Original article

The association of children's nutritional status to maternal education in Zigbaboto, Guragie Zone, Ethiopia

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Abstract: A cross-sectional study intended to assess the association of the nutritional status of children aged 6-59 months in relation to the literacy status of their mothers was undertaken in Zigbaboto village, Guragie Zone, Southern Ethiopia, during March-April, 1996. The study was based on 231 children and the overall prevalences of stunting, underweight and wasting were 46.7%, 44.2%, and 13.0%, respectively. A bivariate analysis based on height-for-age showed a high prevalence of stunting in children of illiterate mothers (52.2%) than children of literate mothers (22.2%). This difference is noted to be statistically significant ($P<0.05$). A multivariate analysis also demonstrated that within the given literacy status, income (that is mainly based on possessions of agricultural products and livestock), prenatal follow-up of the mother, and household size did not show any statistical significance on the nutritional status of the study children. The findings underscored the importance of maternal education for a better achievement of nutritional status than any other variable and has important implications for policy and for further investigation in a similar community. [*Ethiop. J. Health Dev.* 1999;13(1):55-61]

Introduction

The relationship between malnutrition and human behaviour, particularly to maternal education, is very important, in developing countries where malnutrition in preschool children is common (1,2). Various studies indicate that when malnutrition occurs during one of the critical phases of development, permanent damage occurs in the functioning of the central nervous system with impaired motor and mental development (3,4). It is also well recognized that poor nutritional status in developing countries is mainly caused by fetal growth retardation which often result from low maternal food intake, hard physical work, limited nutritional knowledge, and infection during pregnancy (5). Studies also indicate that the relationship between nutrition, knowledge and behaviour has been a controversial issue in the scientific literature for a long time (4). Most health related problems in developing countries including Ethiopia are associated with social impacts which are governed usually by women, so long as women play major roles in producing food, income generating scheme, child bearing, and care taking (6).

In developing countries, most children show retarded growth and development and some die as a result of poor maternal education, malnutrition, common childhood illnesses, poor sanitation, famine, lack of child care, and low income of their families (6). Although various studies had covered wide areas of factors related to child nutrition and maternal behaviours, little or inadequate information is available to illicit the occurrence of important determinants of host factors such as education and nutrition interactions in child growth and development (7). Maternal education is one of the contributing factors to play a major role to curve down malnutrition and its causation, however, such information for comprehensive planning and evaluation is lacking (8,9,10).

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Therefore, the objectives of this study are to assess the nutritional status of the study community and to investigate the relationship of the nutritional status of children to maternal literacy status within the domains of selected variables.

Methods

A cross sectional study was conducted comparing the nutritional status of children in relation to the parental literacy status, in Zigbaboto Peasants Association, Guragie zone in Southern Ethiopia, between March and April 1996.

A fresh census of all households residing in the study community having children 6-59 months of age was undertaken. Accordingly among the total of 400 children captured in the census, 240 children (6-59 months of age) with their respective mothers were selected using a random sampling technique. But, only 231 of the children and their mothers/guardians were available during the data collection.

The required information was collected from all mothers or guardians of the children using a pretested and open-ended questionnaires by enumerators who completed 12^{th} grade and above recruited from the study community. The enumerators were given an intensive two-day training on how to administer the questionnaires and information was collected under close supervision by the investigators. Information on weight, height, age, vaccination status, bottle-feeding situation, prenatal visit, income as assessed by possessions of agricultural production and livestock, parental literacy status, parity of the mother, birth order of the child, and household size was collected. The three indices of nutritional status (hight-for-age, weight-for-age and weight-for-height Zscores) of the children were computed to estimate the overall stunting, underweight and wasting, respectively, using the WHO/CDC/ NCHS reference values contained in the Anthropometric (ANTHRO) Software. A cut- off point of less than -2 Z-scores was considered as low nutritional status and values greater than or equal to -2 Z-score were considered as normal. Stunting reflects the long term (chronic) nutritional status of children, which is also a consequence of nutritional practice as well as related environmental and socioeconomic conditions; height-for-age is mainly used to investigate children's nutritional status in relation to maternal literacy and other related variables. In this study literate parents are those parents who could read and write and above, while illiterate parents are those who could not read and write.

Data entry and statistical analysis were accomplished using SPSS/PC (Statistical Package for Social Sciences) software. Simple descriptive statistics, bivariate analysis (t-test and chi-square test), and multivariate logistic regression analysis were performed and a P value < 0.05 was considered as statistically significant.

Results

Descriptive statistics: As shown in Table 1, the proportion of literate mothers and fathers accounted for 9.3% and 35.1%, respectively. The overall prevalences of stunting, underweight, and wasting were 46.7%, 44.2% and 13.0%, respectively. The proportion of children who have completed vaccination was 76.5%. Among the study mothers 57.1% have experienced prenatal follow-up during the pregnancy of the study children. The proportion of children who practised bottle- feeding was 10.6%. The mean size of parity, mean size of household, and mean duration of breast-feeding were higher among illiterate mothers than literate mothers. The value of possessions of the households was noted to be higher in literate mothers than illiterate ones.

Bi-variate findings: As depicted in Table 2, the significance of maternal literacy status, child vaccination status, bottle-feeding, and prenatal follow-up practices on nutritional status of children was tested and only maternal literacy has shown a significant effect on stunting of the study children at ($P<0.05$). The mean sizes of households, birth-order of the children, parity of mothers, size of land holdings, value of possessions of the family and duration of breast-feeding of the study children were also calculated and compared for significance difference in children nutritional status between those who were average and

Table 1: **Background information of the study subjects, Zigbaboto, Guragie Zone, 1996**

	Variables	number(%)	Mean
Parental literacy status:	literate mothers	45(19.9)	-

	illiterate mothers	186(80.1)	-
	literate fathers	81(35.1)	-
	illiterate fathers	150(64.9)	-
Nutritional status	stunted	108(46.8)	-
	normal	123(53.2)	-
	underweight	102(44.2)	-
	normal	129(55.8)	-
	wasted	30(13.0)	-
	normal	201(87.0)	-
Stunted children from	literate mothers	10(22.2)	-
	illiterate mothers	98(52.7)	-
	literate fathers	31(38.3)	-
	Illiterate fathers	77(51.3)	-
Underweight children from	literate mothers	12(26.7)	-
	illiterate mothers	90(48.4)	-
	literate fathers	28(34.6)	-
	Illiterate fathers	74(49.3)	-
Wasted children from	literate mothers	6(13.3)	-
	illiterate mothers	24(12.9)	-
	literate fathers	6(7.4)	-
	Illiterate fathers	24(16.0)	-
Vaccination status	completed	143(76.5)	-
	partially/not vaccinated	44(23.3)	-
Prenatal follow-up	visited	122(57.1)	-
	not visited	109(42.9)	-
practice of bottle-feeding	bottle-fed	37(10.6)	-
	Not bottle-fed	194(89.4)	-
Parity size	literate mothers		5.0
	illiterate mothers		5.7
Household size:	literate mothers		3.3
	illiterate mothers		4.4
Duration of breast-feeding:	literate mothers		16.8
	illiterate mothers		21.2
Value of Possessions	literate		1630.0
	illiterate		1100.0

below against above the average for these variables. Accordingly t-test was performed and none of the above variables have shown statistical significance at P<0.05.

Chi-square test was also performed to see the association of nutritional status with maternal literacy status (Table 3) by controlling the variables. The nutritional status of children belonging to literate mothers was found to be better than that of illiterate mothers (P<0.05), while no statistically significant difference was observed in relation to fathers' literacy status. Regardless of the vaccination status of the child, prenatal visit by the mother and income of the household as assessed by possessions of agricultural production and livestock, children belonging to literate mothers showed significantly better nutritional status than illiterate mothers. It was also noted that children of literate mothers, but not bottle-fed, have a significantly better nutritional status than children of illiterate mothers. In the case of children who were bottle-fed, no significant difference in nutritional status was observed due to maternal literacy.

Children living within an average and below average, sizes of parity of the mother (≤4), birthorder of the child (≤4), and sizes of households (≤5) for the study community have shown a significantly better nutritional status for literate mothers than illiterate mothers (P<0.05). But no statistically significant difference between nutritional status

Table 2: **The significance of children's nutritional status in relation to selected variables, Zigbaboto, Guragie Zone, 1996**

	Variables	Cases Mean/HAZ	t-value	p-value
Mother literacy				
- Illiterate	186	1.47	-4.19	0.00
- Literate	45	1.78		
Child vaccination				
- Fully	157	1.54	-0.11	0.91
- Partially/not	74	1.53		
Bottle-feeding				
- Bottle-fed	37	1.49	-0.60	0.55
- Not bottle-fed	194	1.54		
Prenatal follow-up				
- visited	122	1.57	1.06	0.55
- Not visited	109	1.50		
HH size				
- ≤5	117	1.59	1.77	0.29
- >5	112	1.47		
Birth order of child				
- ≤4	141	1.53	-0.02	0.98
- >4	90	1.53		
Parity size of mother				
- ≤4	138	1.55	0.67	0.50
- >4	112	1.51		
value of possessions/Birr				

- ≤1200	146	1.51	-0.75	0.46
- >1200	85	1.56		
Duration of breast feeding				
- ≤20	148	1.59	1.63	0.10
- >20	83	1.48		

and literacy of mother was observed in the above average households for these variables except household sizes greater than five were marginally better among literate mothers than illiterate ones (P=0.055).

Multivariate findings: To determine the effect of all the variables stated in the above univariate and bivariate analyses on the nutritional status of children, a logistic regression analysis was performed. Height-for- age Z-score was recorded for level of stunting and normal according to the cut-off point and this variable was considered as a dependent variable. The other variables which were hypothesized to affect nutritional status, such as maternal literacy status, child vaccination status, prenatal follow-up practice of the mother, bottle-feeding practice, parity size, household size, birth order of the child, and value of households possessions as proxy for wealth were entered into the model as independent variables. Among these independent variables, only maternal literacy status has shown statistically significant association (P<0.05) with the nutritional status of children.

Discussion

Maternal knowledge in child care is strongly linked with maternal education and age of mothers. Our findings show that maternal education among the study community is very low. Both mothers and fathers are in the age groups of high child bearing and are economically active, while the age of their children reflected a period of high risks.

As it is evidenced by the number of excellent prospective studies, and national and international conferences the effects of maternal literacy on child nutrition and behaviour have been the subject of intense interest over the past 20 years (9). Some studies show that factors influencing the association between maternal knowledge and behaviour has been a central but controversial issue in child health and nutrition (2).

The bivariate analysis indicated that maternal literacy is strongly associated with child

Table 3: **The association of child nutritional status with maternal literacy, controlling selected confounding variables, Zigbaboto, 1996**

	Variables Educ. Status	stunted	normal	X^2	P. value
Literacy of mother	1	98(52.7)	88(47.3)		
	2	10(22.2)	35(78.8)	13.50	0.01
Literacy of father	1	77(51.3)	73(48.7)		
	2	41(50.1)	40(49.0)	0.01	0.92
Child-Fully Vaccinated	1	63(50.8)	61(49.2)		
	2	0(0.0)	12(100.0)	11.36	0.00
Partially/not	1	35(56.5)	27(43.5)		
	2	10(30.3)	23(69.7)	5.91	0.02
Bottle-feeding - practised	1	17(56.7)	13(43.3)		
	2	02(28.6)	05(71.4)	0.85	0.36
Not Practised	1	81(51.9)	75(49.1)		
	2	08(21.1)	30(79.9)	8.33	0.00

Prenatal - Visited	1	45(50.6)	44(49.4)		
	2	08(24.2)	25(75.8)	6.73	0.01
Not Visited	1	53(54.6)	44.(45.4)		
	2	2(16.7)	10(83.3)	6.10	0.01
Parity size: ≤4	1	57(53.8)	49(46.2)		
	2	05(15.6)	27(84.4)	14.50	0.00
>4	1	41(51.3)	39(48.8)		
	2	05(38.5)	08(61.5)	0.72	0.39
Birth order of child: ≤4	1	60(55.6)	48(44.4)		
	2	06(18.2)	27(81.8)	14.08	0.00
>4	1	38(48.7)	40(51.3)		
	2	04(33.3)	08(66.7)	0.98	0.32
Household with size: ≤5	1	43(49.4)	44(50.6)		
	2	05(16.7)	25(81.3)	9.81	0.00
>5	1	55(56.1)	43(43.9)		
	2	04(28.6)	10(71.4)	3.70	0.06
Possessions/Birr - ≤1200	1	66(53.2)	58(46.8)		
	2	5(22.7)	17(77.3)	6.96	0.01
>1200	1	32(51.6)	30(48.4)		
	2	5(21.7)	18(78.3)	6.09	0.01

(1) Numbers in parenthesis show percent (2) maternal education status: 1=illiterate, 2=literate.

(3) Since expected value is below 5 in some cases, Yates correction is used.

Stunting, while other selected variables did not show any significant differences. Bairagi (1980) supports our findings that maternal education has positive influence without additional resources, towards adequate information to transform their preference for child health (11). Hailemariam and others (1993) in Ethiopia also supported the role of women's education towards improving the nutritional status of children (12). Furthermore, Chaterjee M. et al argued that among parental factors, under-five mortality was significantly and independently against above the average for these variables (13).

A logistic regression analysis was performed to determine the effects of univariate and bivariate analysis on the nutritional status of children in controlling selected variables, only maternal literacy was strongly associated with child stunting, while other variables did not have any significant relationship. This finding shows the importance of the educational program for the family and for the community to strengthen nutrition intervention to child growth and development. Although, variables such as vaccination and prenatal cares are effective answers to child nutrition, maternal literacy status on child stunting showed strong association, regardless of vaccination status (completed or not) and prenatal visit (obtained or not), also indicated the importance of women's knowledge for good nutrition practices and health care. Among all selected variables child stunting was noted to be worst among bottle fed children of literate mothers than children of illiterate mothers. This could be speculated that education in this particular case goes with maternal influence to modern style of life. It is also assumed that in case of her absence a frequent infection would be responsible for poor nutritional status and growth faltering that have been reported in children from many other developing countries.

Studies also indicate that unfavourable housing and environmental conditions, like living in traditional tukuls or homes without windows, poor latrines, cooking fires in the house are significantly linked with parental education and income (9).

Some studies elsewhere have indicated that maternal literacy reduces child mortality by about 15% whereas a similar level of paternal literacy achieves only a 6% reduction (9). It is also noted that every additional year of maternal education has been said to lead to a reduced child mortality rate of 8% (20). Therefore, maternal literacy increases the capacity of women's participation in child health care and nutrition promotion than other variables, which we have also shown to be in concordance with our findings. Other supportive evidences indicated that maternal education has a motivating effect on the nutritional status of the child and repeatedly becoming instrumental for attitudinal changes (14-19). Maternal knowledge also becomes an important factor in reducing child stunting and improving women's income generating scheme.

In multivariate analysis, the mean of household sizes, birth-order of the children, parity of the mothers, size of land holdings, value of possessions of the family, and land holdings above average did not show any relation in child stunting with maternal literacy. These show that other factors are affecting child nutrition more than what we have hypothesized. Therefore, social, economic, biological, and behavioural factors interplay rather than maternal literacy alone in child nutritional status.

In conclusion, our findings at primary level reflected that maternal education is strongly and positively associated with improved nutritional status of children and calls the attention of policy makers to encourage women to go to school for longer period of time (11). We therefore, strongly recommend that maternal education should be given to all women of reproductive age for better care of their children. Moreover, incorporation of maternal literacy issues is very important for those who design development programs, including those who design family planning program.

Acknowledgements

The authors gratefully acknowledge the Ethiopian Science and Technology Commission and Ethiopian Health and Nutrition Research Institute for their financial and technical assistance.

Our gratitude also goes to the Administration of Zigbaboto village, Atate Hospital staff and respondents who willingly and unfailingly participated in the study.

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