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The effect of maternal work on the nutritional status of mothers and children

By

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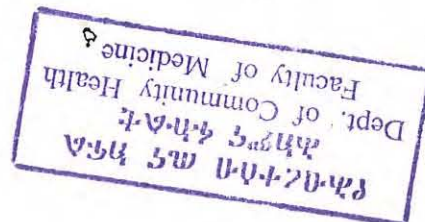
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Abbreviation

BMI	Body Mass index
MUAC	Mid-upper-arm-circumfrance
WHZ	Weight-for-height Z-score
WAZ	Weight-for-age Z-score
WHZ	Weight-for-age Z-score
NCHS	National center for health statistic

Abstract

Maternal work has been seen to have two contradictory effect on child nutrition-via increasing income and decreasing time available in the household. The net effect will depend on the decision making pattern of the household and the adequacy and quality of child care substitute. A sample of 422 mothers and their children were selected in the rural town of Butajira through household survey to examine the effect of working for profit/gain on nutritional status of both the mother and children. Result showed that children of working mothers had a better nutritional status [OR(95%CI): 0.38 (0.19,0.76)] however working mothers themselves were at a risk of being malnourished compared to non-working mothers (95%CI): 1.62 (1.05, 2.5). The decision making pattern and the child care substitute did not show any effect on the overall result. In the attempt to improve the nutritional status of children , the encouragement of maternal involvement in income generating activities is indispensable. Working mothers in the informal work needs to be considered in any nutritional intervention programme as they are likely to be at risk of being malnourished.

1.0. INTRODUCTION

The majority of African women are poor largely because of their limited access to and control of productive resources (1,2). Increasingly, women's participation in economic production has been recognized as essential for the survival of poor households (2,3). African women, produce as much as 80% of the food, and supplement family income by working in the formal and informal sectors as traders and producers (4).

On global basis 42% of women over age 15 are in the labour force (5,6). Economic recession and the severe food production crisis that exist throughout much of sub-Saharan Africa have further intensified responsibility of women (7,8). Thus women confront the need to combine economically productive work with the care and nurturing of their children (8).

In developing countries, the percentage of women in the paid labour force increased from 28% in 1950 to 32% in 1985 (7,8,9). In addition, estimates of households headed by women range from almost half in Botswana, to a Third in Jamaica and to a minimum of 10% in most Arab Middle-East countries (8).

In Ethiopia, in the rural area 85% of the women involved in agricultural work while in the urban area 30% of the low-paid factory worker were women and only 17.9% of them were worked in the formal work(34).

It is widely recognized that the collective state of ill health among women and children in developing countries results from the joint influences of nutritional, biological, and social deprivation (10).

Deprivation of formal economic status is probably the single most important influence in determining variation in health and well-being of both women and their dependant children.

The effect of maternal employment on child welfare are of enormous importance to development policy, to improve healthy child development and economic opportunity for women (3,12). The net effect of greater income and control of expenditures and reduced home production time will depend on the type of women's work and the quality and affordability of available mother substitute (5,14). With the realization of the importance of including women in projects to improve economic opportunity, the question arises as to what effect this may have on family, and especially, on child and mother's nutritional status.

This study, aims to examine the net effects of maternal work on the nutritional status of mothers and children, and to identify the factors that modify this relationships. The information from the study, is essential to the design and implementation of effective programmes intended for empowering of women, and to improve the health and nutrition status of mothers and their children.

2.0. LITERATURE REVIEW

I. BACKGROUND INFORMATION

The contribution of women in Third World countries to the satisfaction of basic nutritional needs of the family is critical. Besides being producers, processors and distributors of food to their families, women are also earners of essential cash income, which goes towards the family's basic needs. Women have, therefore, a dual productive-economic role-as unpaid labourers at home and in the field and as paid labourers outside the home (13). The ways in which women earn cash directly and the ways in which they, as home makers, support the money-making capability of the household, is therefore important for keeping the health and nutrition of the family. At any given level of poverty, however, the nutritional efficiency of resources within the household depends on income control, time allocation, intra-household food distribution and the abilities and skill of those who provide nutrition-enhancing service (cooking, breast-feeding, health care, hygiene, and child care).

One way of increasing women's economic influence within the poor household is through increasing their participation in income generating activities (5,14).

Economist have proposed that there is a trade-off between the benefit for children from mother's increased income and the cost of reduced time of the mother in child care (3,6,15).

Several studies have shown positive association between women's work and children's nutritional status controlling for potentially confounding variables (3,16,17,18,19). A growing body of evidence also suggests that mothers are more likely to use their income to meet their children's and their own basic needs than fathers (3,16,17,18,19,20). Few studies also showed negative association between maternal work for earning and nutritional status of children (14,21).

Several explanations of why mother's income generation would benefit children more than father's have been advanced. The decision-making approach suggests that as women earn more income they have a greater amount of status in the household and their higher status means that they are more able to influence decision-making and to control resources (6,10,16).

The "Mother" explanation uses psychological theory to predict that mothers will be more attentive and responsive to their children's needs than will fathers, whether due to cultural norms or to the process of attachment (16).

II. WOMEN'S WORK AND NUTRITION

The nutritional status of women and their nutrition related roles are clearly inter-related. As women are responsible to acquire, cook, serve, consume and store food, their own and their family's nutritional status is the result of the exercise of these roles (22). Socio-economic and cultural factors (e.g. income, literacy, tradition, belief) simultaneously influence both women's nutritional status and their nutrition related roles, therefore, the performance of these roles is related to women's social and economic status (11,22).

Employment factor which are related to woman's nutrition status and roles include the location of work sites relative to homes, the time spent in work and in travel, the energy cost and physical nature of the work. These factors may, in fact, determine the extent and nature of the trade-offs between women's productive and domestic roles (3,22).

Women's employment has the potential to benefit household nutrition through increased income.

Studies done in Nicaragua (3), Guatemala (16), Dominican Republic (17), Panama (18), India and Pakistan (22), Philippines (23) showed that maternal income has positive association with children's and mother's dietary intake and anthropometry.

Conversely, studies done in Jamaica (21) and Philippines (14) showed that the nutritional status of children of working mothers was poorer than that of children where mothers stayed at home. Another study done in Tanzania showed that nutritional status of children with mothers involved in agricultural work was not negatively associated (negative association which is not significant) (35) . The reason for the apparent difference in result could be poverty, the adequacy and quality of the child care substitute.

Another study in Ethiopia which examined the relationship between family income and malnutrition in the under-five children, showed that, the nutritional status of children in two communities (24) with different income level were similar, with smaller difference than might be expected from the large income difference between the two communities (24).

The study concludes by saying that the nutritional status of children in the two communities appears to be related to factors other than economic factor and further studies were suggested into decision-making pattern and on who is controlling the household income.

III. TIME SPENT IN CHILD CARE AND CHILD NUTRITION

Mothers are the primary care-takers of children only in infancy in most parts of the world (14,25). Older siblings, grandparent and members of the extended household regularly care for preschool children even when the mother is not employed outside the home. Child nutrition is often worsened with non-maternal (particularly sibling) care-taker (3,14).

The rearing of children is a time-intensive activities for which a mother may have limited time when she must also manage other household activities and perform market economic function (25).

Maternal employment usually results in a loss of time for child care, presumably the mother is therefore less available for breast-feeding, making frequent meals, bathing etc.

However, it is possible that non-working mothers also spend relatively little time in child care, in contrary the important care giving behaviours continue to be performed if there is adequate child-care substitute for employed mothers (3,18).

A study done in Nicaragua (3) showed that children who had adequate child care while their mothers were working did not differ in anthropometric status from children who were at home with their non-working mothers explaining the effect of availability and quality of care by mother substitutes (3).

However, those children with inadequate child care while the mother is away has lower height-for-age than those who had adequate care (3).

The expected negative effect of decreased maternal time input to home production did not appear in the Nicaragua and Panama studies because for this group substitutes are adequately compensating the time (3,18).

A study done in Philippines(14) suggested that the market work for rural mothers can adversely affect child nutritional status. In this study, they found a significantly lower nutritional status for younger preschool children associated with the mother's market work.

The reason given for this negative relationship was

1. poverty, which necessitated the mother engaging in market work.
2. The other explanation, was choice or skill especially of mother's substitute child-care in that, women who work may be those who have less taste for and skills in child care,
3. Rivalry between older and younger sibling which is suggested by the fact that older sibling as mothers substitute were associated with reduced nutritional status of the younger preschool children (14).

A study done in Egypt (25) indicated that mothers' child care-giving behaviour varied significantly according to the child age. For children under-two years of age, mothers tended to devote more time-intensive type of child care such as holding and breast-feeding. In contrast, toddlers over two years of age received less physical attention from their mothers, but engaged in more social interaction with them. So it is the under-two children which are mostly affected with mothers' involvement in earning type of work away from home (25).

IV. DECISION MAKING POWER AND CHILD NUTRITION

Women's employment may exert influence on household nutrition through increased status, power, autonomy or decision making ability (16,22,23,25,26). It appears that women spend their earnings preferentially on foods and services that improve the health of children implying an increase in their decision making power (16,22,26). For example, a study done in India showed that the nutritional status of children was better with women receiving cash or grain payment directly (22). In addition, where women exercise control over their wages, the money was spent on food and other basic needs (22).

In Dominica Republic children in female headed households achieved superior nutritional status to those in male headed households in spite of lower per adult-equivalent calories availability and higher incidence of some illnesses. These findings suggest that when women are in charge of the household in terms of resource control and decision-making, children in the family will be benefited (17). Similarly a study done in Kenya showed nutritional status of children of female heads to be better than that of children of male heads (20).

Another scenario is observed among young mothers in Jordan living with their husband's parents, a typical Arab World pattern where the young women are subject to the dual authority of their husband and mother-in-law (26). The mother-in-law in such a case is the overall administrator of the decisions men make. So the negative effect on the growth of the child would be linked either to the mother-in-law's lack of knowledge and awareness of appropriate measures to ensure that children are well-nourished or to her different set of priorities other than child care. The finding supports the argument that maternal role in the household decision-making pattern makes a difference in the feeding pattern of children (26).

Looking at different literature reveals that the impact of maternal work on the health and wellbeing of children and of the mother is a complex issue surrounded with controversies. The Ethiopian government policy on women aims at creating an environment that will encourage women's participation in the labour force. But, there is still a gap in our knowledge of the condition under which effect of maternal work has positive or negative impact on child and mother nutrition. So this study, is conducted with the objective of examining the effect of mother's employment on the nutritional status of their children and themselves in the Ethiopian context.

3.0. OBJECTIVE OF THE STUDY

GENERAL:-To assess the relationship between women's work and nutritional status in a rural town of Butajera, Southern Ethiopia.

SPECIFIC OBJECTIVE:-

- To compare the nutritional status of children of working and non-working mothers.

- To compare the nutritional status of working and non-working mothers.

- To identify factors influencing the nutritional status mothers and children.

4.0. SUBJECT AND METHODOLOGY

Study Design:- The study design was cross-sectional with internal comparison.

Study area:- The study was conducted in Butajera town, of Meskan and Mareko district, Southern Nations Nationalities and Peoples Regional State (SNNPR). The town is administratively divided into four Urban Dweller Association having a total population of 20,509, of which 9,827 are male and 10,682 are females (27). The town has one Health Centre, two health-stations, four health posts and four rural drug vendors. A district hospital is under construction and it is expected to start functioning in the near future.

The staple diets in the area are Enset (*Enset Venticosum*) in the highland and maize in the low land. Literacy rate of the town is 52%, 11% of the town households share their living room with domestic animal and, 86% of the urban house-hold get water from stand pipe (27).

The Butajira Rural Health Programme was established in the area based on a continuous health surveillance system in 1987. It includes the development and evaluation of a system for continuous registration of vital events and provide a baseline population and sampling frame for health-related research activities (28).

Study Population:- The study population were mothers of Butajera town having children in the age group of 4-23 months. Children of this age group were chosen because mothers are the primary caretaker of children mostly in infancy in most part of the world (14,25) and study showed that maternal income has impact on the weaning diet of children which mostly include the period of 4-23 months than other period (3).

THE SAMPLING PROCEDURE

The study was carried out in the four kebles of Butajera town as a higher proportion of working mothers would be available in Butajera town than in the rural area. The study population were identified through house-to-house visit of the town.

In households having more than one children of age group 4-23 months the youngest child was taken assuming younger children will much more reflect the acute effect of malnutrition. The respondents were mothers' of children in the mentioned age group. In their absence appointment were made for a suitable time to meet them, which enabled a higher response rate.

For calculating the sample size of the study population EPI-INFO VERSION 6 was used. Assuming a confidence level of 95%, power (1-B) of 80%, prevalence of malnutrition to be 50% in the non-exposed group. The calculated sample size was 364 with some levels of contingency a total of 422 study population were collected.

DATA COLLECTION

The data collection was conducted from June 30/99-July 15/99. Data were collected by interviewing the respondents using structured questionnaire. The questionnaire was initially prepared in English and then translated into Amharic. The Amharic version was again translated back to English to check for any inconsistencies or distortion in the meaning of words or concepts. The questionnaire was pretested in the nearby town (Enseno) of Butajera. Minor modification of the questionnaire mainly on the interpretation of words and switching serial number of the multiple choice were made according to the pretest result prior to the actual study. Data collectors were residents of the town and staff of the Butajera Rural Health Programme.

All data collectors speak Amharic (National Language) and the local language (Guraghe). A team of five data collectors carried out the data collection. Two of them were taking anthropometric measurements, while the remaining three were interviewing. A field supervisor together with the principal investigator were ensuring the quality of the data collection through continuous spot checking of the interviewers, by checking the completed questionnaire for missed response and for inconsistent information.

The interviewers and the field supervisor had a long experience in data collection and in taking the anthropometric measurement. Training on the purpose of the study and data collection instrument was given for three days in June 1999 by the Principal investigators.

DATA ANALYSIS

Data entry, clearing and analysis were done using EPI INFO version 6. Frequency and rates were calculated for all variables. Anthropometric raw data were converted to standards of NCHS, endorsed by WHO for international use (30). Univariate and bivariate analyses were made to examine for associations. The OR and 95% CI were calculated to determine significance of associations. The possible effect of confounders had been controlled out using Multiple logistics regression.

ETHICAL CONSIDERATION

Informed consent of the study participants were obtained by explaining the purpose of the study. Mothers and children with medical problem were advised to visit the health center in the town. Confidentiality of the information were assured by assigning code to participants and limiting access to information to the study team only.

Measurement and description of variables.

Outcome measures (dependent variables):- The nutritional status of mothers and their children were regarded as outcome measure in this study.

For children:- Stunting (HAZ) - Height for age z-score < -2 SD of the NCHS reference. Stunting reflects long-term undernutrition (31).

Wasting (WHZ) - Weight for height z-score < -2 SD of the NCHS reference. It reflects acute undernutrition (31).

Underweight (WAZ) - Weight for age z-score < -2 SD of the NCHS reference. It reflect the feature of both acute and chronic undernutrition (31).

Standard References:- The -Z- scores values used by National Center for health Statistic (NCHS). The Mid-Upper-Arm-Circumfrance (MUAC) of 13.5 cm was used as an additional Measurement in children (31).

Maternal malnutrition: - Nutritional status of mothers was also assessed using the BMI measurement. Malnutrition was defined as a BMI <18.5 Kg/m².

For adult:- Body Mass Index (BMI), in adult women is highly correlated with weight-for-height and is essentially just a different way of presenting the same information as weight-for-height. The main advantage of BMI is that since it is a self-contained, calculated ratio, it requires no reference tables, in contrast to weight-for-height. Since, no population specific reference values are used to calculate it, the BMI becomes a more convenient indicator for comparison between studies internationally. Cut-off point of 18.5 Kg/m² has been established by the International Dietary Energy Consultative Group (IDECG) suggestive of chronic energy deficiency in adults (31).

Mid-Upper-Arm-Circumference :- As a Measurement the MUAC is relatively simple to take and can be done accurately, provided the tape is snugly fitted and not squeezed too tight. A tape is very cheap and easily carried. It has special value when weighing-scales and/or a length-board are not available, because of cost, convenience, and portability (31) .

Adults' weights were taken on Salter scale by calibration of the pointer at zero with each Measurement, and with minimal clothing. Weight of the under-2 children was taken on a Salter-type spring dial 25 Kgs hanging scale, also by calibration of the pointer at zero before each Measurement. All weight measurements were rounded-off to the nearest 100 grams. Standing height without shoes were take for all mothers, and recumbent length (crown-heel), were taken using calibrated wooden boards for children. Height measurements were rounded-off to the nearest 1cm.

Mid-Upper-Arm-Circumfrance (MUAC), were taken with a tape meter at mid-point between the acromial and olecranon processes on the left arm. MUAC was rounded-off to the nearest 0.5cm.

Vaccination:- Vaccination status of children was taken to compare the health care utilization characteristics of working and non-working mothers. Vaccination status, was observed from the vaccination cards which were given to mothers when the child was brought-in for vaccinations. Vaccinations are required against measles, polio, and DPT (diphtheria, pertusis and tetanus) BCG (tuberculosis). Those children who took BCG and the first DPT and Polio vaccines where considered to be (have started) vaccinated.

Independent variables (exposure):- include income, age, sex, work status, household wealth, education, decision making pattern, maternal differentiation status, child care substitute, feeding pattern.

Household income:- was measured by asking earners in the household about their job and their earning in the past, as well as by asking about household expenditure in the last two months.

Age:- was estimated by inquiring date of birth and local events calender was used to assist respondents recall on the correct date of birth.

Maternal differentiation score:- Is a concept adopted from the sociological term to reflect on mother's ability to process a wide variety of information. It is expected to be related to nutritional status through improved decision making and use of resource (3,18). It was measured using important variables including knowledge about and use of contraceptive, years of formal education, use of after-work time (reading, sewing or crocheting, listening to the radio).

Scoring is given arbitrarily assuming that a composite of variable which includes evidence of use and retention of information will capture individual abilities and efficiency more adequately than will a simple measure of years of education. The score will reflect maternal ability to make decisions and to allocate resources. Concerning mothers' education, illiterates got 0 point, able to read and write +1 point, grade 1-5 got + 2, grade 6-12 and more got +3. Positive use of birth control was scored +1. For after work time use got +5 for listening radio, for hand work +3, for reading +4, house work got +1, for child care +2 (3,18) (see Annex I)

Decision making score:- It is measured using household decision pattern concerning five activities, namely purchasing household items, child treatment, use of birth control, child education and mothers' use of health services. Scoring was given arbitrarily for each activity considering decision made by mothers to be the best, for child and mother nutrition, getting the highest score of +3.

For decisions made by mothers a point of +3 were given, for fathers decision +1 , for decision made by both mothers and fathers a point of +2 were given. Where as, decision by others got 0 point (see Annex II)

Household wealth score:- is measured using a cluster of structural indicators of house quality and a list of household possessions. For number of rooms 1 was scored as 0, 2,3 scored +1, 4-7 scored+2. If they have private toilet scored +2 point, shared toilet scored +1. Possession of radio got +1, of television got +3. Owned house got +2, rented house got +1. Presence of ceiling in the house got +1, and type of floor other than earth got +1 (see Annex III)

Working mothers:-were defined as women who report earning income at least for the last two months.

Formal work:- Refers to regular wage work either in the public or the private sector.

Informal work:- Refers to self-managed income generating work.

Child care substitute:-Refers to the child-care arrangements when the mother is away for work.

RESULTS

The study identified and enrolled 422 mothers with children in the age group between 4 and 23 months. Anthropometric measurements were taken for all the mothers and their children. Most of the households, 367 (87%), were male headed, while, the remaining 52 (12.3%) were female headed.

The age of the mothers ranged from 15-45 years with the mean age of 26.55 years and standard deviation of 5.89, with the median age of 25 years. The age of children ranged from 4 months to 23 months with the mean age of 13.9 months and standard deviation of 5.93, with the median age of 14 months.

On Ethnicity, others mostly include Amahara.

Fifty-one percents (215) of the mothers were Muslim, 158 (37%) were illiterate, the remaining 264 (63%) had various levels of literacy, and 383 (91%) of the mothers were married and living in union (Table 1).

Household categorization on economic index showed that 234 (55.5%) of the households belong to the low level, 155 (35.7%) belong to the medium, and 33 (7.8%) lie in the high level.

Concerning the feeding pattern 187 (44.3%) of mothers reported that priority is given to children while 165 (39.1) of the mothers reported that priority is given to fathers. Separated food (non-adult) is prepared for children in the age group 4 to 23 months in 348 (82.5%) of the households (Table 1)

Maternal differentiation score was low for 299 (70.9%) of the mothers. Decision making pattern showed that only 54 (12.8%) of the mothers had the power to decide on purchasing food items, child treatment and education, use of birth-control and concerning their own treatment (Table 1).

Table 1. Socio-demographic and other family characteristics of the respondents, Butajira, Southern Ethiopia, 1999

Variable	Frequency (%)
Household Status	
Male headed	367 (87.0)
Female headed	52 (12.3)
others	3 (0.7)
Age categories	
< 19	24 (5.7)
19-34	338 (80.1)
>=35	60 (14.2)
Ethnicity	
Meskan	174 (41.6)
Sodo	65 (15.4)
Dobi	33 (7.8)
Selti	32 (7.6)
Mareko	2 (0.5)
others	116 (27.1)
Religion	
Muslim	215 (50.9)
Christian	200 (47.3)
Others	7 (1.8)
Education	
Illiterate	158 (37.0)
Read and write	23 (5.5)
Elementary	106 (25.1)
Secondary	135 (32.4)
Marital status	
Married and in union	383 (90.8)
Divorced	18 (4.3)
Widow	4 (.9)
Single	6 (1.4)
Married and in not union	11 (2.6)
House-Hold wealth	
Low	234 (55.5)
Medium	155 (36.7)
High	33 (7.8)
Priority in feeding habit	
Children	187 (44.3)
Adults	235 (55.7)
Weaning diet preparation	
Yes	348 (82.5)
No	74 (17.5)
Vaccination status	
Yes	268 (63.5)
No	154 (36.5)
Maternal differentiation score	
1-3	299 (70.9)
4-7	91 (21.6)
8-12	32 (7.5)
Decision making role	
Mothers	54 (12.8)
Others	368 (87.2)

Sixty-four percent (268) of the sampled children had a history of vaccination. As shown in table 2, for under-9 months old children only 2 (3.4) took DPT3, while among the older children only 17 (8.1) took DPT3 and 15 (7.2) took measles vaccine which showed a higher drop-out rate.

Table 2 . Vaccination status of children 4-23 months, Butajera, Southern Ethiopia, July, 1999.

Vaccination status	Age	
	4-8 months (n=97)	9-23 months (n=325)
BCG	59 (22.0)	209 (22.0)
DPT1	59 (22.0)	209 (78.0)
DPT2	7 (11.9)	28 (13.4)
DPT3	2 (3.4)	17 (8.1)
Measles	0	15 (7.2)

As shown in table 3 mothers engaged in earning work were 201 (47%). The remaining 221 (52.4%) were house-wives. Among working women, the majority 180 (89.6) were engaged in informal type of work (petty trading , commercial/Semi-skilled domestic services) while only 21 (10.4) were involved in Technical /professional occupation.

Concerning the child care substitute arrangement in the majority 77 (39.9) of the cases it was the adult care-giver who were in charge. Seventy-one percent (141) of the maternal income fall below 100 birr.

Table 3. Maternal Employment Variables, Butajera, July, 1999.

Variables	N0 (201)	Percent (%)
Mothers working for cash		
Yes	201	47.8
No	221	52.4
Maternal occupation: (n=201)		
Informal	180	89.6
Formal	21	10.4
Number of working days per week: (n=201)		
1-3 days	68	33.8
4-6 days	65	32.4
7day	68	33.8
Working hours per day: (n=201)		
1-3 hours	22	10.9
4-8 hours	83	41.3
+9 hours	96	47.8
* Child care arrangement: (n=201)		
At home with working mother	29	15.0
Bring with mother to work	34	17.6
Leaves with adult care giver	77	39.9
Leaves with child \leq 12Yrs	53	27.5
Maternal income: (n=201)		
< 100	141	70.2
101-200	38	18.9
>201	22	10.9

*Eight of the child care substitute could not tell their age

Anthropometric data showed that 303 (72.0%) of the children were stunted, 38 (9.0%) were wasted and 152 (36.0%) were under-weight (Table 4) In 194 (46%) of children the mid-upper-arm-circumfrance measured below 13.5cm which was the cut off point used to indicate undernutrition. Mothers' anthropometry showed that 129 (31%) of them had BMI < 18.5Kg/m² while 134 (31.8%) of them had MUAC < 22.5 cm (Table 4).

Table 4. Maternal and child nutritional indicators among the study populations, Butajira, July, 1999

Anthropometric variables	Number (n) n=422	Percentage(%)
Maternal Nutritional status (n=422)		
Body mass index		
High risk (< 18.5BMI)	129	30.6
Normal (\geq 18.5 BMI)	293	69.4
Mid-Upper-Arm-Circumfrance		
High risk (< 22.5cm)	134	31.8
Normal (\geq 22.5cm)	288	68.2
Nutritional status of children (n=422)		
Height-for-Age (Z-score)		
Stunted	303	71.8
Normal	119	28.2
Weight-for-Age (Z=score)		
Underweight	152	36.0
Normal	270	64.0
Weight-for-Height (Z=score)		
Wasted	38	9.0
Normal	384	91.0
Arm Circumference (cm)		
<13.5 (malnutrition)	194	46.0
\geq 13.5 (normal)	228	54.0

Children of working mothers were less likely to be wasted compared to children of non-working mothers, although the difference was not statistically significant with [OR (95%CI):0.88 (0.43,1.80)]. However, a slightly higher but not significant chance of being stunted was observed in children of working mothers [OR (95%CI):1.37 (0.87,2.15)].

According to the BMI, working mothers were less likely to be malnourished compared to non-working mothers although the difference was not statistically significant (OR (95% CI): 0.75 (0.48, 1.16). But, the maternal Mid-Upper-Arm-Circumference measurement showed that working mothers had lower chance of being malnourished compared to non-working mothers [OR (95% CI): 0.65 (0.42, 1.00] (Table 5).

Table 5. Nutritional status of mothers and children by working condition of mothers, Butajera, July, 1999.

Variables	Working	Non-working	Crude
	No (%)	No (%)	OR (95%)
Child Anthropometry			
HAZ below -2 Sd (Stunted)			
No	50 (24.9)	69 (31.2)	1.00
Yes	151 (75.4)	152 (68.8)	1.4 (0.8, 2.1)
WAZ below -2SD (Underweight)			
No	121 (60.2)	149 (67.4)	1.00
Yes	80 (39.8)	72 (32.6)	1.4 (0.9, 2.2)
WHZ below -2SD (Wasted)			
No	184 (91.5)	200 (90.5)	1.00
Yes	17 (8.5)	21 (9.5)	0.9 (0.4, 1.8)
Mother's Anthropometry			
BMI <18.5 (malnourished)			
No	146 (49.8)	147 (50.2)	1.00
Yes	55 (42.6)	74 (57.4)	0.8 (0.4, 1.1)
MUAC <22.5 (malnourished)			
No	147 (51.0)	141 (49.0)	1.00
Yes	54 (40.3)	80 (59.7)	0.6 (0.4, 1.0)

As shown in table 6, comparison of working and non-working mothers on selected variables revealed that working mothers were more 2.49 times at risk of having low household wealth score, and were 1.84 times more illiterate. Maternal age comparison showed that working mothers were less likely to be younger.

Maternal differentiation score was 4.25 times lower for working mothers than for the non-working mothers, which was statistically significant .

Working mothers were less likely to make decisions compared to non-working mother. Husbands of working mothers were less likely to generate income compared to husbands of non working mothers (Table 6).

Table 6. Relationship of household and maternal characteristics with work status of mothers, Butajera, July, 1999.

Variables	Working No (%)	Non-working No (%)	OR 95% CI
<hr/>			
H,H Wealth score			
Low	64 (31.8)	43 (19.5)	2.4 (1.4, 4.3)
Medium	88 (43.8)	96 (43.4)	1.53 (0.9, 2.4)
High	49 (24.4)	82 (37.1)	1.00
Years of education			
Illiter.	93 (46.3)	65 (29.4)	1.8 (1.1, 3.02)
Read+Write	10 (5.0)	13 (5.9)	0.99 (0.3, 2.6)
Elementary	39 (19.4)	67 (30.3)	0.75 (0.4, 1.3)
High School	59 (29.4)	76 (34.4)	1.00
Maternal age in yrs			
15-24	100 (45.2)	51 (25.4)	3.15 (1.6, 6.1)
25-34	98 (44.3)	113 (56.2)	1.4 (0.75, 2.6)
35-45	23 (10.5)	37 (18.4)	1.00
Maternal differentiation score			
0-3	148 (73.6)	151 (68.3)	4.25 (1.6, 11)
4-8	47 (23.4)	44 (19.9)	4.63 (1.6, 1.9)
9-12	6 (3.0)	26 (11.8)	1.00
Decision making pattern			
Mothers	10 (5.0)	44 (19.9)	0.21 (0.1, 0.4)
Other	191 (95.0)	177 (80.1)	1.00
Household income			
< 100	67 (30.3)	68 (33.8)	0.00 (0.5, 1.2)
101-200	57 (25.8)	54 (26.9)	0.86 (0.5, 1.4)
> 201	97 (43.9)	79 (39.3)	1.00
Husbands generating income			
Yes	143 (87.2)	212 (96.8)	0.22 (0.0, 0.5)
No	21 (12.8)	7 (3.2)	1.00

Stunting was significantly higher in 12-23 months old children compared to younger children. Its association with maternal education , maternal age, household wealth status, maternal income, maternal differentiation score, decision making pattern, household income, or child age and sex were not statistically significant (Table 7.)

Table 7. Relationship between nutritional status (HAZ) of children with selected variables. Butajera, Southern, July, Ethiopia, 1999.

Variables	HAZ		OR (95%CI)	
	Yes	No	Crude	Adjusted
*Working				
No	152 (50.2)	69 (58.0)	1.00	
Yes	151 (49.8)	50 (42.0)	1.37 (0.87, 2.15)	
Maternal Education				
Illite.	117 (38.6)	41 (34.5)	1.00	1.00
Read+ write	16 (5.3)	7 (5.9)	0.80 (0.2, 2.3)	1.03 (0.1, 9.3)
Secondary	82 (27.1)	24 (20.2)	1.20 (0.6, 2.2)	0.49 (0.3, 6.7)
High sch.	88 (29.0)	47 (39.5)	0.66 (0.3, 1.1)	1.39 (0.3, 5.8)
Maternal Age				
15-24	104 (34.3)	47 (39.5)	1.00	1.00
25-34	159 (52.5)	52 (43.7)	1.3 (0.8, 2.2)	0.38 (0.1, 1.4)
35-45	40 (13.2)	20 (16.8)	0.9 (0.4, 1.8)	0.58 (0.11, 3.0)
Household wealth status				
Low	79 (26.1)	28 (23.5)	1.00	1.00
Medium	143 (47.2)	41 (34.5)	1.28 (0.7, 2.3)	1.27 (0.3, 4.0)
High	81 (26.7)	50 (42.0)	0.60 (0.3, 1.0)	0.66 (0.1, 2.3)
Maternal differentiation score				
0-3	214 (70.6)	85 (71.4)	1.00	1.00
4-7	66 (21.8)	25 (21.0)	1.05 (0.60, 1.8)	0.61 (0.1, 2.2)
8-12	23 (7.6)	9 (7.6)	1.02 (0.43, 2.4)	0.06 (0.0, 0.7)
Decision Making pattern				
Others	262 (86.5)	106 (89.1)	1.00	1.00
Mothers	41 (13.5)	13 (10.9)	1.28 (0.63, 2.6)	0.08 (0.1, 3.7)
Household income				
< 100	97 (71.9)	38 (28.1)	1.00	1.00
101-200	81 (73.0)	30 (27.0)	1.06 (0.5, 1.9)	0.86 (0.24, 3)
>201	125 (71.0)	51 (29.0)	0.96 (0.57, 1.6)	2.82 (0.5, 14.)
Maternal Income				
< 100	111 (74.5)	30 (60.0)	1.00	1.00
101-200	23 (15.4)	14 (28.0)	0.44 (0.19, 1.0)	0.41 (0.10, 1.6)
≥201	15 (10.1)	6 (12.0)	0.68 (0.22, 2.1)	0.95 (0.09, 9)
*Child care substitute				
<12 years	71 (77.2)	21 (22.8)	1.00	1.00
>12 Years	29 (76.3)	9 (23.7)	0.95 (0.36, 2.5)	0.56 (0.1, 1.7)
Child age				
4-12	120 (39.6)	73 (61.3)	1.00	1.00
13-23	183 (60.4)	46 (38.7)	2.42 (1.5, 3.8)	5.19 (1.9, 13)
Head of household				
Male	261 (71.0)	109 (28.9)	1.00	1.00
Female	42 (76.4)	10 (23.6)	1.31 (0.6, 2.6)	1.33 (0.4, 4.3)

*Child care substitute refers to care provider by people other than the mother.

*Work held constant for logistics regression.

Table 8. Relationship between nutritional status (WAZ) of children with selected variables. Butajera, Southern Ethiopia, July, 1999.

Variables	WAZ		OR (95%CI)	
	Yes	No	Crude	Adjusted
Working				
No	72 (32.6)	149 (67.4)	1.00	1.00
Yes	80 (52.6)	121 (44.8)	1.37 (0.9, 2.1)	1.1 (0.7, 1.7)
Maternal Education				
Illit	67 (44.1)	90 (33.7)	1.00	1.00
Read+ write	4 (2.6)	19 (7.0)	0.28 (0.1, 0.9)	0.24 (0.1, 0.8)
Primary	51 (33.6)	55 (20.6)	1.25 (0.7, 2.1)	1.08 (0.6, 1.8)
High sch.	30 (19.7)	105 (38.9)	0.38 (0.2, 0.6)	0.40 (0.2, 0.7)
Maternal Age				
15-24	55 (36.2)	96 (35.6)	1.00	1.00
25-34	77 (50.7)	134 (49.6)	1.00 (0.6, 1.5)	0.76 (0.5, 1.2)
35-45	20 (13.2)	40 (14.8)	0.87 (0.44, 1.7)	0.49 (0.2, 0.9)
Household wealth status				
Low	38 (25.0)	69 (25.6)	1.00	1.00
Medium	83 (54.6)	101 (37.4)	1.49 (0.8, 2.51)	1.6 (1.0, 2.6)
High	31 (20.4)	100 (37.0)	0.56 (0.3, 1.0)	0.71 (0.4, 1.2)
Maternal differentiation score				
0-3	116 (76.3)	183 (67.8)	1.00	1.00
4-7	30 (19.7)	61 (22.6)	0.78 (0.4, 1.3)	0.72 (0.4, 1.3)
8-12	6 (3.9)	26 (9.6)	0.36 (0.1, 0.9)	0.61 (0.3, 1.1)
Decision Making pattern				
Others	134 (88.2)	234 (86.7)	1.00	1.00
Mothers	18 (11.8)	36 (13.3)	0.87 (0.4, 1.6)	0.61 (0.3, 1.1)
Household Income				
< 100	55 (40.7)	80 (59.3)	1.00	1.00
101-200	51 (45.9)	60 (54.1)	1.24 (0.7, 2.1)	1.46 (0.8, 2.5)
≥ 201	46 (26.1)	130 (73.9)	0.51 (0.31, 0.8)	0.67 (0.3, 1.1)

Table 9. Relationship between nutritional status (WHZ) of children with selected variables Butajera, Southern Ethiopia, July, 1999.

Variables	WHZ		OR (95%CI)	
	Yes	No	Crude	Adjusted
<hr/>				
*Working				
No	21 (55.3)	200 (52.1)	1.00	1.00
Yes	17 (44.7)	184 (47.9)	0.88 (0.43, 1.80)	0.38 (0.1, 0.7)
Maternal Education				
Illite.	32 (57.9)	136 (35.4)	1.00	1.00
Read+writ	1 (2.6)	22 (5.7)	0.19 (0.01, 1.4)	0.18 (0.0, 1.6)
Secondary	12 (31.6)	94 (24.5)	0.54 (0.25, 1.1)	0.48 (0.2, 1.1)
High sch.	3 (7.9)	132 (34.4)	0.10 (0.02, 0.3)	0.12 (0.03, .4)
Maternal Age				
15-24	12 (31.6)	139 (36.2)	1.00	1.00
25-34	16 (42.1)	195 (50.8)	0.95 (0.4, 2.2)	0.41 (0.2, 0.8)
35-45	10 (26.3)	50 (13.0)	2.32 (0.8, 0.1)	0.82 (0.3, 2.0)
Household wealth status				
Low	12 (31.6)	95 (24.7)	1.00	1.00
Medium	17 (44.7)	167 (43.5)	0.81 (0.3, 1.8)	0.55 (0.2, 1.1)
High	9 (23.7)	122 (31.8)	0.58 (0.2, 1.5)	0.44 (0.1, 1.0)
Maternal differentiation score				
0-3	29 (76.3)	270 (70.3)	1.00	1.00
4-7	9 (23.7)	82 (21.4)	1.02 (0.4, 2.3)	1.07 (0.44, 2.
8-12	0 (0.0)	32 (8.3)	P-Value .09	0.00 (0.0, 9.9)
Decision Making pattern				
Others	32 (84.2)	336 (87.5)	1.00	1.00
Mothers	6 (15.8)	48 (12.5)	1.31 (0.47, 3.51)	0.52 (0.1, 1.3)
Household Income				
≤ 100	16 (42.1)	119 (31.0)	1.00	1.00
101-200	14 (36.8)	97 (25.3)	1.07 (0.4, 2.4)	1.46 (0.6, 3.1)
≥ 201	8 (21.1)	168 (43.8)	0.35 (0.1, 0.9)	0.72 (0.3, 1.7)
Head of household				
Male	35 (9.5)	332 (90.5)	1.00	1.00
Female	3 (5.5)	52 (94.5)	0.59 (0.1, 2.0)	1.17 (0.4, 3.0)

Examination of the association of maternal nutritional status with selected variable showed that working mothers were at risk of being malnourished compared with the non-working mothers with [OR(95%CI):1.62(1.05,2.50)]. Higher levels of maternal education also increase the chance of maternal malnutrition with [OR(95%CI):2.07(1.17,3.66)] (Table 10).

Table 10. Association of nutritional status of mothers with selected mothers and household variables , Butajera, Southern Ethiopia, July, 1999

Variables	Malnourished No (%)	Well-nourished No (%)	OR (95 %)	
			Crude	Adjusted
Working				
No	74 (57.4)	147 (50.2)	1.00	1.00
Yes	55 (42.6)	146 (49.8)	0.75 (0.4, 1.1)	1.6 (1.1, 2)
Maternal Education				
Illi. Read	58 (45.0)	100 (34.1)	1.00	1.00
+write	5 (3.9)	18 (6.10)	0.48 (0.1, 1.4)	2.6 (0.8, 8.1)
Secondary	35 (27.1)	71 (24.2)	0.85 (0.4, 1.4)	1.48 (0.8, 2.5)
High sch.	31 (24.0)	104 (35.5)	0.51 (0.3, 0.8)	2.07 (1.1, 3.6)
Maternal Age				
15-24	49 (32.5)	102 (67.5)	1.00	1.00
25-34	60 (28.4)	151 (71.6)	0.83 (0.5, 1.3)	1.29 (0.8, 2.02)
35-45	20 (33.3)	40 (66.7)	1.04 (0.5, 2.0)	1.22 (0.6, 2.39)
Household wealth status				
Low	33 (25.6)	74 (25.3)	1.00	1.00
Medium	65 (50.4)	119 (40.6)	1.22 (0.71, 2.1)	0.84 (0.5, 1.36)
High	31 (24.0)	100 (34.1)	0.70 (0.38, 1.2)	1.44 (0.81, 2.5)
Maternal differentiation score				
0-3	94 (72.9)	205 (70.0)	1.00	1.00
4-7	27 (30.9)	64 (21.8)	0.92 (0.53, 1.5)	0.99 (0.5, 1.7)
8-12	8 (6.2)	24 (8.2)	0.73 (0.29, 1.7)	1.34 (0.54, 3.3)
Decision Making pattern				
Others	113 (87.6)	255 (87.0)	1.00	1.00
Mothers	16 (12.4)	38 (13.0)	0.95 (0.48, 1.8)	1.62 (0.8, 3.1)
Household Income				
< 100	41 (30.4)	94 (69.6)	1.00	1.00
101-200	41 (36.9)	70 (63.1)	1.34 (0.7, 2.3)	0.68 (0.3, 1.1)
≥ 201	47 (26.7)	129 (73.3)	0.84 (0.4, 1.41)	1.0 (0.58, 1.7)
Head of household				
Male	113 (30.8)	254 (69.2)	1.00	1.00
Female	16 (29.1)	39 (70.9)	0.73 (0.3, 1.4)	1.18 (0.6, 2.3)

DISCUSSION

The overall result showed that the prevalence of stunting (72%) and underweight (36%) were high, while wasting was relatively low (9%), indicating that malnutrition is highly prevalent in children of Butajira town. Maternal malnutrition was 31% as measured by the BMI and MUAC.

The nutritional status of working and non-working mothers did not show significant difference as well as their children with the crude odds ratio. Multiple regression equation were constructed to evaluate the effect of maternal work for earning on child anthropometric status controlling for possible confounding variable. The result suggested that maternal work and higher levels of maternal education was a protective factor against wasted (WHZ) which reflect acute malnutrition. Young maternal age was also a protective factor against wasted (WHZ).

Higher maternal differentiation score was a protective factor against stunting (HAZ). Older children had a higher chance of being stunted reflecting the cumulative effect of choronic malnutrition.

For underweight (WAZ) which reflected acute and chronic malnutrition maternal levels of education, maternal age and household wealth were predictors.

Maternal anthropometry was affected by maternal work status in which workers were at risk of being malnourished compared to the non-working mothers. Similarly mothers having higher levels of education were at a higher risk of being malnourished compared to the lower level ones.

Concerning, the validity of the study the sample size was adequate to assess the relationship between maternal work condition and nutritional status of mothers and children which exclude the role of chance.

Reliability was maintained by prior training of supervisor and interviewer, by using pretested questionnaire, by regular supervision.

Measurement error of anthropometry can not be excluded although, they were taken using standard methods, and by trained and supervised data collectors.

To reduce inter-observer variation two of the data collectors were taking all the measurements and equipment were checked and adjusted regularly. The commonest problem in taking weight measurements was child restlessness.

The recall problem related to the age of children was likely to have distorted the indices (Z-score), although the prevalence found with MUAC and WHZ were relatively free from age influence. It may also have some influence on mothers enrolment into the study population since the inclusive of mothers household was dependent on the child's age.

Information bias was unlikely to have happened since the questionnaire was mostly closed ended, simple and collected by trained interviewer who were supervised.

The prevalence of malnutrition was similar to the National Rural Nutritional Survey figure in which stunting was 64%, underweight 47% and wasting 8% (33). Other information on the nutritional status of mothers indicates that about 27% of lactating mothers were malnourished (<18.4 BMI) which was close to our result (13).

The finding in this study showed that there was a positive association of women working for earning with weight for height (WHZ) of children after controlling for other socioeconomic and maternal variables. Similar, results were obtained in a study done in Nicaragua (3), Guatemala (16).

The possible explanation for the positive association can not be adequacy of child care substitute since the crude odds ratio does not show association. The concept of decision- making approach does not holds true here as it did in the Guatemala study (16) since working mothers were less likely to make decision compared to non-working mothers, which might correspond to their lower income in 141(70%) of the cases. The likely explanation for the association of maternal work with weight for height, a shorter-term measure of anthropometric status, might suggested that during the critical weaning period, the women's income could be used for higher quality weaning foods which benefited child nutrition.

Studies done in Philippines(14) and Jamaica(21) showed negative association between maternal work and nutritional status of their children. The likely explanation for the observed result was poverty and inadequacy of child-care substitute.

Mothers higher levels of education was also protecting their children against acute malnutrition because, the knowledge and the understanding they have on child nutrition and feeding practice was likely to have a positive impact on their child nutritional status.

Children of younger mothers were less likely to be wasted, the likely explanation might be that they might have lesser number of children for whom to care for in which case the resources they have were being used up mostly in child feeding.

Maternal differentiation score was significantly associated with stunting. High maternal differentiation score, appears to increase mothers ability to process information in which they will be able to provide more quantity and quality of food to their child.

Similar, result was obtained in a study done in Panama (18). Older children were much more affected by chronic malnutrition than the younger children because they were reflecting the accumulated effect of chronic malnutrition, similar result was obtained in a study done in Dominican Republic (17).

Children of older mothers were protected against underweight (WAZ) in that maternal life experience in child nutrition and feeding practice was an important factor to consider in nutrition intervention programmes.

Lower household wealth will exposed children to develop both acute and chronic malnutrition. These was associated with lack of family resource to provide the necessary food items to their children requirements.

Working mothers were more likely to be malnourished compared to the non-working mothers. This might be associated with the lower income and household wealth they have, and they were also less likely to make household decision which negatively affect their nutrition. In addition, they work for nine hours or more perday in 50% of the cases, not having adequate time to spare for their care and of nutrition.

A study done in Philippines (23) showed that maternal work was associated with better dietary intake compared to the non-working mothers.

Unlike the study done in Kenya (17), Dominica Republic (13) this study does not show a positive influence of maternal decision making and nutritional status of both children and mothers. This may imply that, women participation in wage work alone may not guaranteed a greater decision making role.

This study identified a group of mothers who were workers and yet were disadvantaged or deprived in terms of household wealth, education, decision making role, maternal differentiation. Their work involvement was protecting their children from acute malnutrition but yet exposing themselves to be malnourished. Programmes which aimed to improved mother's and child well-being should target these group to improve maternal education and work opportunities.

LIMITATION OF THE STUDY

1. Variables used were limited because of resource constraints which obscured factors associated with maternal work and nutritional status of children (e.g. Substitute care giving behaviour, quality of dietary intake, maternal household time allocation).
2. Despite the attempt to avoid Measurement error, over or under estimation of the anthropometric measurements were inevitable.
3. Since the study was carried out in rural town, it was not possible to observe the true effect of formal work on the nutritional status of mothers and children

STRENGTH OF THE STUDY

1. The conduction of pretest and the largely closed ended questions were the strength of the study.
2. The use of logistic regression were controlling the possible effect of confounders.

CONCLUSION

1. Generally nutritional status of both children and mothers was poor, i.e. prevalence of malnutrition is high by all indicators.
2. Mothers work was protecting their children from acute malnutrition (WHZ).
3. Working mothers were at risk of being malnourished compared to the non-working mothers.
4. Higher maternal differentiation was protecting their children against chronic malnutrition.

Mothers work for earning and higher levels of maternal education was protecting their children against acute malnutrition (WHZ).

Lower household wealth exposed their children to underweight (WAZ).

Older maternal age and higher levels of education will protect their children against underweight.

RECOMMENDATION

1. Working mothers who were identified to be illiterate need to be encouraged for school enrolment and basic education.
2. There is a need to encourage and facilitate women's employment in better paying occupation after improving their levels of education to improve household resource.
3. To improve child malnutrition in the area health facilities at various levels shall carry out growth monitoring and promotion programmes as an integral part of MCH/FP services. Communities themselves should also be assisted to carry out growth monitoring programmes through strengthened community health services.
4. There will be a need for food supplementation for individuals and groups found to be at particular risk, namely working mothers.
5. Similar study needs to be carried out in urban set up to examine the effect of formal work and its mediating factors on the nutritional status of mothers and children.

REFERENCE

1. Economic Commission For Africa. Africa: Integrating Gender into Structural Adjustment Policy and Practice. Gender Response Development In Africa. April, 1998:3
2. United Nations Economic Commission For Africa: A Study of The Economic empowerment of women and their role in the Socio-Economic: Development of Africa. August 1996, Addis Ababa, Ethiopia : 38-54
3. Lamontagne JF. Engle PL. Zeitilin MF. Maternal Employment, Child Care and Nutritional Status of 12-18 months old Children. In Managua, Nicaragua. Soc. Sci Med. 1998, 46 (3):403-414.
4. Economic Commission for Africa. Africa: Fostering Women's Economic Empowerment Through Exchange Visit and Networking, Submitted by: The Africa American Institute (AAI). April, 1998:29
5. Mc Guise JS and Popkin BM. Helping Women Improve Nutrition in the Developing World, Beating the Zero Sum Game; World Bank Technical paper, 1990 ;(114)

6. Mc Guire J, Popkin BM. Beating the Zero Sum Game: Women and Nutrition in the Third World. Administrative Committed on Coordination/ Subcommittee on nutrition (ACC/SCN) Symposium Report Nutrition Policy Discussion paper, October, 1990; (6):11-48
7. Leonard A, Chen M, Buvini ME, Jahan R, Mosses C, StaudlK. Supporting Women's work Around the World. 1997:5
8. UNICEF. Landers C, Leonaerd A, Women work and The Need For Child Care ; 5-10
9. UNICEF. Himes R, Lander C, Leslie J. Women Health and Nutrition.
10. Mock NB, Magnani RJ. Intra-House hold Correlation in Maternal and Child Nutrition in Rural Guinea. Bulletin of WHO. 1994; 72(1): 119.

11. Naborro D. Social, Economic, Health, and Environment
Determinant of Human Nutritional Status. Food Nutrition
Bulletin, 1981;2: 18-32
12. Women's Work and Children's Welfare: Mothers and
Children Bulletin On Infant Feeding and Nutrition.
April- June, 1986, 5 (No2) :
13. UNICEF. Children and Women in Ethiopia: A situation
analysis, Addis Ababa. 1993: 1-118
14. Popkin BM. Time Allocation of the mother and child
nutrition. Ecology of Food and Nutrition 1980; 9: 1-14
15. Buvinic N. et al. Women poverty in the Third World Mothers
and Children Bulletin on Feeding and Maternal Nutrition.
March-April, 1984; 4 (1).
16. Engle PL. Influence of Mothers and Fathers Income on
Children Nutrition In Guatemala. Soc. Sci. Med.
1993, 37 (11): 1303-1412.

17. Jonson KC. Rogers Bl. Children's Nutritional Status in Female Head House-Hold In The Dominica Republic. Soc. Sci. Med. 1993, 37 (11), 1293-1301.
18. Tucker K. Sanjur A. Maternal Employment and Child Nutrition in Panama. Soc. Sci. Med. 1988, 26 (6): 605- 612.
19. Quisumbing AR, Brown LR, Feldstein HS, Haddad L, Penaa C. Woman and Economic access To Food. Food Policy Report, The International Food Policy Research Institute. Women: The Key To Food Security. Washington, D.C. August, 1995:9-11
20. Onyango A, Tucker K, Eiseman T. House Hold Headship and child Nutrition: A case study in West Kenya. Soc. Sci. Med. 1994;39 (12):1633-1639
21. Powell CA, Mc Gregor SG. The Ecology of Nutritional Status and development in young children in, Kingston, Jamaica. American Journal of Clinical Nutrition, 1985; 41: 1322-1331
22. Chatterjee M, Lambert J. Women and Nutrition Reflection from India and Pakistan. Food and Nutrition Bulletin. 1989; 11 (4) : 13-28

23. Bisgrove EZ, Popkin BM. Does Women's Work Improve Their Nutritional: Evidence From The Urban Philippines. Soc. Sci. Med. 1996; 43(10): 1474-1488.
24. Seyoum E, Kidane y And Gebru H, Sevenhayen G. Preliminary Study Of Income And Nutritional Status Indicators In Two Ethiopia Communities. Food Nutrition Bulletin, 1984;3 : 37-41
25. Ricci JA, Jerome NW, Sirageldin I. The Significance of Children's Age In Estimating The Effect of Maternal Time Use On Children's Well-being. Soc. Sci. Med. 1996; 42 (5): 651-659.
26. Doan RM, Bishara L. Female Autonomy and Children Nutritional Status: The Extended- Family Residential Unit In Amman Jordan. Soc. Sci. Med. 1990; 31(7): 738-789
27. Central Statistical Authority (CSA) 1994, Population and Housing Census of Ethiopia. Southern Nations, Nationalities and peoples' Region. Volume I: Part II

28. Shamebo D, Muhe l, Freij, Sandstrom A, Wall S. The Butajira rural health project in a Ethiopia. In: Shamebo D. Epidemiology for public health research and action in a developing society. Umea: Umea university, 1993; VI:1-14.
29. Fleiss, "Statistical Methods for Rates and Proportion", 2nd Edition, Wiley, 1981, pp,38-45.
30. WHO. Measuring change in nutritional status Geneva. 1983; 25-28.
31. Jelliffe DB, Jelliffe EFP. Community nutritional assessment. New York. Oxford univ. press. 1989; 294-340, 342.
32. WHO. Maternal anthropometry for prediction of pregnancy outcome: Memorandum from a USAID/WHO/PAHO/ Mother Care meeting. Bulletin of WHO. 1991, 69 (5):523-532.
33. Central Statistical Authority (CSA). Report on the National Nutritional Surveillance System Statistical Bulletin, March, 1992.

34. The Prime Ministers' office Women's Affairs Section. A National policy on Ethiopia Women. September 21, 1993, Addis Ababa.

Annex I. Maternal Differentiation Score.

Variables	Yes	No		
Use birth control:	+1	0		
Education :	Illiterate	Read,write	Primary	Secondary
	0	+1	+2	+3
After-work time use:	House-work	Child-care	Hand-work	Reading Radio
	+1	+2	+3	+4 +5

Annex II. Decision making score.

Activities	Decision making bodies			
	Mothers	Both	Father	Others
Purchasing household item	+3	+2	+1	0
Child treatment	+3	+2	+1	0
Use birth control	+3	+2	+1	0
Child education	+3	+2	+1	0
Health service use	+3	+2	+1	0

Annex III. Household wealth score.

VARIABLES (POSSESSION)		SCORING	
	yes	NO	
RADIO	+1	0	
TV	+3	0	
CEILING	+1	0	
FLOOR	OTHER THAN EARTH		
	+1		
HOUSE CONDITION	OWNED	RENT	
	+2	+1	
NUMBER OF ROOMS	ONE	2, 3	4-7
	+0	+1	+2
TOILET	PRIVATE	SHARED	
	+2	+1	

Questionnaire for the assessment of maternal income on the
Nutritional status of mothers and children in Butajira, 1999

An English Version of the questionnaire

General guideline

Respected respondent, I extend my greeting to you. This is to ask your permission to be part of the study on the effect of maternal income on the nutritional and health status of children and mothers. Your support and willingness in responding to my questions and in getting your child and yourself examined at the of the interview is very much appreciated.

Thank you

I. IDENTIFICATION DATA

No	Question	Response category	Code
1	Kebele number/name		
2	House number		
3	Family size	1. Male----- 2. Female----- 3. 4 month-2 years----- Total-----	
4	Head of the house-hold	1. Father 2. Mother 3. Other, specify----- -----	
5	Date of interview: Date/ month/year	1.visit----- 2.visit----- 3.visit-----	
Interviewer code_____		Date-----	
		Signature -----	

II. Basic Information on Respondent and Family character

No.	Question	Response category	Code
101	What is your name (Respondent)?		
102	What is your age ? (in completed year)		
103	What is your religion ?	1. Orthodox 2. Muslim 3. Catholic 4. Protestant 5. No religion 6. Others	
104	What is your educational status?	1. 00=Illiterate 2. 66=read and write 3. ◆◆= grade completed	
105	What is your ethnicity?	1. Sod 2. Doli 3. Mskan 4. Mareko 5. Silti 6. Others	
106	What is your marital status?	1.--Married and in union 2.--Divorced 3.--widow 4.--Never married 5.--others	
107	What is the age of your child's father?	1. Self-employed 2. Government employed 3. Non Government employee 4. Petit trade 5. Others/specify	
108	What is your husband educational status?	1. 00=Illiterate 2. 66=read and write 3. ◆◆= grade completed	
109	What is your husband's occupation?	1. Self-employed 2. Government employed 3. Non Government employee 4. Petit trade 5. Others/specify	

110	Does your husband has another wife at present? (if no, go to questions no.113).	1. yes 2. no	
111	If yes, how many wives does he has?		
112	Where does your husband mostly live?	1. With me 2. with other wife 3. some other place 4. other	
113	Do you have radio at home?	1. Yes 2. No	
114	Do you have TV at home?	1. yes 2. no	
115	What is the ownership of your house?	1. Owned 2. Rented 3. Other/specify	
116	What are the number of room you have?		
117	What is the source of drinking water?	1. Pipe 2. river 3. well 4. pond 5. other/specify	
118	Do you have latrine?	1. yes 2. no	
119	If yes;	1. Private 2. Shared	
120	What is the type of floor you have?	. Earth 2. concrete	
121	Does your house have ceiling?	1. yes 2. no	
122	What is your occupational status? (If the answer is no.1 go to question 125)	1. House wife 2. Work for gain	
123	What do you do for gain?	1. Self-employed 2. Government employed 3. Non Government employee 4. Petit trade 5. Others/specify	

124	What is your monthly income?		
125	What is the approximate monthly income of the family?		
126	Have you ever used birth control?	1. yes 2. no	
127	What do you do in your leisure time ?	1. Listening radio 2. Do hand work 3. Reading 4. Other-----	
128	Who is gaining the family income?	1. My husband 2. Me 3. Me and my husband 4. Other, specify	
129	Do you think you are pregnant? (If the answer is no go to question 201)	1. Yes 2. No	
130	If yes, how do you know?		
III	Feeding habit of the family		
201	Who eats first in the family ?	1. Father's 2. Children's 3. Mother's 4. All eats equally	
202	Who eats food with whom?	1. Children alone 2. Mothers alone 3. Father alone 4. All eats together 5. Other, specify	
203	Is a separate food prepare for your child whose age is 4 month-2 years	1. Yes 2. No	
204	If yes, specify		
205	What is (are) the staple diet of the family?		
206	How many times your child of age 4 month-2 years feed within a day?		

207	How many times does the family fed in a day?		

IV. Information on characteristics of children aged 4 month-2 years

No.	Question	Response Category	Code
301	What is the age of your child?	____ Months	
302	What is the sex of your child?	1. Male 2. Female	
303	What is the birth order of your child?		
304	With whom does the child aged 4 month-2 years live at present?	1. Both parents 2. Mother only 3. Father only 4. Others, specify	
305	Was the child sick in the past two week? (If no, go to question number 307)	1. Yes 2. No	
306	What kind of symptom does he/she has?	1.diarrhoea 2.respiratory infection 3.measles 4.malaria 5.other/specify	
307	How long is this child exclusively breast fed?		
308	Is the child vaccinated? see card.	1. Yes 2. No	
309	If yes, what type of vaccination does he take?	1.BCG 2.DPT 1.--2.--3.-- 3.Measles	
V	Anthropometry of 4 month-2 years old child		
310	Child's weight in gram (to the nearest 100gm)	_____gram	
311	Child's MUAC (to the nearest 1 cm)	_____ cm	

312	Child's height (to the nearest 1 cm)	_____ cm	
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VI. Information on mothers work characteristics

To be filled for mothers involved in income generating type of work.

No.	Question	Response Category	Code
401	How much does it takes to walk from your house to your working place ?		
402	At what time did you start work?	-----	
403	At what time did you finish work?	-----	
404	What is the number of days you work per week?	_____ days	
405	While you are at work, Who is feeding and taking care of your child?	1. Sisters 2. Brothers 3. Neighbours 4. Husbands 5. Relatives 6. I will take him with me/her 7. Mention other arrangements	
406	How long did you stay at your present work?	_____ months	
407	How much did you earn from your work?	1. per day _____ in birr 2. per week _____ in birr 3. per month _____ in birr	
408	(Only for married in union) Did you know the income of your husband?	1. Yes 2. No	

409	If yes, what is the amount?	1. per day _____ in birr	
		2. per week _____ in birr	
		3. per month _____ in Birr	

VII. Decision Making Pattern of the Family

In your family who is making decision and being respected regarding the following activities:

Decision making body

1. my self
2. my husband
3. 1 and 2
4. Somebody else

Answer question 401-405 based on the above choice

No.	Question	Response Category	Code
501	Purchasing consumable goods?		
502	Taking of sick children to health institute?		
503	Use of birth control?		
504	Educating children?		
505	When you are sick, and want to go to the near by health institution?		

VIII. Information on house-hold pattern of expenditure

No.	Question	Response Category	Code
601	For the last two month what are the priorities on which you spent your money?	1. Food 2. Clothing 3. Education 4. Medication 5. Other/specify	

XI. Anthropometry of the mother

No.	Question	Response Category	Code
701	Mother's weight in kg (to the nearest 0.5 gm)	_____ kg	
702	Mother's height in meters (to the nearest cm)	_____ cm	
703	Mother's MUAC (to the nearest cm)	_____ cm	
704	Mother's triceps skin fold	_____ in cm	

DECLARATION

I, the undersigned, declare that this is my original work, has not been presented for a degree in any other university and that all resources of material used for this thesis have been fully acknowledged.

Name: Samrawit Nigussie

Signature: 

Place: Addis Ababa

Date of submission: December 1999

This thesis has been submitted for examination with my approval as a university advisor.

Name: Dr. Yemane Berhane

