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THE ASSOCIATION BETWEEN
WOMEN S EMPOWERMENT AND
CHILDREN S NUTRITIONAL STATUS
IN RURAL KEBELES OF BAHIR DAR,
NORTH WEST ETHIOPIA.

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SCHOOL OF RESEARCH AND GRADUATE STUDIES

FACULTY OF CHEMICAL AND FOOD ENGINEERING

**THE ASSOCIATION BETWEEN WOMEN'S EMPOWERMENT
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By: Emebet Gashaw

BAHIR DAR, ETHIOPIA

August 2, 2019

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A thesis submitted to the school of Research and Graduate Studies of Bahir Dar
Institute of Technology, Bahir Dar University in partial fulfilment of the requirements
for the degree of Master of Science in Applied Human Nutrition in the Faculty of
Chemical and Food Engineering.

Advisor Name: Dr. Mesfin Wogayehu.


Bahir Dar, Ethiopia

August 2, 2019

DECLARATION

I, the undersigned, declare that the thesis comprises my own work. In compliance with internationally accepted practices, I have acknowledged and refereed all materials used in this work. I understand that non-adherence to the principles of academic honesty and integrity, misrepresentation/ fabrication of any idea/data/fact/source will constitute sufficient ground for disciplinary action by the University and can also evoke penal action from the sources which have not been properly cited or acknowledged.

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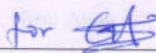
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Acronym and abbreviations

CSA.....	Central Statistical Agency
DHS.....	Demographic and Health Survey
EDHS.....	Ethiopia Demographic and Health Survey
HAZ.....	Height- for- Age Z-score
GDP.....	Gross Domestic Product
NCDs.....	Non-Communicable Diseases
SII.....	Strategic Impact Inquiry
UN.....	United Nations
UNICEF.....	United Nations Children’s Fund
WASH.....	Water, Sanitation and Hygiene
WAZ.....	Weight-for-Age Z-score
WHZ.....	Weight-for-Height Z-score
WEI.....	Women Empowerment Index
WEIMI.....	Women Empowerment Impact Measurement Initiative
WHO.....	World Health Organization

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Abstract

Background: Malnutrition is a universal problem that affects most of the world's population at some point in their lifespan, from infancy to old age. Care is crucial for child nutritional status. Women are often the primary caregivers as they have significant control over aspects critical for child well-being; including food preparation and storage, feeding practices, psychosocial care, hygiene and health practices, and newborn care. Thus, their empowerment can influence nutritional status of their children.

Objective: To determine the nutritional status of children aged 6-59 months and its association with women's empowerment in rural kebeles of Bahir Dar, North west Ethiopia.

Methods: A community based cross-sectional study was conducted among mother's having children 6-59 months in rural kebeles of Bahir Dar city from February 10 to March 21, 2019. Multistage sampling technique was used to select the desired sample and a total of 619 samples were selected. Data were coded and entered in to Epi-data version 3.1 and was exported to SPSS version 20 for analysis. Binary and multivariable logistic regression analysis were used to assess the association between the dependent variables with each independent variables. Odds ratios together with 95% CI was used to report associations. P-value < 0.05 was considered for statistical significance.

Result: A total of 582 mothers who have children aged 6-59 month participated obtaining 94% response rate. Mothers who were in low empowerment level were about six times (AOR=6.023; 95% CI: 1.227-29.549) more likely to have wasted children as compared to mothers who were in high empowerment level. Mothers who were moderately empowered were 44% less likely to have stunted children (AOR=0.559; 95% CI: 0.365-0.857) as compared to highly empowered mothers. However, mother's empowerment level had no significant association with children's underweight and overweight status.

Conclusion: It is concluded that Women empowerment was significantly associated with wasting and stunting. However, there was no significant association observed between empowerment and underweight and overweight.

Key words: women's empowerment, nutritional status, malnutrition, under five children.

Chapter- 1: Introduction

1.1. Background

Malnutrition refers to deficiencies, excesses, or imbalances in a person's intake of energy and/or nutrients and it includes undernutrition (wasting, stunting, and underweight), inadequate vitamins or minerals, overweight, obesity, and resulting diet-related non-communicable diseases (WHO, 2018).

Malnutrition is a universal problem that affects most of the world's population at some point in their lifespan, from infancy to old age; since all geographies, all age groups, rich people and poor people, and all sexes are affected being a truly universal problem (Global Nutrition R. , 2018). It resulted from the summation of poor-quality diets and poor-quality health and care environments and behaviours, which are made in part by a host of underlying factors, such as political instability, poor economic development, conflict, inequality, and some dimensions of globalization (Global Nutrition R. , 2016).

Globally 52 million children under 5 years of age are wasted, 17 million are severely wasted and 155 million are stunted, while 41 million are overweight or obese. Around 45% of deaths among children under 5 years of age are associated with undernutrition. Low- and middle-income countries are the most susceptible areas for these problems (Global Nutrition R. , 2018). More than half of all stunted children and two thirds of all wasted children under five lived in Asia. In addition, more than one third stunted children and more than one quarter wasted children under five lived in Africa. Africa is the only region where the number of stunted children has increased from 50.6 Million to 58.7 million in the year 2000 – 2017 (UNICEF W. H., 2018).

In Ethiopia prevalence of stunting, acute malnutrition (wasting or low weight-for-height) and underweight have decreased over the past decade and remain high, with 38 percent of children under 5 years stunted, 10 percent wasted and 24 percent underweight. However, the prevalence of overweight children remained low at 1%. Children in rural areas are more likely to be malnourished than those in urban areas and also differences in stunting levels can be seen with respect to maternal education and wealth levels, 22 percent of children whose mothers have secondary education are stunted, while the rate rises to 42 percent of children whose mothers had no formal education. There were variations in the severity of stunting and

wasting by region. Stunting is highest in Amhara (46 percent) whereas wasting is highest in Somali (22 percent) (CSA, 2016).

1.2. Statement of the problem

Malnutrition is one of the leading causes of morbidity and mortality among children. According to the UNICEF framework there are three underlying factors that can cause childhood malnutrition: household food insecurity, inadequate care and unhealthy household environment, and lack of health care (UNICEF u. n., 2013).

In early childhood, undernutrition has negative life-long and intergenerational consequences; undernourished children are more likely to require medical care as a result of undernutrition-related diseases and deficiencies. This increases the burden on public social services and health costs incurred by the government and the affected families with estimated cost of 55.5 billion Ethiopian birr (ETB), which is equivalent to 16.5% of GDP (EHNRI, 2009). Without proper care, underweight and wasting in children results in a higher risk of mortality, 28% of all child mortality in Ethiopia is associated with undernutrition. During schooling years, stunted children are more likely to repeat grades and drop out of school, 16% of all repetitions in primary school are associated with stunting, thus reducing their income-earning capability later in life. Moreover, adults who were stunted as children are less likely to achieve their expected physical and cognitive development, thereby affecting their productivity (EHNRI, 2009).

The other form of malnutrition is over nutrition, which can be manifested through overweight, obesity, and diet related non-communicable diseases (NCDs). When undernutrition coexist along with over nutrition within individuals, households and population, it is called double burden of malnutrition. It is global challenge particularly in low and middle-income countries, which resulted from intergenerational changes in diet quality and quantity for individuals and populations leading to greater heterogeneity in nutritional status within the population. It has serious and negative economic impact on individuals and populations. Through its effects on health, malnutrition increases health-care costs, reduces productivity and slows economic growth, which in turn can perpetuate cycle of poverty and ill-health (WHO., 2017).

Care is crucial for child nutritional status as it involves ‘measures and behaviours that transform available food and health resources into child growth and development’ (UNICEF

o. u., 1998). In the meantime, women are often the primary caregivers that they have significant control over aspects critical for child well-being, including food preparation and storage, feeding practices, psychosocial care, hygiene and health practices, and newborn care. Thus, their empowerment can influence nutritional status of their children (Engle, Menon, & Haddad, 1999).

Empowerment is complex, multi-dimensional, and unpredictable. According to Women's Empowerment Impact Measurement Initiative (WEIMI) and Strategic Impact Inquiry (SII), "women's empowerment" is defined as "the sum total of changes needed for a woman to realize her full human rights- the interplay of changes: in her own aspirations and capabilities (i.e. agency), the power relations through which she must negotiate her path (i.e. relations), the environment that surrounds and conditions her choices (i.e. structure)" (Picard & Gillingham, 2012).

Studies conducted on women empowerment and its effect on malnutrition and approve that equality in women's status relative to men's, has a positive influence on child growth and nutritional status (Tracy, 2016). In many parts of the world, women continue to experience very low levels of autonomy. According to one analysis using data from 2004 to 2009, in 18 out of 30 developing countries from Africa, Asia, Latin America and the Caribbean, more than half of the women reported having 'no say' in everyday household decisions- making, large household purchases, purchases for daily needs, visits to family or relatives, or decisions regarding their own health care (UN, 2011).

The lancet series on maternal and child nutrition suggest that improving women's empowerment is an important point of intervention for improving nutrition. For instance, the series describes that women's empowerment is a mechanism through which increases in income and yield from agricultural inputs which in turn affect intra-household resource allocation and children's nutrition (Ruel & H., 2013).

Ethiopia is one of the developing countries where women are facing political, social and cultural challenges that weaken their human worth and dignity resulting extreme suffering from economic poverty, social discrimination, political marginalization, and cultural suppression (Beyene, 2015; UN w. , 2014). Lack of access to productive resources such as land; lack of access to education, employment opportunities, basic health services, and protection of basic human rights; low decision making; violence and harmful traditional

practices are some of the indicators of the socioeconomic marginalization of women in the country (Moreda, 2017).

A mother's ability to make decisions within the household and in her community is vital. At the family/household level, the heavy workload resulting from the many household tasks that women carry usually leaves women with little/ no time to properly care for their children and themselves. Besides, unequal gender based resource distribution at the household level, harmful traditional practices, such as food taboos (especially pregnant and lactating women), early marriage, and violence against women have contributed to the poor nutritional status of the majority of infants, young children and women in Ethiopia (FDRE, 2016). However, there is no research evidences, which support the impact of women's empowerment on malnutrition in Ethiopia and also for this particular area.

1.3. Literature review

In this literature review, it is tried to review the prevalence of malnutrition in Ethiopia, factors associated with malnutrition, definitions of women's empowerment, dimensions of women's empowerment and association between women's empowerment and children's nutritional status.

1.3.1. Prevalence of malnutrition in Ethiopia

A systematic review of studies from 1997 to 2015 estimated the prevalence of stunting, underweight and wasting as 42%, 33% and 15% respectively (Ahmed, Shahabeddin, Kourosh, & Sakineh, 2017). A community based cross sectional study in each of the following areas showed that the prevalence of stunting among children 6-59 months was 54% and 42% stunting in Halaba and Zeway, respectively (Ersino, Zello, Henry, & Regassa, 2018), 39.3% in Hawassa (Hiwot, Ayele, Abebaw, & Solomon, 2017), 22.2% in Wolayta sodo (Hiwot, Yewelsew, Eskindir, Teklemichael, & Tesfalem, 2017), 47.6% in Bule Hora district (Mandefro, Mekitie, Mohammed, & Lamessa, 2015), 45.8 % in Haramaya district (Hiwot, Tesfaye, & Firehiwot, 2015), 67.8% in agro-pastoral households in Afar region (Rabia, Ayalneh, & Degnet, 2013), 46.9% in Tigray (Mulugeta, HAGOS, KRUSEMAN, LINDERHOF, STOECKER, & ABRAHA., 2010), 52.4% in Merhabete (Shiferaw, Bereket, Rajalakshmi, & Masresha, 2018), 64.5% in Dabat Health and Demographic Surveillance System (HDSS) (Amare, Gashaw, Terefe, Molla, & Solomon, 2017), 49.4% in Libo-kemekem (Geberselassie, Abebe, Melsew, Mutuku, & Wassie, 2018), 42.3% in the slum

areas of Gondar (Atanaw, Melkie, Terefe, & Zegeye, 2018), 37.5% in East Gojjam zone and 38.3% in West Gojjam zone (Motbainor, Worku, & Kumie, 2015).

Similarly the prevalence of Underweight among children 6-59 months was 36% and 21% in Halaba and Zeway, respectively (Ersino, Zello, Henry, & Regassa, 2018), 15.8% in Hawassa (Hiwot, Ayele, Abebaw, & Solomon, 2017), 14.0% in Sodo zuria district (Efrata, Samson, Eyasu, Habtamu, & Tesfahun, 2018), 29.2% in Bule Hora (Mandefro, Mekitie, Mohammed, & Lamessa, 2015), 21 % in Haramaya district (Hiwot, Tesfaye, & Firehiwot, 2015), 46.1% in agro-pastoral households in Afar region (Rabia, Ayalneh, & Degnet, 2013), 33.0% in Tigray (Mulugeta, HAGOS, KRUSEMAN, LINDERHOF, STOECKER, & ABRAHA., 2010), 19.5% in Takusa district (Getnet, Solomon, Temesgen, & Melaku, 2018), 22.0% in East Gojjam zone and 22.5% in West Gojjam zone (Motbainor, Worku, & Kumie, 2015).

Likewise, the prevalence of wasting among children 6-59 months was 6.3% in Hawassa (Hiwot, Ayele, Abebaw, & Solomon, 2017), 11.1% in Sodo zuria district (Efrata, Samson, Eyasu, Habtamu, & Tesfahun, 2018), 13.4% in Bule Hora district (Mandefro, Mekitie, Mohammed, & Lamessa, 2015), 10.7 % in Haramaya district (Hiwot, Tesfaye, & Firehiwot, 2015), 12.8% in agro-pastoral households in Afarregion (Rabia, Ayalneh, & Degnet, 2013), 11.6% in Tigray (Mulugeta, HAGOS, KRUSEMAN, LINDERHOF, STOECKER, & ABRAHA., 2010), 7.3% in the slum areas of Gondar (Atanaw, Melkie, Terefe, & Zegeye, 2018), 17.1% in East Gojjam zone and 18.6% in West Gojjam zone (Motbainor, Worku, & Kumie, 2015).

1.3.2. Factors associated with malnutrition in Ethiopia

Differences in stunting levels can be seen according to maternal education and wealth levels; 22% of children whose mothers have secondary education are stunted, while the rate rises to 42% of children whose mothers had no formal education. Similarly, 26% of children in the highest wealth quintile are stunted, while 45% of children in the lowest wealth quintile are stunted (CSA, 2016).

The prevalence of diarrhoea is also greatest between children 6–35 months, ranging from 13%–23% (CSA, 2016). This aligns with the introduction of complementary foods, which if not combined with proper water, sanitation, and hygiene (WASH) practices, and very low usage of sanitation services, with only 7% usage of basic services nationally. Use of basic drinking water services is also low, especially in rural areas where they are used by only 30%

of the rural population, (UNICEF, 2017) can have negative effects on the nutritional status of children.

Another factor that contributes for poor nutrition outcomes in Ethiopia is early motherhood. Relative to older mothers, adolescent girls are more likely to be malnourished and have a low birth weight baby who is more likely to become malnourished, and be at increased risk of illness and death than those born to older mothers (CSA, 2016).

1.3.3. Definitions of women's empowerment

Depending on context and author, empowerment has a lot of definition. Many of these definitions relate empowerment with matters such as autonomy, freedom, ownership of and control over assets, self-awareness, agency, collective action, power and its redistribution, self-determination, participation, dignity, social inclusion, and choice. The terms that mostly used across various definitions refer to choice, power, options, control, and agency (vanden, Quisumbing, & Gillespie, 2013).

With respect to women's empowerment, they most often refer to "women's ability to make decisions and affect outcomes of importance to themselves and their families. Control over one's life and over resources is often stressed" (Malhotra, Schuler, & Boender, 2002).

Another conceptualization of empowerment "the expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them". This underlines that empowerment is a *process* that involves change from a condition of disempowerment and denial of choice to one of empowerment (Kabeer, 1999a). Secondly it highlights *agency* meaning that "women themselves must be significant actors in the process of change that is being described or measured" (Malhotra, Schuler, & Boender, 2002).

Some define as "Empowerment of women is essentially the process of upliftment of economic, social and political status of women, the traditionally underprivileged ones, in the society. It is the process of guarding them against all forms of violence." (Anu, 2015).

World Bank conceptualize empowerment as "the process of increasing the capacity of individuals or groups to make choices and to transform those choices into desired actions and outcomes. Central to this process are actions which both build individual and collective

assets, and improve the efficiency and fairness of the organizational and institutional context which govern the use of these assets” (WorldBank, 2009).

1.3.4. Dimensions of women’s empowerment

All study defines women empowerment as a dynamic process of existing norms of the society, in which they live to improve its well-being. The components of Women’s empowerment include decision making power in the household, access to credit, participation, knowledge & awareness, raising voice, freedom, mobility, respect and economic participation (Shodhganga, 2018). Decision making power in the household means “The ability to make and influence the process of accomplishment of decisions.” Access to credit means, “to access the credit for their livelihood so their income level will change.” Participation means “the role of women’s economic activity and financial decision making.” Knowledge & awareness means, “the level of awareness and are measured in terms of knowledge, changed mind-set.” Freedom of expression means, “She feels comfortable expressing her views without any hesitation in the family and in group meetings.” Freedom & Mobility means, “The freedom of movement (Ability to visit the local market or go outside with confidence).” Respect means, “Their family feels her value and gives her the respect.” Raising Voice means, “she can raise her voice against exploitation.” (Shodhganga, 2018).

1.3.5. Relation between women’s empowerment and child nutritional status

A study conducted in India examined the link between mother’s autonomy and child nutritional status and found that one SD increase in maternal autonomy score is associated with a 10 percent reduction (representing 300,000 children aged less than 18 months) in the prevalence of stunting, and compensates for half of the estimated average decline in Height-for-Age Z-scores (HAZ) Indian children experience in the second six months of life (Wiji, Anjor, & Nisha, 2016).

Another study in rural Andhra Pradesh, India examined the association between child nutritional status and women’s autonomy. Autonomy measures were based on four domains; decision-making power of women in various activities, women’s freedom of movement, financial autonomy and attitudes towards domestic violence. The study revealed that financial autonomy and permission to go the market (physical autonomy) remained significant predictors of stunting. A mother with higher financial autonomy had lower odds (OR

=0.731.; 95% CI 0.546, 0.981) of having a stunted child. Mothers with higher levels of physical autonomy were less likely (OR=0.593; 95% CI 0.376, 0.933) to have stunted children (Shroff, Griffiths, Adair, Suchindran, & Bentley, 2009).

Another study investigated the role of women's empowerment in determining child stunting in Eastern India and Bangladesh. The empowerment of women was measured by some direct and indirect indices. The direct measures included individual decision making – health care decisions, household decisions and spatial mobility of women. Indirect measures included women's education, employment status, type of earning, partner's education level and her mass media exposure. The study indicated that with rising educational level, stunting decreased significantly in both the areas, i.e. when the women were more educated the chance of stunting decreases by 30% ($p < 0.01$). In Bangladesh, Children of women who did not decide on large household purchases were more likely to be stunted ($p < 0.10$) and children of women who did not take decisions on own health were twice more likely to be stunted. ($P < 0.05$) (Ankita & Aparajita, 2017).

A study done in India and Nigeria investigated the effect of women's empowerment on child health status. Women's empowerment in both study areas were examined through women's decision-making autonomy in the household. The result showed that women's decision making autonomy has a direct influence on the health of children. Child's stunting status is affected by parent's education, place of residence, wealth status as well as work status of women in both populations (Asabe, Sushama, & Alok, 2015).

A cross-sectional descriptive study carried out in Bhaktapur district, Nepal evaluated the relationship between women's empowerment and nutritional status of their children. Women's empowerment was assessed using Women's Empowerment Index (WEI) and found out that in comparison to highly empowered mothers, low empowered mothers were five times (Adjusted OR=5.070; 95% CI: 1.885-13.638), three times (Adjusted OR=3.031; 95% CI: 1.281-7.141) and ten times (Adjusted OR=10.056; 95% CI: 1.127-89.693) more likely to have underweight, stunted and wasted children respectively (Shiwakoti, Devkota, & Paudel, 2017).

A study examined the relationship between maternal household decision-making autonomy and children's nutritional status in Bangladesh showed that children whose mothers participated in making all household decisions are 15%,16%, and 32% significantly less

likely to be stunted (OR = 0.85; 95% CI = 0.67-0.98), underweight (OR = 0.84; 95% CI = 0.70-0.98), and wasted (OR = 0.68; 95% CI =0.52-0.90), respectively, than mothers who did not participate in making any decision (Mosfequr, Umme, & Abdul, 2015).

A study which assessed independent associations between the health and nutritional status of children under 5 years old and (1) family behavioural factors related to women with regard to child care and (2) war-related experience by the household of hardships in Afghanistan found out that lack of maternal autonomy was associated with the occurrence of linear growth retardation (OR = 1.38; 95% CI =1.01, 1.90) (Taufiq, et al., 2008).

A mixed-methods study examined a relationship between women's empowerment and childhood malnutrition in Timor-Leste. Three quantitative women's empowerment measures: a household decision-making index, attitudes towards violence index and lifetime experience of violence variable was used. The result revealed that among women aged 30 – 49, the children's odds of being underweight increased by 1.25 times per every increase in the attitudes towards violence index (95% CI: 1.08-1.45; p=0.003). Women who were younger or the same age as their husbands were 1.27 times more likely to have stunted children if they experienced violence (95%CI: 1.02-1.59; p=0.03). However, women older than their husbands who had experienced violence were 52% less likely to have stunted children (95% CI: 0.24-0.96; p=0.04). The study also found unpredicted result among women who were older than their husbands, the odds of child stunting increased one-and-a-half times per increase in the decision-making index (95% CI: 1.19-2.00, p=0.001) (Scantlan & Previdelli, 2013).

A cross-sectional survey conducted in Lao PDR assessed the association between Mothers' autonomy and childhood stunting. The study used self-esteem, self-efficacy, decision-making power, freedom of mobility, and control of money as dimensions of women's autonomy and found out that the likelihood of childhood stunting was significantly lower if mothers had higher self-efficacy for health care (OR = 0.15, p = 0.007), self-esteem (OR = 0.11, p = 0.025), or control of money (OR = 0.11, p = 0.041) (Yusuke, Marika, Hina, Kanako, Latsamy, & Phonepadith, 2018).

A study examined the relationship between maternal autonomy and child stunting in Brazil. Maternal autonomy was estimated by the decision-making power of each woman in their household and the result showed that women with high autonomy indicated by the final say

on what items are to be cooked [OR = 1.856; 95% confidence interval (CI) 1.004, 3.433] were significantly more likely to have a stunted child compared to women with low autonomy (Pamela & Daniel, 2013).

A cross sectional survey carried out in Kapiri-Mposhi, Zambia assessed Women's empowerment and the nutrition status of children aged 6-59 months. Women's access to productive resources, access to household income, access to extension services, women's voices in household decisions and women leadership in agriculture programs were used to measure women empowerment. The result indicated that access to income/credit was positively affecting the WHZ outcome (Chipili, Msuya, Pacific, & Majili, 2018).

One study which examined the association between women's empowerment and maternal and child nutrition in Kalal'e district of Northern Benin revealed that Mobility was positively associated with female children's WHZ and male children's HAZ and WAZ, while decision-making was correlated with male child's WHZ and female children's WAZ. Women's empowerment measures were leadership, decision making, mobility, economic security, male involvement in housework, nonfamily groups (Halimatou, Min, Jennifer, Rosamond, & Taren, 2017).

A study explored the effect of women's autonomy on children's nutrition among the Rendille of Northern Kenya showed that among older children (3-10yrs. of age), an increase of 1 point in a mother's autonomy score led to a corresponding increase of 0.23 in her older children's WHZ score ($P < 0.05$) (Emily, Bettina, & Matthew, 2009). Though empowerment is measured differently in each study, improving maternal autonomy or capacity is considered to have a positive impact on child nutritional status.

1.4. Conceptual framework

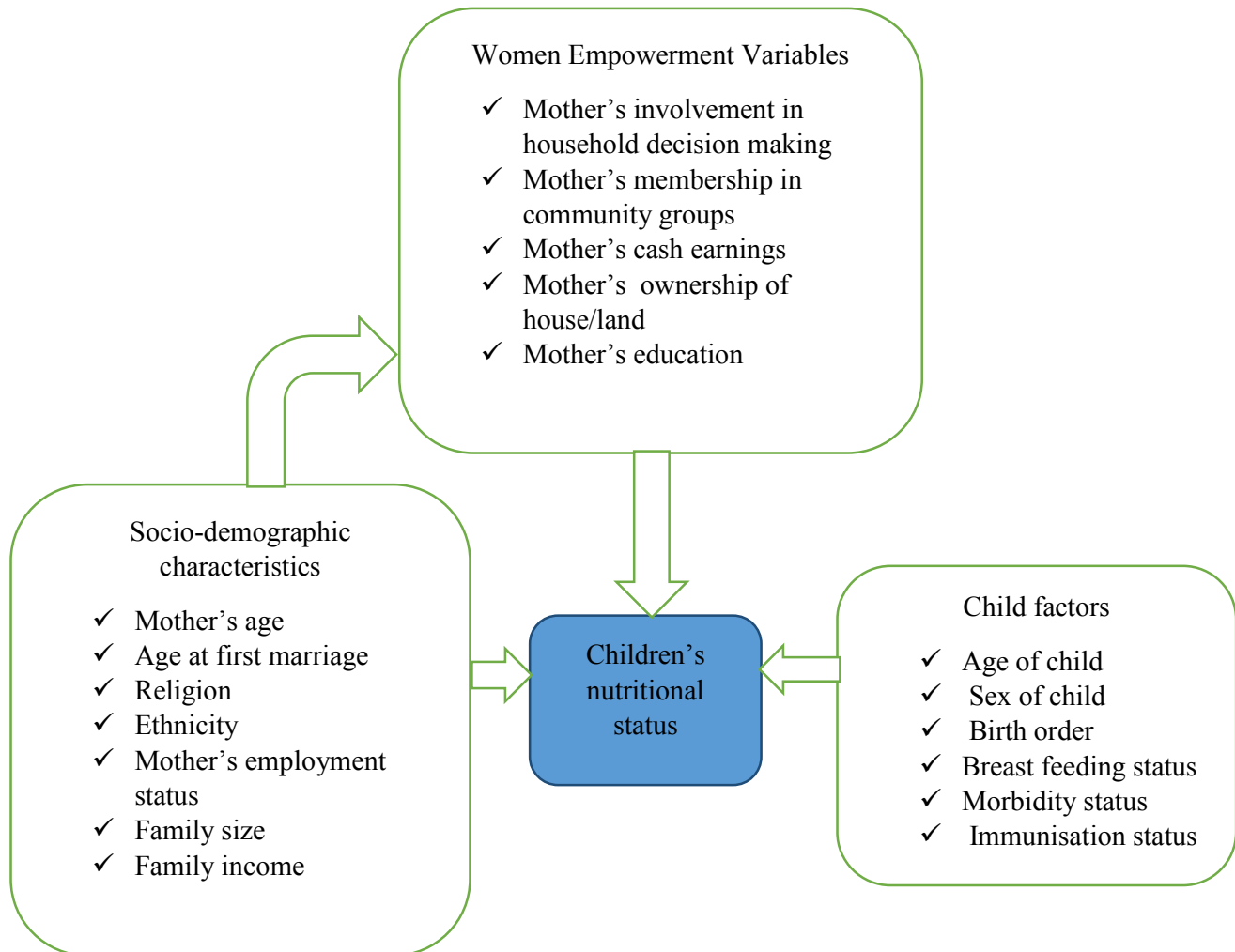


Figure 1: Conceptual framework showing factors affecting child nutritional status.

1.5. Significance of the study

A lot of research has been done on the causes of malnutrition and there are many risk factors already identified, for that, interventions in different areas of Ethiopia are being done to prevent those risk factors and thereby prevent malnutrition. So far, there are different research from different countries that revealed the significant effect of women empowerment on child malnutrition. Despite the effect of a range of socio-economic, demographic and

fertility related factors on malnutrition have been investigated in Ethiopia, to date there is no research that identify women empowerment as one of a factor for malnutrition. In a country where striving to eliminate stunting in 2030, investigating such under studied factors will have paramount input for future nutritional interventions especially in the rural areas where health information is limited. This is also helpful to provide evidence for program planners, policy makers, researchers and stakeholders working on nutritional programs. As this is the first research investigating women empowerment as a factor of malnutrition, it might give an insight for future large scale studies.

Chapter -2: Objectives

2.1. General objective

- To determine the nutritional status of children aged 6- 59 months and its association with women's empowerment in rural kebeles of Bahir Dar, North west Ethiopia, 2019.

2.2. Specific objectives

- To determine the nutritional status of children aged 6-59 months.
- To identify the association between women's empowerment and childhood stunting.
- To investigate the association between women's empowerment and childhood wasting.
- To determine the association between women's empowerment and childhood underweight.
- To examine the association between women's empowerment and childhood overweight.

Chapter-3: Methods

3.1. Study area and period

The study was conducted in three rural kebeles of Bahir Dar city i.e. Weramit, Werebqolatsion and Zenzelma kebeles. Bahir Dar is the capital city of Amhara Regional State, located 565 km from Addis Ababa, Northwest Ethiopia. For administrative purposes, the town is divided into nine sub cities, four satellite cities and nine rural kebeles. According to the Bahir Dar City administration health bureau report, the total population of the town is 339,683 of which 65,224 are living in rural kebeles. The numbers of under-five-year-old children is 46,007 where 8834 are in rural kebeles. The town has four hospitals (one public regional referral hospital, one public primary hospital, and two private general hospitals), 6 health centres, 2 nongovernmental clinics, 9 private special higher clinics, 2 private higher clinics, and 12 private clinics. The study was conducted from February 10- March 21, 2019. (BahirDar, 2018)

3.2. Study design

Community based cross-sectional study was conducted among mother's having children aged 6- 59 months.

3.3. Source population

All mothers who have children aged 6-59 months in rural kebeles of Bahir Dar were the source population.

3.4. Study population

Mothers who have children aged 6-59 months in selected rural kebeles of Bahir Dar were the study population.

3.5. Inclusion criteria and Exclusion criteria

3.5.1. Inclusion criteria

- All sampled mothers who are currently married and have child aged 6-59 months were included for this study.
- When the mother has more than one child aged 6-59 months, only the youngest child was selected for this study.

3.6. Variables

3.6.1. Independent variables

Women's empowerment variables: Women's involvement in household decision making, Women's membership in community groups, Women's cash earnings, Women's ownership of house/land, Women's education.

Socio-demographic characteristics: Mother's age, age at first marriage, family size, media exposure.

Socio-economic status: Employment status of the mother.

Child factors: Age of index child, sex of index child, birth order, breast feeding status, morbidity status and immunisation status.

3.6.2. Dependent variables

The dependent variable was nutritional status of a child aged 6-59 months. (i.e. stunting, wasting, underweight and overweight).

3.7. Operational definition

➤ Women's empowerment was assessed by using five indicators: (Tuladhar, Khanal, K.C., Ghimire, & Onta, 2013)

1. Women's involvement in household decision making (access to health care, household purchasing, and freedom to visit relatives): If a woman participated in all three decisions, she would receive a "2" score; if she participated in one or two decisions, she would receive a "1" score; and if she did not participate in any decisions, she would receive a "0" score.

2. Women's membership in community groups: If a woman is a member of any community groups, such as a mothers' group, saving group, women's group and others, she would score "1" and if she is not involved in any groups she would score "0".

3. Women's cash earnings: If a woman earn cash only or both cash and in-kind, she would be given a score of "1" and if she does not earn cash at all, she would be given score of "0".

4. Women's ownership of house/land: If a woman own a house, land, or both alone and jointly with husband, she would receive a score of "1" and if she does not own a house, land or both, she would receive a score of "0".

5. Women's education: If a woman attained secondary or higher education, her score would be "2". If a woman attained primary level education, her score would be "1" and if she did not attend school at all, her score would be "0". (Tuladhar, Khanal, K.C., Ghimire, & Onta, 2013)

➤ Women's empowerment were classified into three categories and defined as follows as reported by Tuladhar, et al. (Tuladhar, Khanal, K.C., Ghimire, & Onta, 2013)

- ✓ Low Empowerment: -Women who received total score less than or equal to 2.
- ✓ Moderate Empowerment: - Women who received total score of 3 or 4.
- ✓ High Empowerment: -Women who received total score of greater than or equal to 5.

3.8. Sample size determination

The sample size in this study was determined by using single population proportion formula by taking prevalence of stunting 42.3% and wasting 7.3% among children aged 6- 59 months in Gondar, Northwest Ethiopia (Atanaw, Melkie, Terefe, & Zegeye, 2018)and prevalence of underweight 19.5% in Takusa district, Northwest Ethiopia, (Getnet, Solomon, Temesgen, & Melaku, 2018)with degree of freedom (d)= 5% and 95% confidence level. Finally, the largest sample size was used for this study.

$$N = \frac{(Z_{\alpha/2})^2 p (1-p)}{d^2}$$

Where: N= total sample size

$Z_{\alpha/2}$ = 1.96 at 95% confidence interval.

P= proportion

d=5% (degree of freedom)

Table 1: Calculation of sample size based on prevalence of undernutrition from the study done in Gondar and Takusa.

Variables	P	N
Stunting	42.3%	375
Wasting	7.3%	104
Underweight	19.5%	241

Note: where P is proportion, N is total sample size.

N= 375 was taken since it is the largest sample size and the final sample size was 619 by taking design effect 1.5 and 10% non-response rate.

3.9. Sampling procedures

Multistage sampling technique was implemented. Three Kebeles were selected from nine rural kebeles of Bahir Dar randomly by computer-generated method. Then, proportional allocation was used to determine the desired samples from selected Kebeles. Mothers having children age 6-59 months in selected kebeles were selected through systematic sampling method with K=7 interval. Finally, house-to-house interview was conducted.

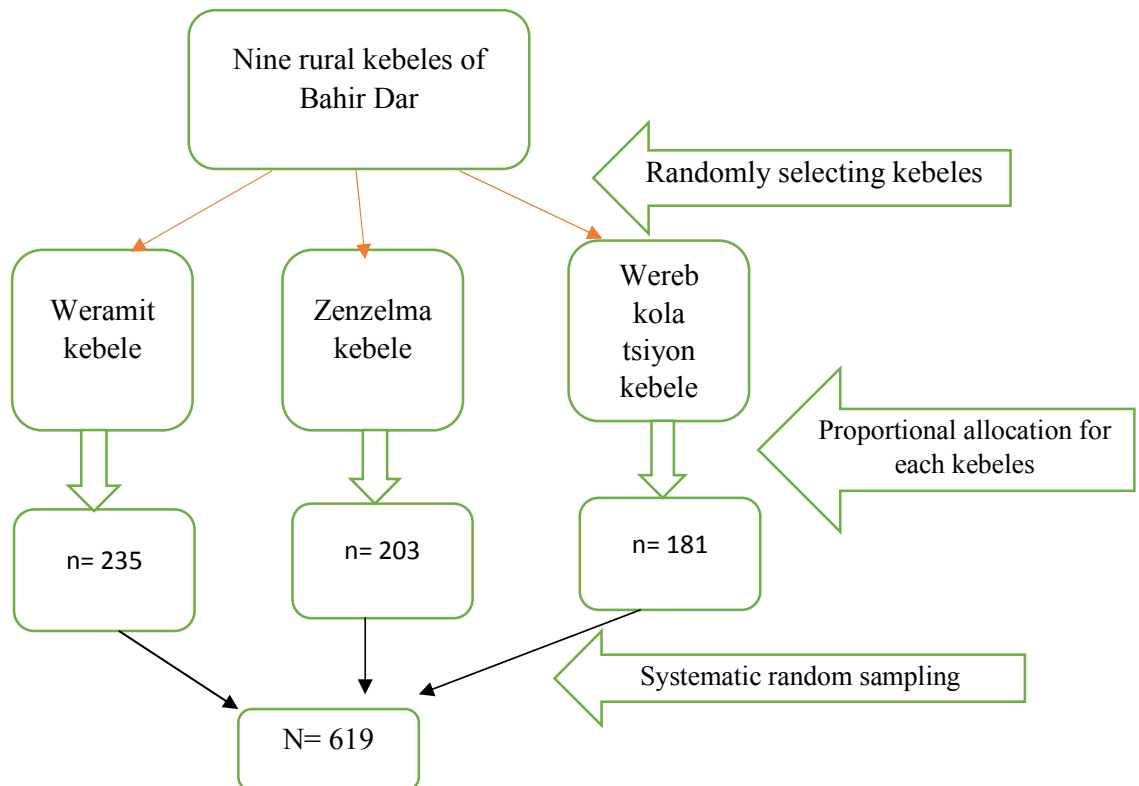


Figure 2: Schematic presentation of sampling procedure.

3.10. Data collection procedures

Data was collected from mothers who have child aged 6 to 59 months by direct interviewing and by measuring anthropometric measurements from February 10- March 21, 2019.

3.10.1. Structured questionnaire

Pre-tested and structured questionnaire was used to collect data on socio-demographic characteristics, maternal and child characteristics. EDHS questionnaires were adapted. The questionnaire was first prepared in English and then translated in to Amharic Version, which later on was translated to the English version to check its consistency. Six data collectors (clinical nurses) and two supervisors (public health officers) were participated for the data collection process in rural kebeles of Bahir Dar. Two day training about the tool was provided to data collectors and supervisors. Finally, house to house interview was conducted.

3.10.2. Anthropometric measurements

Weight and height measurements was carried out on children aged 6-59 months in all selected households.

Weight measurements were obtained using lightweight SECA mother-infant scales with a digital screen designed and manufactured under the guidance of UNICEF. The weight was measured on barefoot and minimal cloths. For child less than 1 year of age, the “mother-and-baby function” was used to determine the body weight of child while being held in the arms of the mother.

Height measurements were carried out using a Shorr measuring board. Children younger than 24 months were measured for length in recumbent position, and older children were measured while standing. Z-score was used to determine underweight, overweight, stunting and wasting based on WHO Growth Standard-2006 (WHO M. G., 2006).

3.11. Data quality control

To assure the quality of the data, two-day training was given to data collectors and supervisors on the aim of study, content of questionnaire, how to conduct interview and how to measure anthropometric measurements (i.e. weight and height) of children aged 6- 59 months. Pre-test was done on 30 mothers before actual data collection outside the selected kebeles, i.e. in Addis Alem rural kebele but there was no correction or modification of questionnaires after

interview. After data collection, each data collector checked the questionnaires for completeness on daily basis. Each questionnaire was also reviewed daily by supervisors and the principal investigator to check for completeness and consistency of the collected data. After collection, the collected data were kept in the form of file in secure place.

3.12. Data processing and analysis

Data were coded and entered in to Epi-data version 3.1 and exported to SPSS version 20.0 for analysis. Anthropometric measurements were calculated using WHO Anthro software version 3.2.2 and transferred to SPSS version 20.0 for analysis. Missing values were checked and also data cleaning was done by using simple frequency analysis and by sorting. All descriptive statistics were reported. A binary logistic regression analysis was used to assess the association between the dependent variable with each independent variables. Finally, variables, which show association in binary logistic regression at P-Value of less than 0.2, were entered in to multivariable analysis to control the possible effect of confounders. Interactions between variables were also assessed. Model fit was tested with Hosmer–Lemeshow Goodness of Fit test. Odds ratios together with the 95% CI was used to report associations between dimensions of women’s empowerment and child nutritional status. P-value < 0.05 was considered for statistical significance. Results were presented in tabulation, charts and percentage.

3.13. Ethical considerations

The proposal was submitted to the Research ethics committee of Bahir Dar University, Faculty of chemical and food engineering. Ethical clearance was obtained from Bahir Dar University, Faculty of chemical and food engineering, Research Ethics Committee and letter of permission was obtained from Amhara Public Health Institute and Bahir Dar city administration health bureau. The purpose of the study was explained to respondents and verbal informed consent was obtained from the Mothers. Confidentiality of information was maintained by omitting any personal identification from the questionnaires. Respondents were informed about the study and the variety of information needed from them. Chance was given to ask anything about the study and made free to refuse or stop the interview at any moment.

Chapter-4: Results

4.1. Socio-demographic characteristics

In this study, 582 mothers who have a child aged 6-59 months participated, obtaining a 94% response rate. Among the respondents, the mean age of mothers was 28 years (28.47 ± 5.04) and the mean age of mothers at first marriage was 17 years (17.27 ± 4.069). Most of the mothers (99%) were Orthodox Christians and all participants were Amhara in ethnicity. Among the mothers, 48.5% of them did not attend any education, 33.7% of them had attended primary education and 17.9% had attended secondary and above education. More than half of the mothers (77%) were housewives (Table 2).

The mean age of children was 28 months (28.25 ± 13.93) and more than half (51.5%) were males (Table 2).

Table 2: Socio-demographic characteristics of mothers and children in rural kebeles of Bahir Dar, North west Ethiopia, 2019

Characteristics	Number (n=582)	Percent (%)
Maternal age		
15-19	9	1.5
20-24	121	20.8
25-29	227	39
30-34	139	23.9
35-39	66	11.3
40-44	20	3.4
Mean ± SD	28.47 ± 5.04	
Maternal age at first marriage		
<15	190	32.6
15-18	96	16.5
≥18	296	50.9
Mean ± SD	17.27 ± 4.069	
Maternal religion		
Orthodox Christian	576	99
Muslim	6	1
Maternal education level		
No education	282	48.5
Primary level education	196	33.7
Secondary and above education	104	17.9
Maternal occupation		
House wife	448	77
Employed	15	2.6
Merchant	25	4.3
Farmer	70	12
Daily labourer	24	4.1
Total family size		
Median, Range	4, 6 (3-9)	
Number of under five children		
1	519	89.2
≥2	63	10.8
Maternal media exposure (radio/TV) yes no		
Yes	40	6.9
No	542	93.1
Age of child (months)		
6-11	67	11.5
12-23	163	28
24-35	176	30.2
36-47	112	19.2
48-59	64	11
Mean age ± SD	28.25 ± 13.93	
Sex of child		
Male	300	51.5
Female	282	48.5
Birth order		
1 st	223	38.3
2 nd	158	27.1
3 rd or more	201	34.5

Table 2: continued

Characteristics		Number (n=582)	Percent (%)
Breast feeding status	Age of child (months)		
Still breast feeding	6-11	64	15.8
	12-23	154	37.9
	24-35	136	33.5
	36-47	44	10.8
	48-59	8	2
Stop breast feeding	6-11	3	1.7
	12-23	9	5.1
	24-35	40	22.7
	36-47	68	38.6
	48-59	56	31.8
Morbidity status			
	Yes	56	9.6
	No	526	90.4

4.2. Nutritional status of the children

The prevalence of wasted, stunted, underweight and overweight among children were 5.5%, 43.8%, 13.2%, 21.1% respectively.

The prevalence of wasting was 5.7% for female and 5.3% for male children, 56% of female children were stunted, 19.5% of female children were underweight and 25.3% of male children were overweight (Figure 3).

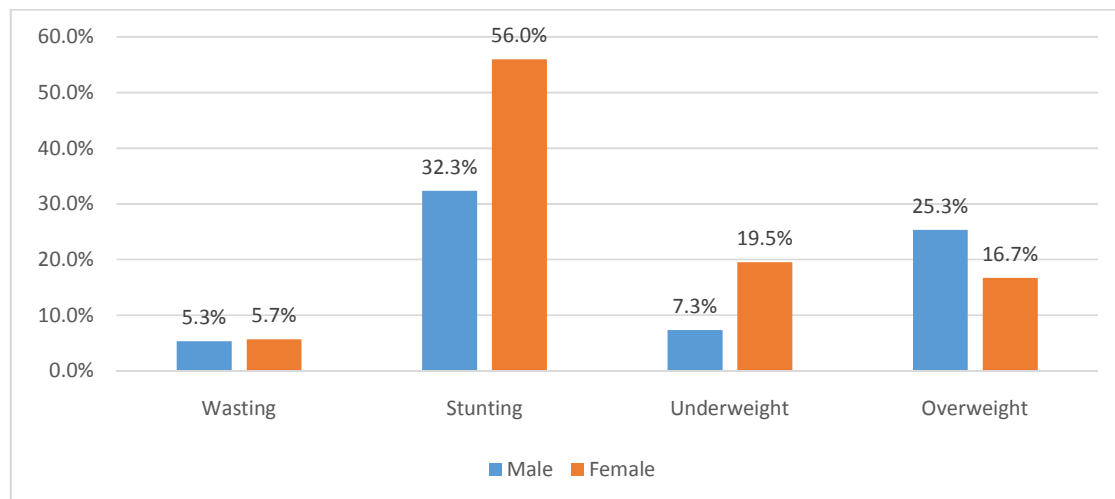


Figure 3: Nutritional status of children aged 6- 59 months grouped by sex in rural kebeles of Bahir Dar, North west Ethiopia, 2019.

The nutritional status of children based on age category showed that between 24- 35 months of age the highest magnitude for wasting, stunting and underweight was seen i.e. 28.1%, 35.7% and 35.1% respectively. For overweight 12- 23 months of age was the highest i.e. 33.3% (Figure 4).

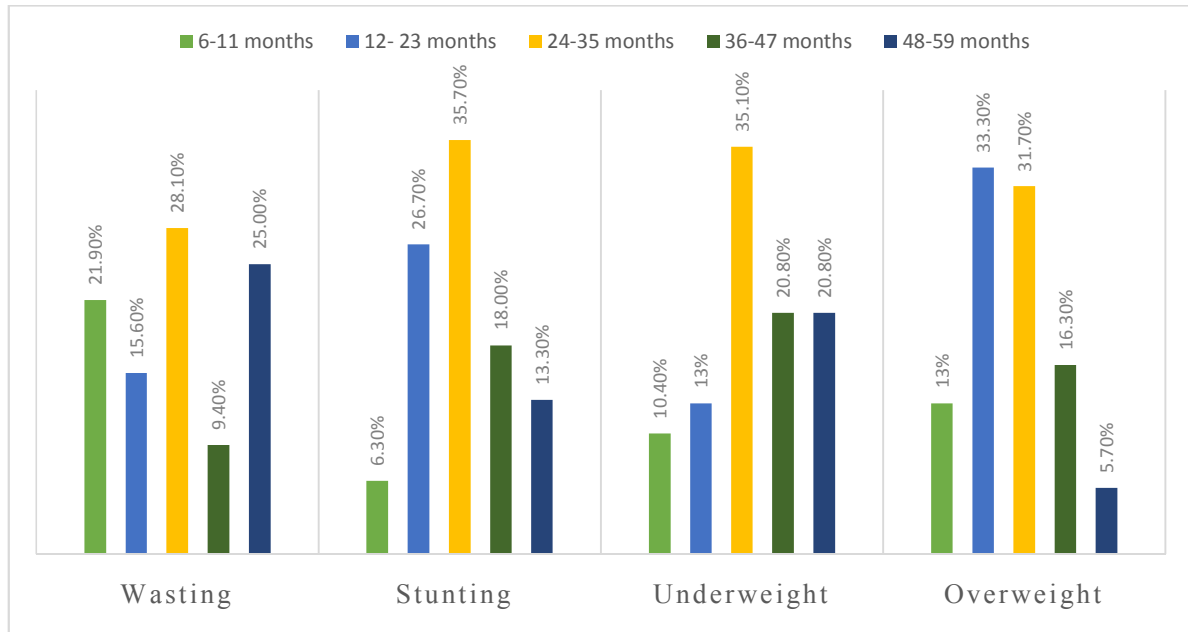


Figure 4: Nutritional status of children aged 6- 59 months grouped by age in months in rural kebeles of Bahir Dar, North west Ethiopia, 2019.

4.3. Women's empowerment level and its dimensions

More than half (53.6%) of the mothers were moderately empowered, 19.6% were at low empowerment level whereas 26.8% were on high empowerment level. From all mothers, 73.7% participated in all three household decision making, 28.5% of mothers were members of community groups, 30.1% of mothers earned cash, and more than half (69.8%) of mothers were owners of house or land (Table 5).

Table 3: Women’s empowerment level and its dimensions in rural kebeles of Bahir Dar, North west Ethiopia, 2019.

Characteristics	Number	Percent (%)
Mother’s empowerment level		
Low	114	19.6
Moderate	312	53.6
High	156	26.8
Mother’s involvement in three household decision making		
No participation	43	7.4
Participate in one or two decisions	110	18.9
Participate in all three decisions	429	73.7
Mother’s membership in community groups		
Yes	166	28.5
No	416	71.5
Mother’s cash earnings		
Yes	175	30.1
No	407	69.9
Mother’s ownership of house/land		
Yes	406	69.8
No	176	30.2
Mother’s educational status		
No education	282	48.5
Primary level education	196	33.7
Secondary and above	104	17.9

4.4. Association between women’s empowerment and child nutritional status

Binary logistic regression was executed to assess the association between mother’s empowerment and other control variables with child nutritional status. The results showed that mother’s empowerment and birth order of the child were independently associated with wasting. Mother’s empowerment level, family size, media exposure, child sex and childbirth order were associated with stunting. Mother’s occupational status and child sex were associated with underweight. Mother’s occupational status, child age, child sex and birth order were associated with overweight.

Variables which showed significant association with child nutritional status with $P < 0.2$ at 95% CI were further analysed with multivariate logistic regression. Model fit was tested with Hosmer and Lemeshow Goodness of Fit test and all models were fit with $P > 0.4$. Multi-collinearity test was done, there was no problem of collinearity among independent variables with VIF for wasting, stunting, underweight and overweight were 2.01, 1.2, 1.13 and 1.05 respectively.

Mothers who were in low empowerment level were six times (AOR=6.023; 95% CI: 1.227-29.549) more likely to have wasted children as compared to highly empowered mothers. There was a significant association between children's nutritional status and dimensions of mother's empowerment. Those mothers who owned house or land were 64.3 % (AOR =0.357; 95% CI: 0.168 - 0.761) and they were 36% (AOR=0.643; 95% CI: 0.438 - 0.944) less likely to have wasted and stunted children respectively compared to mothers who did not own house or land (Tables 6& 7).

Table 4: Results of the logistic regression model analysing the relation between women's empowerment and childhood wasting.

Explanatory variable	Wasting		COR (95% CI)	P-value	AOR (95% CI)	P-value
	Yes	No				
Mothers empowerment level						
Low	8	106	5.811 (1.21, 27.908)**	0.028	6.023 (1.227, 29.549)**	0.027
Moderate	22	290	5.841 (1.356, 25.169)**	0.018	6.37 (1.46, 27.787)**	0.014
High	2	154	Ref			
Dimensions of mother's empowerment						
<i>Mothers involvement in household decision making</i>						
Didn't participate in any decisions	5	38	2.434 (0.872, 6.794)*	0.089	2.385 (0.819, 6.95)	0.111
Participate in one or two decisions	5	105	0.881 (0.326, 2.381)	0.803	0.789 (0.283, 2.204)	0.652
Participate in all three decisions	22	407	Ref			
<i>Mothers membership in community groups</i>						
A member of a group	19	397	0.563 (0.272, 1.168)	0.123	0.469 (0.211, 1.046)*	0.064
Didn't a member of any group	13	153	Ref			
<i>Mothers ownership of house or land</i>						
Own house or land	16	390	0.41 (0.2, 0.84)**	0.015	0.357 (0.168, 0.761)***	0.008
Didn't own house or land	16	160	Ref			
Birth order						
1st	8	215	0.794 (0.3, 2.098)	0.641	0.772 (0.286, 2.083)	0.61
2nd	15	143	2.238 (0.952, 5.258)*	0.065	2.172 (0.911, 5.175)*	0.08
3rd or more	9	192	Ref			

Sig. *0.1 **0.05 ***0.01
 Ref = reference category

Mothers who were moderately empowered were 44% less likely to have stunted children compared to highly empowered mothers (AOR=0.559; 95% CI: 0.365-0.857). However, there was no significant association between mother's empowerment and children's underweight and overweight status. Mothers who attended secondary and above education were 43% at less risk of having stunted child when compared to mothers who didnot attend any education (AOR=0.57; 95% CI: 0.348- 0.933)(Table 7).

Table 5: Results of the logistic regression model analysing the relation between women's empowerment and childhood stunting.

Explanatory variable	Stunting		COR (95% CI)	P-value	AOR (95% CI)	P-value
	Yes	No				
Mothers empowerment level						
Low	49	65	0.735 (0.452, 1.194)	0.214	0.596 (0.347, 1.022)*	0.06
Moderate	127	185	0.669 (0.455, 0.985)**	0.042	0.559 (0.365, 0.857)***	0.008
High	79	77	Ref			
<i>Dimensions of mother's empowerment</i>						
<i>Mothers involvement in household decision making</i>						
Didn't participate in any decisions	21	22	1.135 (0.606, 2.125)	0.693	1.259 (0.659, 2.405)	0.485
Participate in one or two decisions	38	72	0.627 (0.405, 0.971)**	0.036	0.814 (0.515, 1.287)	0.378
Participate in all three decisions	196	233	Ref			
<i>Mothers membership in community groups</i>						
A member of a group	162	254	0.501 (0.348, 0.721)***	0.0001	0.535 (0.358, 0.8)***	0.002
Didn't a member of any group	93	73	Ref			
<i>Mothers cash earnings</i>						
Earn cash	161	246	0.564 (0.394, 0.806)***	0.002	0.76 (0.511, 1.129)	0.174
Didn't earn cash	94	81	Ref			
<i>Mothers ownership of house or land</i>						
Own house or land	61	115	0.58 (0.402, 0.836)***	0.004	0.643 (0.438, 0.944)**	0.024
Didn't own house or land	194	212	Ref			
<i>Mothers education</i>						
Attend primary level education	91	105	0.985 (0.683, 1.419)	0.935	1.291 (0.869, 1.919)	0.206
Attend secondary and above education	32	72	0.505 (0.313, 0.814)***	0.005	0.57 (0.348, 0.933)**	0.025
Didn't attend education	132	150	Ref			
<i>Total family size</i>						
≥4	140	212	0.66 (0.472, 0.923)**	0.015	0.686 (0.292, 1.612)	0.387
≤5	115	115	Ref			
<i>Media exposure</i>						
No	242	300	1.675 (0.846, 3.317)	0.139	1.978 (0.94, 4.163)*	0.073
Yes	13	27	Ref			
<i>Child sex</i>						
Male	97	203	0.375 (0.268, 0.525)***	0.000	0.33 (0.23, 0.472)***	0.000
Female	158	124	Ref			
<i>Birth order</i>						
1 st	86	137	0.622 (0.422, 0.915)**	0.016	0.99 (0.393, 2.495)	0.984
2 nd	68	90	0.748 (0.492, 1.137)	0.175	1.012 (0.418, 2.452)	0.979
3 rd or more	101	100	Ref			

Sig. *0.1 **0.05 ***0.01

Ref = reference category

Mothers who were members of community groups were 46.5% (AOR=0.535; 95% CI: 0.358 - 0.8) and 51.1% (AOR=0.489; 95% CI: 0.279 - 0.857) less likely to have stunted and underweighted child respectively in comparison with mothers who were not members of community groups (Tables 7 & 8).

Table 6: Results of the logistic regression model analysing the relation between women's empowerment and childhood underweight.

Explanatory variables	Underweight		COR (95% CI)	P-value	AOR (95% CI)	P-value
	Yes	No				
Mothers empowerment level						
Low	18	96	1.437 (0.711, 2.904)	0.312	1.828 (0.853, 3.914)	0.121
Moderate	41	271	1.16 (0.642, 2.094)	0.623	1.302 (0.692, 2.451)	0.413
High	18	138	Ref			
<i>Dimensions of mother's empowerment</i>						
<i>Mothers involvement in household decision making</i>						
Didn't participate in any decisions	9	34	1.693 (0.772, 3.713)	0.189	1.902 (0.846, 4.278)	0.12
Participate in one or two decisions	10	100	0.64 (0.316, 1.297)	0.215	0.658 (0.316, 1.367)	0.262
Participate in all three decisions	58	371	Ref			
<i>Mothers membership in community groups</i>						
A member of a group	48	368	0.616 (0.373, 1.017)*	0.058	0.489 (0.279, 0.857)**	0.012
Didn't a member of any group	29	137	Ref			
<i>Mothers ownership of house or land</i>						
Own house or land	30	146	1.57 (0.955, 2.579)*	0.075	1.677 (0.99, 2.84)*	0.055
Didn't own house or land	47	359	Ref			
<i>Mothers education</i>						
Attend primary level education	36	246	1.376 (0.656, 2.883)	0.398	1.41 (0.66, 3.014)	0.375
Attend secondary and above education	31	165	1.766 (0.829, 3.763)	0.141	1.996 (0.91, 4.376)*	0.085
Didn't attend education	10	94	Ref			
<i>Maternal employment status</i>						
Not Employed	64	384	1.551 (0.826, 2.914)	0.172	0.657 (0.336, 1.284)	0.219
Employed	13	121	Ref			
<i>Child sex</i>						
Male	22	278	0.327 (0.193, 0.552)***	0.000	0.337 (0.198, 0.576)***	0.000
Female	55	227	Ref			

Sig. *0.1 **0.05 ***0.01
Ref = reference category

In contrast to mothers who didn't earn cash, those who earned cash were 3 times more likely to have overweighted child (AOR= 2.959; 95% CI: 1.872- 4.679) (Table 9).

Table 7: Results of the logistic regression model analysing the relation between women's empowerment and childhood overweight.

Explanatory variable	Overweight		COR (95% CI)	P-value	AOR (95% CI)	P-value
	Yes	No				
Mothers empowerment level						
Low	24	90	0.8 (0.449, 1.426)	0.449	0.78 (0.413, 1.47)	0.442
Moderate	60	252	0.714 (0.451, 1.13)	0.151	0.687 (0.417, 1.131)	0.14
High	39	117	Ref			
Dimensions of mother's empowerment						
<i>Mothers cash earnings</i>						
Earn cash	59	116	2.726 (1.806, 4.114)***	0.000	2.959 (1.872, 4.679)***	0.000
Didn't earn cash	64	343	Ref			
<i>Mothers education</i>						
Attend primary level education	68	214	2.043 (1.093, 3.819)**	0.025	1.725 (0.907, 3.281)*	0.096
Attend secondary and above education	41	155	1.7 (0.879, 3.29)	0.115	1.653 (0.838, 3.26)	0.147
Didn't attend education	14	90	Ref			
Maternal employment status						
Not Employed	83	365	0.534 (0.344, 0.83)***	0.005	0.569 (0.344, 0.941)**	0.028
Employed	40	94	Ref			
Child age						
<24	57	173	1.428 (0.956, 2.133)*	0.082	1.739 (1.123, 2.692)**	0.013
≥24	66	286	Ref			
Child sex						
Male	76	224	1.696 (1.129, 2.549)**	0.011	1.585 (1.043, 2.408)**	0.031
Female	47	235	Ref			
Birth order						
1st	48	175	0.874 (0.555, 1.378)	0.563	1.045 (0.629, 1.735)	0.866
2nd	27	131	0.657 (0.388, 1.112)	0.118	0.803 (0.458, 1.407)	0.443
3rd or more	48	153	Ref			

Sig. *0.1 **0.05 ***0.01
Ref = reference category

Chapter-5: Discussion

The study revealed that mothers who were in low empowerment level were six times more likely to have wasted children as compared to highly empowered mothers. This finding was consistent with a study from Nepal that found that low empowered mothers were ten times more likely to have wasted children (Shiwakoti, Devkota, & Paudel, 2017). Similarly, a study in Bangladesh showed that mother's decisionmaking in all household decisions protects the child 32% less likely from wasting (Mosfequr, Umme, & Abdul, 2015).

In this study, mothers who were in moderate empowerment level who included in decision making were 44% less likely to have stunted children. Likewise a study from Bangladesh showed that mothers participated in making all household decisions were 15% times (AOR= 0.85) less likely to have stunted child (Mosfequr, Umme, & Abdul, 2015). Another study in Bangladesh also revealed that children of women who did not decide on large household purchases were more likely to be stunted and children of women who did not take decisions on own health were twice more likely to be stunted (Ankita & Aparajita, 2017). Similarly a study in Afghanistan found out that lack of maternal autonomy was associated with the occurrence of linear growth retardation (AOR = 1.38) (Taufiq, et al., 2008). Correspondingly, a study in India found that one SD increase in maternal autonomy score is associated with a 10 percent reduction in the prevalence of stunting (Wiji, Anjor, & Nisha, 2016). However, our finding was opposite from a study done in Brazil which showed that women with high decision making autonomy (AOR = 1.856) were significantly more likely to have a stunted child compared to women with low decision making autonomy (Pamela & Daniel, 2013). This discrepancy may be due to contextually of women's empowerment and this study used composite index of empowerment. However, the study from Brazil used only decision making power score.

In this study, mothers who owned house or land were 64.3 % times and they were 36% times less likely to have wasted and stunted children respectively compared to mothers who did not own house or land. This may be due to women's control over house or land may enhance women's economic security and strengthen their control over resources within the household. These resources concentrated in the hands of women may contribute to higher spending on children, which can improve children's health and nutritional status.

In this study, mothers who were members of community groups were 46.5% and 51.1% times less likely to have stunted and underweighted child respectively in comparison with mothers

who were not members of community groups. This may be due to women's groups assist to create a comfortable space where women can voice their opinions and share experiences with colleague members that can build their confidence, gains support from community and they may be better able to make decisions that promote her own health and that of their children.

In this study, mothers who attended secondary and above education were 43% at less risk of having stunted child when compared to mothers who did not attend any education. This finding was consistent with a study from eastern India and Bangladesh which indicated that when the women were more educated the chance of stunting decreases by 30% ($p < 0.01$) in both areas (Ankita & Aparajita, 2017). This result may be due to education may enable women to make independent decisions, to be accepted by other household members, and to have greater access to household resources that are important to nutritional status of their children.

In this study, mothers who earned cash were 3 times more likely to have overweighed child. This may be due to firstly when mothers participate in cash earning activities they may not have enough time for childcare, thus they may not feed their child nutritious food and their child may not involve in physical activities like playing with children if the child was with his mother in the working place. Secondly, when mothers earn cash they may buy cheap, unhealthy, junk street foods for their children on their way to home which can be a cause for overweight.

Chapter-6: Conclusion and recommendations

6.1. Conclusion

Overall, the study showed strong association between women's empowerment and their children's nutritional status. There was a six-fold increase in odds of wasting and 44% decrease in odds of stunting among mothers who were in low empowerment level and moderate empowerment level respectively. However, there was no significant association between underweight and overweight status of children's and women's empowerment.

6.2. Recommendations

- ✓ Equal access of education and promotion should be given for women by giving more attention for barriers of women not to go to education such as early marriage, childcare, far schools and cost of education.
- ✓ Promote education about healthy eating habits through public-health messages, increase funding for public-health campaigns and nutrition counselling in health care settings.
- ✓ Health extension workers should link mothers in the community groups and should encourage participating all the time then she can raise her voice freely, she can decide by herself, she can communicate other members of the group or health professionals for a better nutrition status of her child.
- ✓ Promoting women's groups in nutrition advocacy and skill transfer.
- ✓ Promoting women's empowerment and integrating with nutrition programs, policies and plans.
- ✓ The questions used in this study were not comprehensive in explaining the various dimensions of women's empowerment indicators, so it is recommended that additional qualitative research be conducted to gain further understanding in this theme.

Chapter-7:References

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Annexes

7.1. Questionnaires participant consent form

INTRODUCTION: **how are you?** My name is _____. I am working as data collector in a survey conducted by Emebet Gashaw in.....Keble. The program supported in collaboration of Bahir Dar University, Faculty of Chemical and Food Engineering, Department of Applied Human Nutrition to assess the association between women's empowerment and child nutritional status in rural kebeles of Bahir Dar. You are invited to participate in this study so thank you for your contribution.

STUDY TOPIC: The Association between Women's Empowerment and Children's Nutritional Status in Rural Kebeles of Bahir Dar, North west Ethiopia.

GENERAL OBJECTIVES: To determine the association between women's empowerment and child nutritional status in rural kebeles of Bahir Dar, Northwest Ethiopia, 2018/2019.

STUDY PERIOD: from To.....

PROCESS OF STUDY: to completion this study there are prepared different directly related questions for each asked questions you should respond correctly. For unclear questions, if you need clarification you can ask any time. To complete these questions at list it takes 20-25 minutes.

ADVANTAGE AND DISADVANTAGE: For your participation in this study, there are no direct benefits but your honest answer to these questions is very important for the purpose of the study. Additionally because of your participation in this study, I am sure that there are no problems. You do not have to answer any questions that you do not want to answer and you may end this interview at any time you want.

CONFIDENTIALITY: Your name will not be written on this form and will never be used with any information you may tell me. Your response on the questions will not disclose other than the principal investigator.

PARTICIPATION: your participation in this study is based on your interest. Additionally after you start to respond, the questions if you are not interested for one or more questions you can jump and left it and by doing so there will not influence from the community or other body.

Do you have any questions?

May I begin the interview now?

Signature of the interviewer certifying that informed consent has been given verbally by
respondent _____.

Questionnaire identification number / _____ / _____ /

Interviewer code _____ Name _____

Date of interview _____

Checked by supervisor; Name _____, Signature _____

7.2. Questionnaire template

Part 1: Socio-demographic characteristics of Mother.

Question code	Question/ variable	Response	Skip
101	Maternal age?	.....year	
102	Maternal age at first marriage?	.....year	
103	Maternal religion?	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. Others (specify) -----	
104	Maternal ethnicity?	1. Amhara 2. Oromo 3. Tigre 5. Others (specify) -----	
105	Maternal educational status?	1. unable to read and write 2. Read and write only 3. Primary 4. Secondary 5. Preparatory 6. Certificate and above	
106	Maternal occupation?	1. House wife 2. Government employed 3. Private employed 4. Merchant 5. Farmer 6. Daily laborer 7. Student 8. Other(specify)-----	
107	Father's educational status?	1. unable to read and write 2. Read and write only 3. Primary	

		4. Secondary 5. Preparatory 6. Certificate and above	
108	Father's occupation?	1. Farmer 2. Government employed 3. Private employed 4. Merchant 5. Farmer 6. Daily laborer 7. Student 8. Other(specify) -----	
109	Total family size	.....
110	Number of children in the house who are < 5 yrs?	.....
111	Average monthly income of the family?	.....ETB	
112	Do you have radio/television?	1. Yes 2. No -----	If no skip to 119
113	Is it functional?	1. Yes 2. No -----	
114	Do you listen radio or television news/ programs?	1. Yes 2. No -----	
115	How often do you listen?	----- times per week	
116	Have you heard about women's nutritional status?	1. Yes 2. No	
117	Have you heard about children's nutritional status?	1. Yes 2. No	
118	Have you heard about women's empowerment?	1. Yes 2. No	
119	Do you have farmland?	1. Yes 2. No	
120	Do you have livestock?	1. Yes 2. No	

121	Cultivating dummy vegetables in the garden?	1.Yes 2.No	
122	Ownership of animal like cows, sheep, goats and oxen?	1.Yes 2.No-----	124
123	If yes to quos 123, does have milk in the house and feed your child?	1.Yes 2.No	
124	Do you have chicken and egg in the house?	1.Yes 2.No	

Part 2: children related factors questions

Question code	Question/ variable	Response	Skip
201	Age of the index child in months?	..... months	
202	Sex of the child?	1. Male 2. Female	
203	Weight of child?	..... kg	
204	Height of child?	..... cm	
205	Birth order?		
206	Breast feeding status currently?	1.still breast feed----- 2.stop breast feeding-----	207 208
207	If yes to question 206, how many times did the child eat additional solid, semisolid or soft foods during the day and the night with in 24hrs?	1.none 2.one 3.two 4.three 5. four and above	
208	If stop breast feeding in question 206, how many times did the child eat additional solid, semisolid or soft foods during the day and the night with in 24hrs?	1.none 2.one 3.two 4.three 5. four and above	

209	Do you know when do you start complimentary food for your child?	1. Yes 2. No	
210	At what age did you start complementary feeding?	..... months	
211	Morbidity status in the preceding week	1.Yes 2.No-----	213
212	If yes for question 211, what?	1.diarrhea 2.fever 3.cough 4.AURT's 5.Others	
213	Do you have growth monitoring follow up?	1.yes 2.No	
214	Which immunization service did receive? (more than one answer is possible)	1. BCG 2. PNTA 1 + Polio 1 3. PNTA2 + Polio 2 4. PNTA 3 + Polio 3 5. PCV 1 6. PCV 2 7. PCV 3 8. Rota 1 9. Rota 2 10. Measles 11. Vitamin A	

Part 3: Women's Empowerment related characteristics

Question code	Question / variable	Response	Skip
301	Maternal education level?	7. unable to read and write 8. Read and write only	

		<ul style="list-style-type: none"> 9. Primary 10. Secondary 11. Preparatory 12. Certificate and above 	
302	Do you own house or land either alone or jointly with your husband?	<ul style="list-style-type: none"> 1. Alone 2. Jointly with husband 3. Does not own 	
303	Maternal cash earnings	<ul style="list-style-type: none"> 1. Yes she earn in cash or in-kind. 2. No she do not earn. 	
304	Maternal membership in community groups	<ul style="list-style-type: none"> 1. Yes she is a member 2. No she is not 	
305	Who usually makes decisions about health care for yourself: you, your (husband/partner), you and your (husband/partner) jointly, or someone else?	<ul style="list-style-type: none"> 1. mother herself 2. husband/partner 3. mother and husband/partner jointly 4. someone else 	
306	Who usually makes decisions about making major household purchases?	<ul style="list-style-type: none"> 1. Mother 2. husband/partner 3. mother and husband/partner jointly 4. someone else 	
307	Who usually makes decisions about visits to your family or relatives?	<ul style="list-style-type: none"> 1. Mother 2. husband/partner 3. mother and husband/partner jointly 4. someone else 	

7.2.የአማራጭ ቅጂ የመረጃ ቅፅ የስምምነትና መጠይቅ

7.2.1. የመረጃቅፅናየስምምነት

መግቢያ:-እንደትነታት ?እኔስሜ -----ይባላል እኔ በእናንተ ቀበሌ ወ/ሪት እመቤትጋሻው በምትሰራው ጥናት የመረጃ ሰብሳቢነት፡፡ጥናቱ በባህርዳር ዩኒቨርሲቲ በኬሚካል እና ስነምግብ ምህንድስና ፋካልቲ ትብብርና ድጋፍ በሴቶች የሀይል አቅም መጎልበት እና በልጆች የአመጋገብ ሁኔታ መካከል ያለውን ግንኙነት ለመገምገም በባህርዳር ገጠር ቀበሌወች ይካሄዳል፡፡እርስዎ በዚህ ጥናት ተሳታፊ እንዲሆኑ ተጋብዘዋል፡፡ ስለዚህ ለሚያደርጉት አስተዎጾ አመሰግናለሁ፡፡

የጥናቱርዕስ:-

የሴቶች የሀይል አቅም መጎልበት እና የልጆች የአመጋገብ ሁኔታ መካከል ያለው ግንኙነት በባህርዳር ገጠር ቀበሌወች ሰሜን ምዕራብ ኢትዮጵያ፡፡

የጥናቱአላማ:-

በባህርዳርገጠርቀበሌወችየሴቶችየሀይልአቅምመጎልበትእናየልጆችየአመጋገብሁኔታመካከልያለውንግንኙነትመገምገም፡፡

የጥናቱጊዜ:-የካቲት /2011-9/ም

የጥናቱሂደት:-ለዚህጥናትመሳካትበቀጥታግንኙነትያላቸውየተለያዩመጠይቆችተዘጋጅተዋል፡፡

ለምጠይቅዎጥያቄየሚያምኑበትንናትክክለኛመልስዎንእንዲሰጡኝእጠይቃለው?

ለማቀርባቸውጥያቄዎችተጨማሪማብራሪያክፈለጉበማንኛውንምጊዜመጠየቅይችላሉ፤

ይህመጠይቅለማጠናቀቅቢበዛለ20 ደቂቃአብረንእንቆያለን፡፡

የጥናቱጥቅምናጉዳት:-በዚህጥናትበመሳተፍዎቀጥተኛጥቅምአያገኙም፡፡

ግንየእርስዎእውነተኛመልስለዚህጥናትበጣምጠቃሚነው፡፡

በተጨማሪምበጥናቱበመሳተፍዎምንምአይነትችግርናጉዳትአይደርስብዎትም፤

መመለስያልፈለጉትንጥያቄአለመመለስይችላሉ፡፡እናምመጠየቁንበፈለጉትጊዜካልተመቸዎትማቆምይችላሉ፡፡

ሚሲጢራዊነት:-

በመጠይቁላይየእርስዎስምአይሰፍርም፡፡እርስዎየነገሩኝነገርለሌላነገርአይውልም፡፡

የተናገሩትነገርከጥናቱአጥኝበስተቀርለሌላተላልፎአይሰጥም፡፡

ተሳትፎ:-

በጥናቱለመሳተፍየእርስዎፍላጎትብቻነው፡፡

በተጨማሪምመጠይቁንከጀመሩበኋላበአንድወይምበሁለትጥያቄዎችላይለመመለስፍላጎትከሌለዎትመዘለልይቻላል፡፡ይህንንበማድረግዎተፅኖአይደረግብዎትም፡፡

- በመጠይቁከተስማሙመቀበልካልተስማሙወደሚቀጥለውእለፉ
- የቃልስምምነትማድረግንበፈርማየአረጋግጣለሁ-----
 የመጠይቁመለያቁጥር -----
 የጠያቂውኮድ-----ስም-----
 መጠይቁየተሞላበትቀን -----
 ያረጋገጠውሱፕርቫይዘርስም-----

ክፍል 1: የእናቶችየማህበራዊ፤መሰረታዊጉዳዮችንእናኢኮኖሚያዊሁኔታዎችየሚዳስሱመጠይቆች

የመጠይቅ ድ	መጠይቅ	መልስ	ይዘት
101	የእናትእድሜ (በአመት)	-----	
102	የእናትእድሜበመጀመርያጋብቻ	-----	
103	የእናትሀይማኖት?	1. ኦርቶዶክስ 2. ሙሲሊም 3. ፕሮቴስታንት 4. ካቶሊክ	

		5. ሌላይገለፅ-----	
104	የእናት-ብሄር	1. አማራ 2. ኦሮሞ 3. ትግሬ 5. ሌላይገለፅ-----	
105	የእናት-የትምህርት-ደረጃ	1. ማንበብ-መጻፍ-የማትችል 2. ማንበብና-መጻፍ-ብቻ 3. አንደኛ-ደረጃ-የጠናቀቀች 4. ሁለተኛ-ደረጃ-የጠናቀቀች 5. መሰናዶ-የጠናቀቀች 6. ኮሌጅና-ከዛብላይ	
106	የእናት-ስራ	1. የቤት-አመቤት 2. የመንግስት-ስራ-ተኛ 3. የግል-ተቀጣሪ 4. ነጋዴ 5. ገበሬ 6. የቀንሰራ-ተኛ 7. ተማሪ 8. ሌላይገለፅ -----	
107	የአባት-የትምህርት-ደረጃ	1. ማንበብ-መጻፍ-የማይችል 2. ማንበብና-መጻፍ-ብቻ 3. አንደኛ-ደረጃ-የጠናቀቀ 4. ሁለተኛ-ደረጃ-የጠናቀቀ 5. መሰናዶ-የጠናቀቀ 6. ኮሌጅና-ከዛብላይ	
108	የአባት-ስራ	1. ገበሬ 2. የመንግስት-ስራ-ተኛ 3. የግል-ተቀጣሪ 4. ነጋዴ 5. የቀንሰራ-ተኛ 6. ተማሪ 7. ሌላይገለፅ -----	
109	አጠቃላይ-የቤተሰብ-ብዛት	.....
110	ከአምስት-አመት-በታች-ህጻናት-ብዛት	.....
111	አማካይ-ወር-ሀዋይ-የቤተሰብ-ገቢ	.....አ.ት-ዩ.ጽ.ያ-ብር	
112	ራድዮ-ቴሌቪዥን-አላችሁ	1. አዎ 2. የለም -----	119

113	ካለይሰራል ?	1.አዎ 2.የለም	
114	ዜናወይምፕሮግራሞችታያለሽ/ ታዳምጫለሽ ?	1.አዎ 2.የለም	
115	በሳምንትምንያክልጊዜታያለሽ/ታ ዳምጫለሽ ?	----- በሳምንት	
116	ስለሴቶችየአመጋገብሁኔታሰምተ ሽታውቂያለሽ?	1.አዎ 2.የለም	
117	ስለህፃናትየአመጋገብሁኔታሰም ተሽታውቂያለሽ?	1.አዎ 2.የለም	
118	ስለሴቶችየሀይልአቅምማጎልበት/ ሴቶችንማብቃትሰምተሽታውቂያ ለሽ?	1.አዎ 2.የለም	
119	የሚታረስመሬትአላችሁ ?	1.አዎ 2.የለም	
120	የቤትእንስሶችአላችሁ?	1.አዎ 2.የለም	
121	በግቢውየተለያዩየጓሮአትክልትት ዘራላችሁ ?	1. አዎ 2 የለም	
122	የእንስሳትባለቤትናችሁለምሳሌበ ግፍየልበግናበሬ ?	1. አዎ 2. የለም	124
123	ወተትከቤትካለእናለልጅትሰጡት አላችሁ ?	1. አዎ 2. የለም	
124	በቤትውስጥዶሮእናእንቁላልአለ?	1. አዎ 2. የለም	

ክፍል 2: የህጻኑን አጋላጭ ሁኔታ የሚዳስሱ መጠይቆች

የመጠይቅ ኮድ	መጠይቅ	መልስ	ዝለል
201	የህፃኑ እድሜ በወር	-----ወር	
202	ጾታ	1. ወንድ 2. ሴት	
203	የህፃኑ ክብደት	.....ኪሎግራም	
204	የህፃኑ ቁመት	.....ሴንቲሜትር	
205	ስንተኛ ልጅ ነው ?	.....
206	እስካሁን ጡት ታጠቢ ዋለሽ ?	1. አዎ 2 የለም	

207	ጥያቄቁጥር206 አዎከሆነበቀንምንያህልጊዜ ተጨማሪምግብይመግቡታ ል /በ24 ስአትውስጥ?	1.የለም 2.አንድ 3.ሁለት 4.ሶስት 5. አራትናከዚያበላይ	
208	ጥያቄቁጥር 206 የለምከሆነበቀንምንያህልጊ ዜተጨማሪምግብይመግቡ ታል /በ24 ስአትውስጥ ?	1.የለም 2.አንድ 3.ሁለት 4.ሶስት 5.አራትናከዚያበላይ	
209	ተጨማሪምግብመቼእንደ ሚጀመርታውቂያለሽ?	1.አዎ 2.የለም	
210	መቸተጨማሪምግብጀመረ?	----- ወር	
211	ባለፈው 24 ስአትውስጥታሞነበር?	1.አዎ 2.የለም-----	213
212	ጥያቄቁጥር 211 አዎከሆነምን?	1.ተቅማጥ 2.ትኩሳት 3.ሳል 4.የመተንፈሻአካላትበሽታ 5. (ሌላ)-----	
213	የእድገትክትትልይደረግለት ነበር ?	1.አዎ 2የለም	
214	የትኛውክትትትተከትቧል(ከ አንድበላይመምረጥይቻላል ?ካርዱይታይ	12. የሳንባነቀርሳክትባት 13. ፀረ-አምስት-1 ፖሊዮ 1 14. ፀረ-አምስት 2+ፖሊዮ2 15. ፀረ-አምስት 3+ፖሊዮ3 16. የሳንባምችክትባት 1 17. የሳንባምችክትባት 2 18. የሳንባምችክትባት3 19. የተቅማጥክትባት-1 20. የተቅማጥክትባት-2 21. የኩፍኝክትባት 22. ቫይታሚንኤ	

ክፍል 3: የሌቶች የሀይል አቅም ማሳልበት የሚዳስሱ ጥያቄዎች

የመጠይቅ ክፍል	መጠይቅ	መልስ	ዝልል
301	የእናት የትምህርት ደረጃ	1. ማንበብ መጻፍ የማትችል 2. ማንበብና መጻፍ ብቻ 3. አንደኛ ደረጃ ያጠናቀቀች	

		4. ሁለተኛ ደረጃ ያጠናቀቀች 5. መሰናዶ ያጠናቀቀች 6. ኮሌጅና ከዛባላይ	
302	ቤት ወይም መሬት በማንስም ነው ባለቤትነቱ?	1. በሚስት ብቻ 2. በባል እና ሚስት በጋራ 3. በባል ብቻ	
303	የእናት የገንዘብ ገቢ ማግኘት	1. አወጣጥ ራስ ገንዘብ / በአይነት ገቢ ታገኛለች 2. የለም ገቢ አታገኝም	
304	በማህበረሰብ ቡድኖች (የእናቶች ቡድን፣ 1 ለ 5 ቡድን) ውስጥ የእናት አባልነት	1. አወ አባል ናት 2. የለም አባል አደለችም	
305	ስለ አንድ የጤና እንክብካቤ በአብዛኛው ንጊቱ ውሳኔ የሚወስነው ማነው?	1. እናት ብቻ 2. ባል / የትዳር አጋር ብቻ 3. ባል እና ሚስት በጋራ 4. ሌላ ሰው	
306	በቤት ውስጥ የናዋና ግዢዎችን ለመፈጸም ውሳኔ የሚወስነው ማነው?	1. እናት ብቻ 2. ባል / የትዳር አጋር ብቻ 3. ባል እና ሚስት በጋራ 4. ሌላ ሰው	
307	ቤተሰብ ወይም ዘመድ መገባዘን ስትፈልገው ውሳኔ የሚወስነው ማነው?	1. እናት ብቻ 2. ባል / የትዳር አጋር ብቻ 3. ባል እና ሚስት በጋራ 4. ሌላ ሰው	