educational attainment and effective child-rearing practices.

A 22-year-old mother with a 2-year-old child said, "I always knew that education was important, but it wasn't until I became a mother that I truly realized its value. The more mothers are educated, the more confident we and we felt in making decisions about what to feed our child".

Theme 5: Diverse Practices in Infant Feeding Timing and Choices

Accordingly, the data explores diverse practices in infant feeding, timing and choices, illustrating the varied beliefs and approaches among mothers regarding when and how to introduce solid foods to their infants.

A 19-year-old mother with a 1-year-old child said, "When I first thought about introducing solid foods, I found it overwhelming because my sister-in-law said to wait until 6 months, while another friend insisted that 4 months was just fine. It felt like there was no one right answer and it shows how each of us interprets our babies' needs differently."

Theme 6: Autonomy and Financial Dependency in Household Nutrition Decisions

The data demonstrated the low autonomy and financial dependency of mothers in household nutrition decisions. This highlights the varying degrees of mothers' experience and dependency on husbands in acquiring food and nutritional materials for their families, particularly for their children.

A 24-year-old mother with a 3-year-old child said, "I often feel like I have to rely on my husband. Most of the time, I need to ask him for money to buy what we eat, especially for our children's food. In reality, it is better if I make decisions myself and manage to earn my own income from my small business. If this happens, it gives me a sense of independence, but it's not always that easy."

Table 8. Qualitative Findings from Non-Empowered Women

No.	Theme Title	Description	Illustrative Quote
1	1. Decision-Making Dynamics in Marital Relationships	Women are often included in discussions but rarely have the final say in major family decisions, reflecting ongoing patriarchal norms.	<i>"Most of the time, my husband and I discuss major decisions together. he usually asks for my opinion, but I know that in the end, he makes the final decision."</i> 28-year-old mother
2	2. Gender Roles and Autonomy in Health Service Utilization	Some women exhibit autonomy by making independent decisions regarding family planning without spousal consultation, signaling a shift in control over reproductive health.	<i>"I have reached a point where I just make decisions. I do not feel the need to discuss it with my husband. It's about my body and my choices."</i> 36-year-old mother
3	3. Financial Autonomy and Resource Access	Women exercise decision-making power over small household resources, granting them a degree of control and Independence in daily life.	<i>"I've always taken charge of the little things. I don't need to run these decisions by my husband."</i> 32-year-old mother
4	4. Impact of Education on Child Care	Education equips mothers with knowledge for better child-feeding and care, enhancing their confidence and effectiveness in childcare.	<i>"The more mothers are educated, the more confident we felt in making decisions about what to feed our child."</i> 22-year-old mother
5	5. Diverse Practices in Infant Feeding Timing and Choices	Variability in infant feeding practices reflects influence from social networks and cultural norms, resulting in diverse maternal strategies.	<i>"It felt like there was no one right answer. each of us interprets our babies' needs differently."</i> 19-year-old mother

4.9. Perceived contribution of women's empowerment to child nutrition

The finding highlights how empowerment status influences maternal decision making, financial autonomy, and educational access, ultimately affecting child feeding and care practice. It revealed that a clear distinction between the experiences of empowered and non-empowered women, particularly in three core domains decision making, financial autonomy and education.

The qualitative evidence strongly indicates that women's empowerment is perceived as a significant contributor to improve child nutrition. Making within the household, equips mother

with the agency, resources, and knowledge to priorities and act up on their children's nutritional needs. In contrast the absence of these factor constrains maternal autonomy and create dependency, which can hinder optimal child feeding practice. Therefore, interventions aimed at improving child nutrition outcome should integrate components that foster women's economic empowerment, education, and supportive household dynamics.

4.10. Factors associated with nutritional status of <5 children of non- empowered women

In our analysis focused on children born to unpowered women, several maternal and household factors emerged as significant factors of malnutrition among under-five children. First, the maternal occupation of being a housewife appeared protective. Children whose mothers were housewives had significantly lower odds of malnutrition (APOR = 0.31; 95% CI: 0.12–0.81) compared to those whose mothers were merchants. This finding suggests that when mothers are at home, they may be better able to devote time to infant care and nutritional practices, thereby reducing the risk of malnutrition among their children.

This finding was also supported with qualitative findings that, *a 32-year-old mother with a 3-year-old child said, "I've always taken charge of the little things around the house, like managing our hens, collecting eggs, and tending to the garden. I don't need to run these decisions by my husband, because this gives me a sense of freedom and control over our daily life".*

In contrast, family marital status was associated with a higher risk of malnutrition among under-five children. Children from households with an unmarried or otherwise unstable marital status had nearly six times the odds of malnutrition (APOR = 5.78; 95% CI: 2.24– 14.89) compared with those from married families.

This finding was also supported with qualitative findings that *"A 24-year-old mother with an 8-month-old child said, "In our household, we make decisions as a team. I consult my husband about everything because I believe that both our opinions matter, no matter how big or small the issue is. We weighed the pros and cons together. It feels good to work together and know that we're both on the same page, making our home a place where both of our choices count."*

Furthermore, exclusive breastfeeding (EBF) for the first 6 months was linked to malnutrition, with children who did not receive EBF exhibiting 2.36 times higher odds of malnutrition (APOR = 2.36; 95% CI: 1.09– 5.10) compared to those children who didn't breastfeed exclusively for the first 6 months. This finding

underscores the potential protective effect of exclusive breastfeeding during the first six months in reducing the risk of malnutrition.

This finding was also supported with qualitative findings that *A 34-year-old mother with an 11-month-old child said, to be honest, I started giving solids to my baby at 6 months, just like most of my friends. It feels like the right age for them to begin trying new foods. I usually prepare porridge for him, mixing in different ingredients to make sure he gets all the nutrients he needs carbohydrates, proteins, fats, and vitamins. Some of the other moms I know started introducing solids at 4 months, and they also give porridge, but I wanted to wait a bit longer to ensure he was really ready”.*

Finally, inadequate antenatal care (ANC) utilization greatly increased the risk of malnutrition (either under or over-nutrition). Children whose mothers did not attend ANC services were almost 7 times more likely to be malnourished (APOR = 6.94; 95% CI: 3.23–14.91) compared to children whose mothers utilized antenatal care.

In the multivariable logistic regression analysis among non-empowered women, several factors were significantly associated with children’s nutritional status. Children of divorced mothers had nearly six times higher odds of undernutrition compared to children of married mothers (APOR=5.7; 95% CI: 2.2-14.8; $p<0.001$). Children whose mothers did not use antenatal care had substantially higher odds of undernutrition (APOR=6.9; 95% CI: 3.2-14.9; $p<0.0001$). Additionally, mixed feeding was significantly associated with undernutrition, with children who were not exclusively breastfed having more than twice the odds of undernutrition compared to exclusively breastfed children (APOR=2.3; 95% CI: 1.09-5.1; $p=0.029$).

Table 9.Ordinal logistic regression analysis for nutritional status of children aged 6-59 months among non-empowered women in Chiro Town, West Hararghe Zone, Oromia, Ethiopia, 2024

Variables	Category	Nutritional status			COR(95%CI)	AOR(95%CI)	P>z
		Normal	Under	Over			
Maternal education	Secondary& above	43	13	6	1	1	
	Primary education	108	31	10	0.71(0.32-1.56)	1.36(0.57-3.28)	0.488
	No formal education	37	13	7	1.23(0.44-3.46)	2.56(0.90-7.24)	0.077
Maternal occupation	Merchant	25	6	6	1	1	
	civil servant	41	11	5	0.86(0.35-2.13)	(0.36-2.95)	0.964
	Daily labor	8	6	7	3.54(1.23-10.15)	3.20(0.96-10.67)	0.059
	Housewife	115	33	5	0.50(0.22-1.13)	0.31(0.12-0.81)	0.017
ANC frequency	Once	116	40	14	1	1	
	Twice	30	16	9	1.94(0.88-4.27)	1.52(0.56-4.13)	0.407
Marital status	Married	179	45	17	1	1	
	Divorced	9	12	6	5.61(2.56-12.30)	5.7(2.2-14.8)	<0.001
Wealth index	Rich	28	9	9	1	1	
	Medium	65	15	9	0.88(0.36-2.13)	0.79(0.30-2.06)	0.625
	Poor	95	33	5	1.16(0.52-2.60)	0.56(0.22-1.38)	0.207
Place of delivery	Facility	117	40	15	1	1	
	Home	77	11	8	0.71(0.39-1.32)	0.73(0.26-2.09)	0.56
Family size	<Five	154	49	18	1	1	
	>=Five	34	8	5	0.94(0.44-2.01)	1.30(0.54-3.12)	0.563
BF	Exclusive feeding	161	34	19	1	1	
	Mixed feeding	26	20	8	2.69(1.43-5.06)	2.3(1.09-5.1)	0.029*
ANC visit	Used	170	32	9	1	1	
	Not used	18	25	14	8.24(4.16-16.32)	6.94(3.23-4.91)	<0.0001
Immunization	Fully immunized	175	32	15	1	1	
	Partially immunized	32	6	8	1.78(0.88-3.59)	2.46(0.88-6.87)	0.086
Illness	No	98	43	6	1	1	
	Yes	90	14	17	1.78(0.88-3.59)	0.69(0.30-1.59)	0.379
Exclusive BF time	Four Month	84	6	5	1	1	
	Six Month	95	13	11	2.24(1.20-4.15)	1.86(0.75-4.59)	0.178

4.11. Factors associated with the nutritional status of < 5 children of empowered women

In a multivariable analysis adjusting for relevant confounders, our study revealed that the maternal place of delivery is significantly associated with the nutritional status of children under 5 years. Children born at home had significantly higher odds of being malnourished (APOR = 3.34, 95%CI: 1.38–13.61) compared to those born in health institutions. Specifically, the odds of malnutrition were 3.34 times greater among children born at home.

These findings underscore the importance of institutional deliveries, which likely facilitate timely neonatal care and early nutritional counseling, thereby mitigating the risk of malnutrition in early childhood. *This finding was also supported with a qualitative finding that A 19-year-old mother with a 1- year-old child said, “When I first thought about introducing solid foods, I found it overwhelming because my sister-in-law said to wait until 6 months, while another friend insisted that 4 months was just fine. It felt like there was no one right answer and it shows how each of us interprets our babies' needs differently.”*

In addition, the analysis revealed a significant association between household family size and the nutritional status of children under five years. Children from households with a family size of five or more were found to be about 3.39 times more likely to be malnourished; either under nutrition or over nutrition (APOR = 3.39, 95% CI: 1.24–9.27) compared with those from households with fewer members . This association suggests that larger household sizes may strain available resources and reduce per capita food and care, thereby increasing the risk of malnutrition in young children.

This finding was some what related with qualitative finding that *A 36-year-old mother with a 6-month-old child said, in the past, I always felt like I had to consult my husband about family planning. Now, I have reached a point where I just make decisions that I believe are best for our family and myself. If I want to space out our children, I do not feel the need to discuss it with my husband. It’s about my body and my choices.”*

Furthermore, our study found a significant association between maternal antenatal care (ANC) attendance and the nutritional status of children under 5. Children born to mothers who did not

attend any ANC services were 3.76 times more likely to be malnourished (APOR] = 3.76, 95% CI: 1.17–12.14) compared to those whose mothers attended ANC. This result underscores the critical role of ANC not only in monitoring pregnancy but also in providing nutritional counseling and support, which can have lasting impacts on child health outcomes.

The study also found that children who were partially immunized had 3.47 times the odds of experiencing malnutrition under nutrition or over-nutrition— (APOR = 3.47, 95%CI: 1.38– 8.68) compared to fully immunized children of empowered women. This statistically significant finding suggests that incomplete immunization is strongly associated with an increased risk of nutritional abnormalities. Although causality cannot be inferred from this cross-sectional analysis, the result may indicate that partial immunization serves as a proxy for broader disparities in access to health services and nutrition.

The triangulation of quantitative and qualitative findings reveals that facility-based deliveries serve not only as a means to ensure safer birth but also as crucial gateway for lifelong nutritional interventions. While qualitative data highlights key risk factors including large household size, lack of antenatal care, and incomplete immunization. The qualitative insights uncover the underlying drivers issue of maternal autonomy, inequitable resource allocation, and barriers to health care access. Together this finding underscore that effective nutritional intervention must look beyond food provision alone and address broader systemic factor, such as household dynamics, women's empowerment, and strengthen health system engagement.

Among empowered women, several factors were significantly associated with the nutritional status of their children. Children born at home had over four times higher odds of undernutrition compared to those delivered in health facilities (APOR=4.34; 95% CI: 1.38- 13.61; p=0.01). Similarly, children from larger families (≥ 5 members) were more likely to be undernourished than those from smaller families (APOR = 3.39; 95% CI: 1.24-9.27; p = 0.02). Lack of antenatal care utilization was also a significant risk factor; children of mothers who did not attend ANC visits had higher odds of undernutrition (APOR=3.76; 95% CI: 1.17- 12.14; p=0.03). Additionally, partially immunized children were more likely to be undernourished compared to fully immunized children (APOR=3.47; 95% CI: 1.38-8.68; p=0.01).

Table 10. Ordinal logistic regression analysis for nutritional status in children aged 6-59 months among empowered women in Chiro Town, West Hararghe Zone, Oromia, Ethiopia, 2024

Variables	Category	Nutritional status			CPOR(95%CI)	APOR(95%CI)	P>z
		Normal	Under	Over			
Maternal education	Secondary/ above	23	7	5	1	1	
	Primary	57	14	5	0.71(0.32-1.56)	0.66(0.25-1.71)	0.39
	No formal education	10	6	5	1.23(0.44-3.46)	1.32(0.42-4.16)	0.63
ANC	Once	33	5	6	1	1	
	Twice	17	9	7	1.94(0.88-4.27)	2.13(0.77-5.93)	0.15
Marital status	Married	87	19	10	1	1	
	Divorced	5	6	5	2.87(1.09-7.54)	2.22(0.71-6.93)	0.17
Place of Delivery	Facility	81	16	8	1	1	
	Home	14	6	7	4.17(1.61-10.80)	4.34(1.38-13.61)	0.01
Wealth index	Rich	24	7	5	1	1	
	Medium	26	7	5	0.88(0.36-2.13)	0.84(0.31-2.33)	0.74
	Poor	42	11	5	1.16(0.52-2.60)	1.10(0.44-2.76)	0.84
Family size	<Five	82	19	9	1	1	
	>=Five	11	5	6	2.31(0.94-5.70)	3.39(1.24-9.27)	0.02
Exclusive feeding	Yes	57	11	9	1	1	
	No	39	17	7	2.03(0.98-4.23)	0.51(0.16-1.59)	0.25
ANC visit	Used	76	6	9	1	1	
	Not used	19	16	6	3.89(1.91- 7.90)	3.76(1.17-12.14)	0.03
Immunization status of the child	Fully	76	8	9	1	1	
	Partially	19	24	6	3.48(1.72-7.04)	3.47(1.38-8.68)	0.01
Illness status of the child*	No	74	20	9	1	1	
	Yes	19	5	6	3.54(1.12-5.74)	1.67(0.62-4.46)	0.31
exclusive breastfeeding duration	Four Month	10	5	5	1	1	
	Six Month	19	7	6	0.27(0.12- 0.57)	0.59(0.20-1.72)	0.33

5. DISCUSSIONS

The main of this study was to evaluate the effect of nutrition status of children aged six- 59 months and its associated factors among empowered and non-empowered women in Chiro Town, West Hararghe Zone, and Oromia Region, Ethiopia between from September 25 to October 25, 2024. Accordingly, the prevalence of under nutrition is slightly higher in children with non-empowered mothers (21.27%, 95%CI: 16.75-26.61) compared to empowered mothers (16.67%, 95%CI: 11.17-24.13). A higher percentage of children with over-nutrition are observed among empowered mothers (11.36%, 95%CI: 6.92-18.10) compared to non- empowered mothers (8.58%, 95%CI: 5.75-12.61). This study identified several maternal and household factors associated with child nutritional status, with differences observed between empowered and non-empowered women. Triangulation with qualitative findings provides deeper insight into the mechanisms behind these associations.

Among non-empowered women, marital status was strongly associated with child nutritional outcomes. Quantitatively, children of divorced mothers had nearly six times higher odds of undernutrition compared to those of married women (APOR=5.78; 95% CI: 2.2-14.8; $p < 0.001$). Qualitative accounts highlighted the limited decision-making power of women within marriage, where men retained the final authority. As one mother explained: *“Most of the time, my husband and I discuss major decisions together. He usually asks for my opinion, but in the end, he makes the final decision.”* This suggests that when marital stability is lost, women’s already constrained autonomy further deteriorates, limiting the resources and support available for optimal child nutrition.

Antenatal care (ANC) utilization was another significant predictor. Children whose mothers did not attend ANC visits were nearly seven times more likely to be undernourished (APOR=6.9; 95% CI: 3.2-14.9; $p < 0.0001$). The qualitative data reflected mixed patterns of autonomy in reproductive health decisions. One participant stated: *“Now I make decisions that I believe are best for our family. If I want to space out our children, I do not feel the need to discuss it with my husband. It’s about my body and my choices.”* While some non-empowered women expressed autonomy over reproductive health, the broader lack of structured ANC follow-up deprived them of essential nutritional counseling and support.

Breastfeeding practices also influenced nutritional outcomes. Quantitative analysis showed that

children who received mixed feeding had more than twice the odds of undernutrition compared to those exclusively breastfed (APOR=2.36; 95% CI: 1.09–5.10; p=0.029). This aligns with qualitative findings, where women described highly variable practices in infant feeding: *“There was no one right answer. Each of us interprets our babies’ needs differently.”* Such inconsistency shaped by cultural norms and peer influence likely contributes to early mixed feeding, thereby increasing the risk of undernutrition.

Among empowered women, place of delivery emerged as a critical factor. Home births were associated with more than four times higher odds of undernutrition compared to facility deliveries (APOR = 4.3; 95% CI: 1.3-13.6; p = 0.01). While empowered women described agency in decision-making *“Having that knowledge allows me to make informed decisions. I feel empowered to advocate for my child’s nutritional needs.”* those delivering at home missed opportunities for professional counseling on optimal infant feeding, underscoring the importance of institutional delivery.

Family size also significantly affected nutritional outcomes. Children from larger households (≥ 5 members) had more than three times higher odds of undernutrition than those from smaller families (APOR=3.3; 95% CI: 1.2–9.2; p=0.02). Despite mothers emphasizing their efforts *“I prioritize buying fresh fruits and preparing nutritious meals while also contributing to our family’s income.”* larger families likely stretched financial and food resources, limiting the adequacy of children’s diets.

ANC attendance remained significant among empowered women as well. Lack of ANC utilization increased the odds of undernutrition nearly fourfold (APOR=3.7; 95% CI: 1.1-12.1; p=0.03). One empowered mother highlighted the role of economic autonomy: *“We can buy our child food by ourselves because we have our own income. It is empowering to contribute financially.”* Yet, the absence of ANC contact diminished opportunities for nutrition education and preventive care, reinforcing the importance of health service engagement regardless of empowerment status.

Finally, immunization status was associated with nutritional outcomes. Partially immunized children were more than three times as likely to be undernourished as fully immunized ones (APOR=3.4; 95% CI: 1.3-8.6; p=0.01). This finding complements qualitative accounts where empowered women described proactive shared decision-making in reproductive health *“We discussed and decided together when to start and stop using contraceptives.”* Reflecting their

general willingness to engage in health-promoting behaviors. However, partial immunization suggests that systemic barriers for instance, access, availability, or health system gaps) rather than maternal reluctance may drive undernutrition risk.

This result found that children from households with an unmarried or unstable marital status faced nearly six times the odds of malnutrition compared to those from married families. This strong association suggests that having a stable marital relationship may promote better resource sharing, coordinated parenting practices, and overall household stability, all of which contribute to improved childcare and nutrition (Utter et al., 2018).

The current Research indicates that stable marital unions are often associated with higher household incomes, consistent caregiving, and improved health decision-making. This is due to that married couples can share responsibilities and pool their resources, which often leads to more timely and coordinated decisions regarding health and nutrition (Karki et al., 2021, Jeyaseelan and Lakshman, 1997, Mukuku et al., 2019).

This finding was also supported with qualitative finding the majority of mothers endorsed a collaborative model of household decision-making, characterized by systematic spousal consultation and mutual valuation of perspectives. Critically participants framed joint decision-making as an uncompromisable necessity, with emphatic assertion that “both opinions matter”.

A 24-year-old mother with an 8-month-old child said, “In our household, we make decisions as a team. I consult my husband about everything because I believe that both our opinions matter, no matter how big or small the issue is. We weighed the pros and cons together. It feels good to work together and know that we’re both on the same page, making our home a place where both of our choices count.”

This research also revealed that the nutritional status of children of housewives’ mothers have substantially lower odds of malnutrition compared to those whose mothers are merchants. This is due to that increased maternal presence and involvement in decision-making at home can enhance infant feeding practices, (Malapit and Quisumbing, 2014). This is also supported with study from Nepal (Poudel, 2021).

This finding was also supported with qualitative findings with majority of mothers stated that they have autonomous control over routine domestic and agricultural activities including poultry

management, egg collection, and garden cultivation which they termed *"the little things around the house."* They framed this autonomy as a critical source of personal agency, clearly stating, *"We don't run these decisions by our husbands."* Such self-directed management of micro-level tasks discussed on both practical independence (e.g., food production control) and psychological empowerment, reinforcing their sense of autonomy in daily life.

A 32-year-old mother with a 3-year-old child said, "I've always taken charge of the little things around the house, like managing our hens, collecting eggs, and tending to the garden. I don't need to run these decisions by my husband, because this gives me a sense of freedom and control over our daily life".

Our analysis found that children who were not exclusively breastfed had 2.36 times the odds of being malnourished compared to those who were exclusively breastfed during this period. This finding reinforces the established understanding that EBF provides essential nutrients and bioactive factors, reduces the risk of infections, and supports optimal growth and development in early life(WHO, 2024).

This finding was also supported with qualitative findings that Majority of mother participants initiated complementary feeding at six months, they perceived this age developmentally appropriate for dietary transition. Their primary complementary food was locally prepared nutrient-fortified porridge, deliberately incorporating diverse macronutrients (Carbohydrate, protein, fat) and micronutrients to meet infant dietary needs. While some peers introduce solid earlier (at Four months).

A 34-year-old mother with an 11-month-old child said, to be honest, I started giving solids to my baby at 6 months, just like most of my friends. It feels like the right age for them to begin trying new foods. I usually prepare porridge for him, mixing in different ingredients to make sure he gets all the nutrients he needs carbohydrates, proteins, fats, and vitamins. Some of the other moms I know started introducing solids at 4 months, and they also give porridge, but I wanted to wait a bit longer to ensure he was really ready".

Among empowered women children born at home had significantly higher odds of malnutrition compared to those born in health institutions. This result likely reflects the critical role that institutional delivery plays in providing immediate postnatal care and essential health education.

Health facilities not only offer skilled birth attendance and neonatal care but also serve as platforms for counseling on exclusive breastfeeding, proper complementary feeding, and immunization all of which contribute to improved child nutritional status (WHO, 2024).

This association is also supported with qualitative finding, A 22-year-old mother with a 2-year-old child said, “I always knew that education was important, but it wasn't until I became a mother that I truly realized its value. The more mothers are educated, the more confident we and we felt in making decisions about what to feed our child”.

Inadequate antenatal care (ANC) utilization emerged as a very strong risk factor for malnutrition. Specifically, children whose mothers did not attend ANC services were nearly seven times more likely to be malnourished compared with children whose mothers did utilize ANC. This finding reinforces the critical role of ANC as a platform for delivering essential health and nutrition services to pregnant women (McCauley et al., 2022).

This is also supported by qualitative finding that maternal education emerged as a critical determinant of child nutrition in this study, enabling informed decision-making regarding dietary composition (proteins, vitamins, minerals). Educated mothers demonstrated heightened nutritional literacy, and proactive information-seeking behaviors. These findings underscore education's dual role as both knowledge provider and catalyst for maternal advocacy. The results suggest that targeted maternal education programs could significantly enhance child nutrition outcomes through improved caregiver knowledge and agency.

A 24-year-old mother with an 8-month-old child said, “I believe that a mother’s education has a significant impact on child nutrition. Having that knowledge allows me to make informed decisions about what to feed my child. I can recognize the right balance of proteins, vitamins, and minerals that are essential for their health. Because of my education, I feel empowered to advocate for my child’s nutritional needs and to seek help or more information when I am unsure. It’s clear to me that when we, as mothers, are educated, we are better equipped to provide for our children in the best way possible.”

In our final analysis, incomplete immunization emerged as a strong predictor of nutritional abnormalities among empowered women’s children. Even among households where mothers have higher decision-making autonomy and better access to resources, failing to complete the

recommended immunization schedule can expose children to preventable infections. These infections often recurring can lead to nutrient malabsorption and a higher risk of both undernutrition and, in some cases, over nutrition due to subsequent metabolic disruptions (Humphries et al., 2021).

Implication for policy maker

The findings revealed that child nutrition is not merely a matter of food availability but is deeply connected with maternal empowerment, healthcare access, and household dynamics. Therefore, effective policy must move beyond traditional nutrition programs and adopt an integrated, multi-sectoral approach. Thus, policies must actively promote women's decision-making autonomy, economic independence, and control over resources. Empowerment alone is not enough without access to quality health services. Systemic barriers prevent even willing mothers from obtaining crucial care. Marital status can be a major risk factor for food insecurity and undernutrition. Generalized programs may miss these most vulnerable households. As communities develop and empower women, nutritional challenges may shift from undernutrition to obesity. This study provides robust evidence that improving child nutrition in Ethiopia requires a dual strategy directly empowering women while simultaneously strengthening the health system and social safety nets to support their choices. Policies must be implemented, recognizing that the needs of empowered and non-empowered women differ. An integrated approach across the health, gender, agriculture, and social protection sectors is essential to translate these findings into tangible improvements in child health and development. The study also suggests that the strong link between larger family size (≥ 5 members) and undernutrition (APOR=3.3) highlight the pressure on household resources. Improving child nutrition requires enabling women to plan and space their pregnancies.

6. STRENGTH AND LIMITATION

6.1. Strength of the study

The key strength of this study lies in its Phenomenological approach, which integrates quantitative data from children aged 6–59 months with qualitative insights to comparatively evaluate the effect of maternal empowerment on nutritional status. In Chiro Town, West Hararghe Zone, Ethiopia, 2025. Data collected by trained Health Extension workers and closely supervised. Additionally, standard measurement procedures used to minimize the error and so, they were of good quality and high reliability.

6.2. Limitations of the study

One of the key limitations of this study is it's a Phenomenological cross-sectional design, which restricts our ability to draw causal relationships from the findings.

7. CONCLUSION AND RECOMMENDATIONS

7.1. Conclusion

This study provides critical insights into the complex interplay between women's empowerment, socio-economic factors, and child nutrition outcomes in Chiro Town, Ethiopia. Key findings reveal that children of non-empowered women face higher rates of undernutrition while over-nutrition is more prevalent among empowered households (Empowered women demonstrated superior utilization of maternal health services, including antenatal care (ANC), institutional deliveries, and exclusive breastfeeding practices. Qualitative data underscores the role of women's autonomy in decision-making, financial independence, and education in shaping child nutrition. Multivariate analysis highlights empowerment, maternal education, ANC frequency, immunization, and household wealth as significant determinants of malnutrition. However, persistent challenges such as food insecurity, limited sanitation access, and socio-cultural norms perpetuate disparities. The interconnected nature of malnutrition outcomes (wasting, stunting, and undernutrition) emphasizes the need for holistic interventions addressing shared drivers like poverty and healthcare access.

7.2. Recommendation

For ministry of health and health policy makers

✓ **Strengthening Women's Empowerment Programs:** To foster sustainable progress, women's empowerment initiatives must be integrated into national policies. Embedding programs such as financial literacy training and income-generating activities into nutrition and health frameworks ensures systemic support. Simultaneously, community engagement is critical: gender-sensitive education campaigns and programs that encourage male involvement can amplify women's participation in household decision-making. Legal reforms further reinforce these efforts by guaranteeing women's access to education, healthcare, and economic resources, dismantling structural barriers to equality.

✓ **Enhancing Maternal Health Education and Healthcare Access:** Improving maternal and child health begins with prioritizing girls' education and adult literacy programs, equipping women with knowledge of childcare and nutrition. Scaling up antenatal care outreach, especially in rural areas, ensures early access to nutrition counseling, supplements, and breastfeeding guidance.

Incentivizing facility-based births through transportation subsidies and community health worker networks can reduce maternal and infant mortality, creating safer environments for childbirth and postnatal care.

✓ **Ensuring Effective Implementation:** Multi-sector collaboration across health, education, and agriculture addresses malnutrition's root causes holistically. Culturally sensitive approaches, such as engaging religious leaders, enhance community acceptance. Concurrently, training healthcare workers in malnutrition screening and counseling builds local capacity, fostering sustainable program success.

For Chiro town office of water and sewerage system

✓ **Upgrading Sanitation and WASH Infrastructure:** Targeted investments in water access and waste management systems, such as piped water and septic tanks, are vital for underserved households. Complementing infrastructure improvements, community-led hygiene campaigns can promote behaviors like handwashing and safe food practices. These efforts collectively reduce waterborne diseases, safeguarding children's health and nutritional outcomes.

For Chiro Town agriculture and food security office

✓ **Combating Food Insecurity and Enhancing Diets:** Subsidized nutrition programs, including fortified foods and school meals, can alleviate household food insecurity. Supporting backyard poultry and livestock initiatives increases access to nutrient-rich animal-source foods for children. Additionally, training farmers in cultivating diverse crops and improving post-harvest storage ensures sustained availability of nutritious produce, addressing both immediate and long-term dietary needs.

✓ **Tailored Support for Marginalized Groups:** Single mothers, widows, and low-income households require targeted interventions, such as cash transfers and childcare support, to buffer against malnutrition risks. Leveraging wealth index data enables the design of context-specific strategies, like subsidized healthcare, ensuring resources reach those most in need.

For Chiro Town primary health care system

Strengthening Immunization and Healthcare Service: Expanding vaccination drives against illnesses like rotavirus and measles minimizes infection-related malnutrition. Integrating nutrition screenings with medical treatments such as providing zinc for diarrhea ensures holistic care. This

dual approach not only manages illnesses but also mitigates their impact on nutritional status, particularly in vulnerable populations.

For the federal Ministry of education

✓ **Investing in Research and Adaptive Monitoring:** Longitudinal studies can unravel the links between empowerment and nutrition, guiding evidence-based policies.

Robust surveillance systems tracking stunting and over-nutrition trends allow for dynamic adjustments to interventions, ensuring they remain responsive to evolving challenges.

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9. ANNEXES

9.1. Participant Information Sheet and Informed Voluntary Consent Form

Introduction:

My Name is _____

I am working as a data collector for the study being conducted by Elsabet Teshager who studying her Msc in Haramaya University, College of Health and Medical Sciences in collaboration.

Title: Women Empowerment on Nutrition Status of Children aged 6-59 months in Chiro Town, West Hararghe Zone, Oromia Region, Ethiopia.

Purpose/aim of the study: The aim of the study is to assess women empowerment on nutritional status and associated factors among children aged 6 to 59 months in chiro town West Hararghe Zone, Oromia Region, Ethiopia. This will contribute to having the necessary information to inform policy and programmatic interventions aimed at promoting women's empowerment as a means to improve child nutrition and overall well- being.

Procedure and duration: I will be interviewing you using a questionnaire to provide me with pertinent data that is helpful for the study. There are a few questions to answer and I will write your response using this questionnaire. The interview will take about 30-45 minutes, so I kindly request you to spare me this time for the interview.

Risk and benefits: The risk of participating in this study is minimal, only taking a few minutes of your time. There would not be any direct payment for participating in this study, but the findings from this research may reveal important information for concerned bodies. **Confidentiality:** The information you will provide will be confidential. There will be no information that will identify you in particular. The findings of the study will be general for the study population and will not reflect anything particular to a person or organization. The questionnaire will be coded to exclude showing names. No reference will be made in oral or written reports that could link participants to the research.

Rights: Participation in this study is fully voluntary. You have the right to declare whether to participate or not in this study. If you decide to participate, you have the right to withdraw from the study at any time, this will not able you or your organization to any loss of benefit to which you otherwise are entitled. You do not have to answer any question that you do not want to answer.

Contact address: If there are any questions or inquiries at any time about the study or procedures, please contact us at this address. Haramaya University, College of Health and Medical Sciences staff: Mr. **Elsabet Teshager** Mobile phone: **0921847204**, Email: elsateshager27@gmail.com as well as contact address of the responsible Institutional Health Research Ethics Review Committee (IHRERC) at office phone 0254662011 or P.O.Box 235, Harar, Ethiopia].

Declaration of Informed Voluntary Consent: I have heard/read the participant information sheet and voluntary informed consent. I have clearly understood the purpose of the research, the procedures, the risks and benefits, issues of confidentiality, the rights of participating, and the contact address for any inquiry. I have been allowed to ask questions about things that may have been unclear. I was informed that I have the right to withdraw from the study at any time or not to answer any question that I do not want. Therefore, I declared my voluntary consent to participate in this study with my initials (signature) as indicated below.

Name and Signature of the participant: _____ **Date** _____

Name and Signature of the Data Collector _____ **Date** _____

Appendix I: Participant Information Sheet and assent Form of the Study

This informed assent form is for parents or husband of women age <18 years participating in the research. In my research I will talk to many women aged <18 years , and ask them a number of questions. As I am doing research among women, I wanted to talk to the parents or their husband if their age less than 18 years and ask them for their permission. After you have heard more about the study, and if you agree, then the next thing I will do is ask your daughter/wife for her agreement as well. Both of you have to agree independently before I can begin. You do not have to decide today whether or not you agree to have your child/wife participate in this research. Before you decide, you can talk to anyone you feel comfortable with. Your daughter will fill out a questionnaire which will be provided and collected by trained data collectors, or the questionnaire can be read aloud and she can give us the answer which she wants us to write. I am asking your child/wife to participate in survey which will take about few minutes of her time. There will be no immediate and direct benefit to your child/wife or to you, but your child's/wife participation is likely to help me find out more about the effect women empowerment on child nutrition and I hope that these will help the country health policy to meet those needs better in the future. I will not be sharing information about your daughter outside of the research purpose. If you have any questions you may ask now or later, even after the study has started I have been asked to give consent for my daughter to participate in this research study which will involve her completing one questionnaire. I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it. I consent voluntarily for my child/wife to participate as a participant in this study.

Name of Parent or husband_____

Signature of Parent or husband_____ **Date** _____

9.2. Questionnaire English version

This questionnaire will be used to collect data on Women Empowerment and Nutrition Status of Children aged 6-59 months in Chiro Town, West Hararghe Zone, Oromia Region, Ethiopia, 2024.

Kebele:___Client code: ___Name of data collector:_____Signature____Date__

Name of supervisor:___Signature____Date__

Part I: Socio – Demographic Characteristics

Q.	Question	Responses	Code	Skip to
101	Mother's age?	(years)		
102	Where is your place of	1. Urban 1 2. Rural 2		
103	What is your Religion?	1. Orthodox 1 2. Muslim 2 3. Protestant 3 4. Others (Specify)		
104	Current marital status	1. Married 1 2. Divorced 2 3. Widowed 3 4. Single 4		
105	What is your educational level (mother)?	1. Unable to read and write 1 2. Able to read and write 2 3. Only primary education (1-8th) 4. Secondary education (9-12th) 4 5. College Diploma and above 5		
106	What is your husband educational level?	1. Unable to read and write 1 2. Able to read and write 2 3. Only primary education (1-8th) 4. Secondary education (9-12) 6. College Diploma and above 5		
107	What is your occupation	Farmer 1 Housewife 2 Merchant 3 Government employee 4 Other (specify)		
108	What is your husband occupation?	Farmer 1 Merchant 2 Daily laborer 3 Government employee 4		

Part II: Questionnaires of Wealth index, Household properties (assets)

	Asset type	Response		
	Domestic animals			
501	Ox cattle (ox, cow)	Yes (1)	No (0)	
502	Caw	Yes (1)	No (0)	
503	Calf	Yes (1)	No (0)	
504	Hen and cock	Yes (1)	No (0)	
505	Goat	Yes (1)	No (0)	
506	Sheep	Yes (1)	No (0)	
507	Horse	Yes (1)	No (0)	
508	Donkey	Yes (1)	No (0)	
509	Mules	Yes (1)	No (0)	
	Durable asset			
510	Television	Yes(1)	No(0)	
511	Watch/clock	Yes(1)	No(0)	
512	Electricity	Yes(1)	No(0)	
513	Refrigerator	Yes(1)	No(0)	
514	Non-mobile telephone	Yes(1)	No(0)	
515	Mobile phone	Yes(1)	No(0)	
516	Car	Yes(1)	No(0)	
517	Motorcycle	Yes(1)	No(0)	
518	Cycle	Yes(1)	No(0)	
519	Cart	Yes(1)	No(0)	
520	Table	Yes(1)	No(0)	
521	Chair	Yes(1)	No(0)	
522	Bed	Yes(1)	No(0)	
523	Electric “Mitad”	Yes(1)	No(0)	
524	Own living house	Yes(1)	No(0)	
525	Own Agricultural land	Yes(1)	No(0)	
526	Stove	Yes(1)	No(0)	

Part II: Questionnaires of Wealth index, Household properties (assets).....

	Productive asset			
527	Plough plow	Yes(1)	No(0)	
528	Axe	Yes(1)	No(0)	
529	Modern Beehive	Yes(1)	No(0)	
530	Traditional Beehive	Yes(1)	No(0)	
531	Hoe	Yes(1)	No(0)	
532	Shovel	Yes(1)	No(0)	
533	Sickle	Yes(1)	No(0)	
534	Water source	pipe(1)	Non- pipe(0)	
535	Type of floor	Cement/wood(1)	Earth (0)	
536	Type of wall	Cement(1)	Mud (0)	
537	Type of roof	Concrete(1)	Iron sheet(0)	
538	Toilet facility	Ventilated improved pit latrine(1)	Traditional pit latrine(0)	

Part III: Questions of women empowerment

Q.NO	Empowerment indicators	Score		
		0 _____	1 _____	2 _____
201	Women's involvement in household decision- making (access to health care, household purchasing, and freedom to visit relatives)	Did not participate in any decisions	Participated in one or two decisions	Participated in all decisions
203	Women's education	Did not attend school at all	Attended primary education	Attended secondary or Higher education
204	Women's cash earnings	Did not earn cash at all	Earned cash only	Earned both cash and in kind income
205	Women's ownership of house/land	Did not own a house, land, or both	Owned a house, or land Individually or jointly with husband	Owned both house and individually or jointly with husband.
206	Women's membership in community groups	Was not a member of any community group	Was a member of community groups	

Part IV: Other compounding factors associated with child nutrition

Q. No	Question	Responses		Skip to Q_
Reproductive health service utilization				
301	Number of pregnancies	(in number)		
302	Number of live birth	(in number)		
303	Age during first pregnancy	_____ (in years)		
304	Did you visit health facility for ANC service during the last pregnancy?	Yes 1 No 2		If 2, go to Q 206
305	If your answer to Q. 203 is yes, how many visits did you have?	_____ visit (s)		
306	Where was the place of delivery for the index child?	Home..... Health facility.....		
307	What was the mode of delivery?	Normal 1 Caesarian 2 Episiotomy 3		
308	Did you receive PNC service for current child?	Yes No	1 2	
309	Birth interval for the last delivery?	_____ (in year)		
Child Feeding practices of children				
310	Have you Ever breast feed your child??	Yes No	1 2	
311	If yes to Q. 301, for how long exclusively breast feed your child?		Four Month.....1 Six Month..... Others (specify)____	
313	Age at which your child introduced Complimentary Feed?		(in month)	
314	Types of Complementary feed introduced		Milk 1 Porridge 2 Family Food..... Other (specify).....	
315	Have the child ever been immunized		Yes 1 No 2	
316	How is the status of immunization?		Partially vaccinated Fully vaccinated.... Not known	
317	Types of food consumption commonly used in the family?		Enjera, rise and other grains 1 Fruit and Vegetable 2 Legumes including bean and nut... 3 Meat 4	

			Other (specify)...	5	
	Child illness				
318	Did your child face a history of illness in the past four weeks?		No 0 Yes 1		
319	Types of illness (Disease) the child faced		fever	1	
			Cough	2	
			Vomiting	3	
			Watery stool	4	
			Poor appetite	5	
			Difficulty in breathing	6	
			Other (specify)	7	
320	Symptom she /he presented?				
321	Did your child receive any Immunization? Check the card		Yes No	1 2	
322	What was the reason for not full immunization of the child				
Part V: Sanitation status or WASH					
401	Is latrine available in your home?		Yes No	1 2	
402	What kind of toilet facility do members of household usually use?		Flush connected to municipal sewer line	1	
			Flush connected to septic tank	2	
			Ventilated improved pit latrine	3	
			Pit latrine made from concrete slab	4	
			Shared latrine	5	
403	How do you dispose household solid wastes or refuse?		In a privately prepared pit hole	1	
			In refuse pit collected by municipality	2	
			Dumped in street/open space	3	
			Burn	4	
			Garbage can	5	
			Collected by private establishment	6	
404	Where do you dispose your household liquid waste?		In septic tank/latrine pit	1	
			In seepage pit	2	
			Anywhere in open space	3	
405	What is your source of water for drinking?		Pipe	1	
			protected wall spring	2	
			unprotected wall spring	3	

406	Distance of water source to home		minutes/meter		
407	Is there any hand washing facility beside the toilet?		Yes	1	
			No	2	
408	Where do you dispose your under five child waste?		In the toilet	1	
			Left it open everywhere	2	
			covered by soil	3	

Part VI: Child anthropometric measurements

Code	Type of measurement	Average measurement result	
601	Weight of Child		Kg
602	Height of Child		Meter
603	Age of child in month?	months	
604	Sex of child	Male	1
		Female	2
605	MUAC		

Source: Adapted from (FAO, 2007) and different literature review

Part VII: Assessment of Women empowerment tool (Standard questionnaire)

s/n	Women Empowerment practice Questions	Yes /No
1	Women have accessed to productive resources	
2	Women have accessed to income opportunities or credit	
3	Women have voice's in farming decision making	
4	Female have holding leadership in agricultural programs	
5	Women have accessed to extension services and information	

Part VIII: Questions relate to dietary diversity consumption pattern

Code	Food groups	Response
0701	Starch staples☐ Bread, biscuits, cookies or any other foods made from millet, sorghum, maize, spaghetti, pasta, rice, wheat, ugali, porridge or pastes or other locally available grains	Yes=1 No = 0
0702	Pulses (beans, peas and lentils) ☐Dried beans, dried peas, lentils, nuts, seeds or foods made from these (e.g. hummus, peanut butter)	Yes=1 No = 0
0703	Nuts and seeds: White potatoes, white yam, white cassava, or other foods made from roots or tubers	Yes=1 No = 0
0704	All Dairy: Milk and milk products milk, cheese, yogurt or other milk products	Yes=1 No = 0
0705	Meats, poultry and Fish: Organ meat, liver, kidney, heart or other organ meats , Flesh meats (beef, pork, lamb, goat, chicken, duck, doves or other birds Poultry , Fish (Fresh or dried fish),	Yes=1 No = 0
0706	Eggs: Eggs from chicken, ducks	Yes=1

Instruction: Ask the respondents to recalls all the foods and beverages consumed inside and outside the home during the previous 24 hours (day and night). Start with the first food/drink consumed the previous morning. After the respondent recalls the foods she consumed, underline/circle the corresponding foods in the list under the appropriate food group and write “1” in the column next to the food group if at least one food in this group has been underlined. If the food is not listed in any group, write it in the margin and discuss it with the supervisor. Probe for snacks eaten between main meals, for added foods. Please describe the foods (meals and snacks) that you ate yesterday during the day and night, whether at home or outside the home. Start with the first food eaten in the morning.

List of food groups

0707	Dark green leafy vegetables: Like cabbage, cassava leaves, pumpkin leaves, cowpeas leaves ,indigenous green lettuce, and spinach	Yes=1 No= 0
0708	Other vitamin A-rich fruits and vegetables: Any vitamin A rich fruits like ripe mango and papaya, Deep yellow- and orange-fleshed bananas, pumpkin, carrots, yellow fleshed sweet potatoes and 100% fruit juice made from these	Yes=1 No= 0
0709	Other vegetables: Tomato, onion, green pepper,	Yes=1 No= 0
0710	Other fruits: Green unripe mango, papaya, avocado, including wild fruits (and 100% fruit juice made from these	Yes=1 No= 0

Q.No	Questions	Response options (encircle one)	Code	skip	
801.	In the past four weeks, did you worry that your	No 0		If. Yes	“0”
	Household would not have enough food?	Yes 1		Q802↓	
801.a	How often did this happen?	Rarely 1 Sometimes 2 Often 3			
802.	In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources?	No 0 Yes 1		If. 0 ↓ Q803	“0”

Part IX: Questions relate to household food security condition (HFIAS)

802.a	How often did this happen?	Rarely 1 Sometimes 2 Often 3		
803.	In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources?	No 0 Yes 1		If. “0” ↓ Q804
803.a	How often did this happen?	Rarely 1 Sometimes 2 Often 3		
804.	In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food?	No 0 Yes 1		If. “0” ↓ Q805
804.a	How often did this happen?	Rarely 1 Sometimes 2 Often 3		

805.	In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food?	No 0 Yes 1	If. "0" ↓ Q806
805.a	How often did this happen?	Rarely 1 Sometimes 2 Often 3	
806.	In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food?	No 0 Yes 1	If. "0" ↓ Q807
806.a	How often did this happen?	Rarely 1 Sometimes 2 Often 3	
807.	In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food?	No 0 Yes 1	If. "0" ↓ Q808
807.a	How often did this happen?	Rarely 1 Sometimes 2 Often 3	
808.	In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food?	No 0 Yes 1	If. "0" ↓ Q809
808.a	How often did this happen?	Rarely 1 Sometimes 2 Often 3	
809.	In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food?	No 0 Yes 1	If. "0" ↓
809.a	How often did this happen?	Rarely 1 Sometimes 2 Often 3	

Keys: Rarely =once or twice in the past 30 days, Sometimes =3–10 times in the past 30 days Often =more than 10 times in the past 30 days

Thank you for your response!

The time interview is ended: _____

Field guideline

1. First the data collectors should introduce him or herself,
2. Explain the title of the study, aim of the study and purpose of the study
3. Explain data collection procedure and the time needed to complete data collection
4. Explain risk and benefit of participating on research
5. Confirm that the data collected will be contained with confidentiality
6. Inform the respondent that they have full right to either to continue or withdraw from the study at any time
7. Provide the respondent with your contact address to contact you at any time if they want any clarification
8. Ask the respondent to sign to confirm that they have understand all the above points and decided to participate on the study.
9. If they refuse to sign thank the them and leave
10. If they agree and sign continue data collection

Thank them at the end of data collection