

Constraints on good child-care practices and nutritional status in urban Dar-es-Salaam, Tanzania

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Abstract

Background. Care is increasingly being recognized as a crucial input to child health and nutrition, along with food security, availability of health services, and a healthy environment. Although significant gains have been made in the fight against malnutrition in Tanzania, the nutritional status of preschool children in urban areas is not improving.

Objective. To assess child-care practices and the nutritional status of infants and young children with the aim of improving feeding practices and child nutritional status.

Methods. A cross-sectional study was undertaken in urban Dar-es-Salaam, Tanzania. The study involved 100 randomly selected mothers of children 6 to 24 months old from households in Ilala Municipality, one of the three municipalities that constitute the Dar-es-Salaam City Council. Data were collected by a structured questionnaire, spot-check observations, and anthropometric measurements.

Results. The prevalence rates of stunting, underweight, wasting, and morbidity were 43%, 22%, 3%, and 80%, respectively. The prevalence of exclusive breastfeeding was very low (9%), and most stunted children (88%) were not exclusively breastfed for the first 6 months. The mean age at which complementary foods and fluids were introduced was 3.26 ± 1.12 months (range, 1 to 5 months). The fluids given were mainly water and thin cereal-based porridge. More than half of the households practiced good hygiene. Most of the psychosocial practices (e.g., caregiver's attention, affection, and involvement in child feeding, hygiene, health care, and training) were performed by mothers, except for cooking and feeding the

children and child training, which were done mostly by alternative caregivers. Nearly half of the mothers (44%) worked out of the home. The mean number of working hours per day was long (10.32 ± 2.13), necessitating the use of alternative caregivers. A negative correlation was found between height-for-age z-scores and the number of hours mothers worked outside the home.

Conclusions. The prevalence rates of chronic malnutrition and morbidity are high, and child-feeding practices are inadequate in this urban population. Maternal employment and educational characteristics constrain good child-care practices, and alternative caregivers are taking a more important role in child care as mothers join the work force. We recommend that formative research be conducted to study the actual practices of caregivers in order to form the basis for a child-care education program. There is also a need to strengthen national health system support for improved child feeding.

Key words: Child-care practices, child-feeding practices, nutritional status, preschool children, Tanzania

Introduction

About one-third of the population of Africa live in urban areas, and this proportion is expected to increase to more than one-half by the year 2033 [1]. The average rate of urban population growth in East Africa from 1995 to 2025 is projected to be 4.7%, so that by the year 2025, 41.2% of the population in this region will live in urban areas [2].

Urbanization and changing food habits and lifestyles have placed an additional burden on nutritional problems in Africa. The incidence of malnutrition among preschool children (under 5 years of age) in low socioeconomic groups is on the increase [3]. Diversification of available food and better services can be viewed as factors that have positive nutritional outcomes. However, some studies have found that a cash economy in which most food has to be purchased and lessening of

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extended family interactions are among the factors that can lead to negative nutritional consequences [4, 5].

During the 1980s, there were three major types of specific national nutritional programs whose objective was to reduce the high rates of malnutrition and mortality: the Iringa Joint Nutrition Support Programme (JNSP), the Child Survival Protection and Development (CSPD) Programme, and the National Micronutrient Control Programme (NMCP). Although these programs were successful in terms of sustainability and reducing the very high rates of severe malnutrition [6], the nutritional status of young children has not improved. Data collected in the 1999 Tanzania Demographic Health Survey (TDHS) to assess the nutritional status of children under 5 years of age were similar to those obtained in the 1991–92 and the 1996 TDHS. The three surveys found that the prevalence of stunting has remained at around 43% to 44%. The prevalence of wasting rose from 6% to 7% from 1991–92 to 1996 and decreased to 5% in 1999. The proportion of underweight children remained constant at around 29% to 31% [7]. Deterioration in the nutritional status of children was shown to begin shortly after birth and continue through the first 18 months, and then to improve slightly thereafter to the third birthday [7].

Although significant gains have been made in the fight against malnutrition in Tanzania, the nutritional status of preschool children in urban areas is not improving. Conditions of urban poverty, the high proportion of women working outside the home, dependence on a cash income, and the unavailability of household resources (food, water, sanitation services, and alternative child caregivers) have been found to be the major constraints to good child-care practices in some African cities [1]. Care refers to the provision (in both the household and the community) of time, attention, and support to meet the physical, mental, and social needs of the growing child and other household members [8]. Care practices necessary for good growth and development in children under the age of 3 years include care for women; young child feeding, psychosocial stimulation, and support for development; food preparation, hygiene, and storage; personal hygiene practices; and home health practices. These care practices require human, economic, and organizational resources and support from the family [9].

Children's basic needs are the same in all cultures; however, care practices and resources vary greatly between cultures, and even within different groups within cultures. Widespread changes in society, such as urbanization and the changing economic role of women, require adaptations in care practices [9]. Understanding the importance of care practices would help identify good practices that should be encouraged and poor practices that should be corrected. Since performance of care practices requires enough

resources for the caregiver to be able to put knowledge into practice, understanding the extent to which household resources influence child-care practices would contribute to the improvement of intervention strategies to address malnutrition among urban preschool children. The purpose of this study was to assess child-care practices and the nutritional status of children aged 6 to 24 months in Ilala Municipality, Dar-es-Salaam, Tanzania.

Subjects and methods

The study was carried out in Ilala Municipality of the Dar-es-Salaam region in December 2003. The region is located on the east coast of Tanzania, bordered by the Indian Ocean to the east and on all other sides by the Coast region. The estimated population of Dar-es-Salaam, according to the 2002 census, was 2,497,940 [10]. Ilala Municipality is one of three municipalities that constitute the Dar-es-Salaam City Council. It consists of three divisions: Kariakoo, Ilala, and Ukonga. Ilala was selected by simple random sampling, and three wards from Ilala (Buguruni, Vingunguti, and Tabata) were selected by systematic sampling. A sampling frame constituting households with children 6 to 24 months of age was constructed from each selected ward and the households were numbered. There were 98 households in Buguruni, 102 in Vingunguti, and 99 in Tabata. From each list, a random selection of every third household with a child 6 to 24 months of age was performed, resulting in a total of 100 study households—33 from Buguruni, 34 from Vingunguti, and 33 from Tabata. Ethical approval to conduct the study was obtained from the Office of the Vice-Chancellor, Sokoine University of Agriculture. Permission to conduct the study was obtained from the office of the Ilala Municipal Director.

A structured questionnaire was constructed and pretested on a group of nonparticipating mothers, and adjustments to the questions were incorporated accordingly. The pretested questionnaire was used to collect information from mothers with children between 6 and 24 months of age. It consisted of questions on background characteristics of parents (age, marital status, education level, and occupation) and households in general; feeding practices; use of preventive health services and morbidity of children; hygiene practices; psychosocial practices (e.g., caregiver's attention, affection, and involvement in child feeding, hygiene, health care, and training); and anthropometry. Hygiene practices were assessed and graded as "clean" or "not clean" by a spot-check approach [1], using observations of predetermined hygiene-related features of the caregiver, index child, house compound, and latrine. These features have been used in previous surveys as proxies for positive or negative behaviors, rather than observations

of the behaviors themselves, and the method has been used in cross-sectional surveys [1].

Weight [11] was measured to the nearest 0.1 kg with a Salter scale (Model 235, CMS Weighing Equipment, London) while the children were minimally clothed and without shoes. Recumbent length was measured by a measuring board (Perspective Enterprises, Portage, MI, USA) with a movable foot piece and fixed headrest placed horizontally on a flat surface. With the child lying in the supine position, the length was recorded to the nearest 0.1 cm. The child's age was determined from the date of birth recorded on the clinic card. Three anthropometric indices—height-for-age, weight-for-age, and weight-for-height—were computed by comparing the child's measurements with the reference values of the US National Center for Health Statistics (NCHS) using the Epi-Info software program (Version 6.0; Centers for Disease Control and Prevention, Atlanta, GA, USA) [12]. The prevalence rates of stunting (low height-for-age), underweight (low weight-for-age), and wasting (low weight-for-height) were defined as the proportions of children who had index scores below -2 SD of the NCHS reference mean [12].

All questionnaires were checked in the field for completeness and consistency. All households gave oral consent to be interviewed after the study objectives were explained to them.

Data were entered and analyzed by the Statistical Package for the Social Sciences (SPSS) program (Windows version 9.0; Chicago, IL, USA). Means and SDs were computed for continuous variables, and frequencies and proportions were computed for categorical variables. Associations and relations between nutritional status indices and other variables were tested by chi-square and Pearson correlation tests, respectively. The level of significance was set at $p < .05$ for all analyses.

Results

Males headed 74% of the households and females 26%. The mean household size was 5.3 ± 2.2 (range, 3 to 17). The education levels of most of the male heads of the participating households ranged from primary to tertiary school. The main sources of income were from permanent employment (57%) and informal business (43%). The mean household income per year was US\$1,030.40 (TSh. 1,137,570 \pm 753.50).^{*} Other household care resources are presented in **table 1**. The majority of the households occupied rented rooms (75%). All households had access to a protected water supply. Ninety-four percent of the households had access to running water outside their rooms or houses, and 6% had access to covered wells. More than half of the

TABLE 1. Distribution of selected care resources among households ($n = 100$)

Resource	% of households
Housing quality	
Satisfactory ^a	54
Good ^b	21
Very good ^c	25
Assets owned	
Radio	98
Television set	27
Furniture	96
Charcoal stove	93
Garbage disposal	
Public dumping bins	76
Dug household pits	24
Has protected water supply	100
Type of latrine	
Public pit	62
Private pit	30
Private flush	8

a. Rented rooms built of bricks, unplastered unpainted walls, ceiling board present, very small rooms and windows.

b. Rented rooms built of bricks, walls plastered with cement and painted, ceiling board present, small rooms and windows.

c. Rented house built of bricks, walls plastered with cement and painted, ceiling board present, large rooms and windows.

households used public pit latrines and public dumping bins for garbage disposal. Most households owned radios, furniture, and charcoal or kerosene stoves, but only 27% of households owned a television set.

The mean age of the mothers was 27.9 ± 4.18 years (range, 18 to 37 years). The mean number of years of schooling for the mothers was 9.23 ± 3.43 (range, 0 to 16). Most of the mothers (94%) had some form of basic education; 82% had a high school education, 12% had professional certificates or diplomas, and 6% had no schooling at all. A large proportion (75%) of the mothers were married, 13% were not officially married but living with a partner, 7% were widows, and 5% were divorced. Ninety-five percent of the mothers who were not married or who were divorced reported receiving financial support from the child's father.

Forty-four percent of the mothers worked full-time and 30% were not employed (**table 2**). Of the 70 mothers who were working full-time or part-time, 37% were engaged in small businesses at home, 36% were traders in local markets, and 27% were formally employed as teachers, nurses, bar and restaurant attendants, and office and shop workers. The mean number of hours these mothers worked per day was 10.32 ± 2.13 (range, 4 to 14), and up to 67% of them worked 8 hours or more per day. Of the mothers who worked full-time, 57% employed alternative caregivers and 27% lived with their relatives who acted as alternative caregivers. The remaining 16% worked and looked after their children simultaneously.

^{*} Exchange rate at the time of survey: 1US\$ = 1,104 TSh.

TABLE 2. Distribution of maternal employment characteristics

Characteristic	% of mothers
Current employment (<i>n</i> = 100)	
Full-time housewife	24
Working part-time	26
Working full-time	44
Unemployed (looking for work)	6
Place of employment (<i>n</i> = 70)	
Home (<i>n</i> = 26)	37
Markets (<i>n</i> = 25)	36
Office, school, hospital, or shop (<i>n</i> = 19)	27
Child care (<i>n</i> = 70)	
Mother works and looks after child (<i>n</i> = 11)	16
Mother uses alternative child care	
Employs household help (<i>n</i> = 40)	57
Lives with a relative (<i>n</i> = 19)	27

The mean age of the children was 14.35 ± 5.97 months; 55% were girls. The mean birth order was 3.39 ± 1.19 . The distribution of child nutritional status is presented in **table 3**. The prevalence rates of stunting, underweight, and wasting were 43%, 22%, and 3%, respectively. The mean height-for-age was -1.94 ± 1.18 z-score, the mean weight-for-age was -0.004 ± 0.93 z-score, and the mean weight-for-height was 1.68 ± 1.25 z-score. The prevalence rates of stunting by age were 100% for children aged 6 months (*n* = 5), 42.8% for those aged 7 to 11 months (*n* = 35), and 38.3% for those aged 12 to 24 months (*n* = 60).

A high proportion of children (80%) had been ill during the 7 days prior to the survey. Malaria accompanied by fever (40%), diarrhea (35%), and cough and cold (25%) were the major illnesses, and most children had more than one illness. The majority of the children (90%) were taken regularly to maternal and child health (MCH) clinics for growth monitoring. However, only 80% of the children had been taken to a

clinic one month prior to the survey; 75% of these were older children (12–24 months) and 25% were younger children (7–11 months). The immunization rate was high, with 95% of the children having received a full course of immunizations before their first birthday.

Few mothers (9%) reported that their children had been exclusively breastfed for the first 6 months, and more than 80% of the mothers reported using water and thinly prepared porridge as complementary food (**table 4**). A smaller proportion of mothers had fed cow's milk, fruit juices, or commercial milk formulas to their infants. Of the children who were not exclusively breastfed, 1.1% were first given complementary foods or fluids at 1 month of age, 19.8% at 2 months, 57.1% at 3 months, 20.9% at 4 months, and 1.1% at 5 months.

A high proportion of mothers (78%) were breastfeeding at the time of the survey. All 6-month-old children (*n* = 5) were breastfeeding, as were 94% of those aged 7 to 11 months and 66.7% of those aged 12 to 24 months. Among the 22% of the children who were not breastfeeding at the time of the survey, the mean duration of breastfeeding was 11.91 ± 4.69 months. The minimum age at which complementary foods and fluids were introduced to these children was 2 months.

The mean age of introduction of complementary foods and fluids for all children was 3.26 ± 1.12 months. The most commonly given complementary food was a thin, cereal-based porridge made from maize, rice, or millet. As the child grew to accept the porridge, the mothers would introduce locally made cereal-legume or oilseed mixtures, with beans, groundnuts, and soybean most commonly given. The most frequently given reason for stopping breastfeeding was that the child was accustomed to other foods and fluids and was eating well, leading to refusal of the breast. There was a significant positive correlation between the age at

TABLE 3. Nutritional status of children according to age (*n* = 100)

Feature	0–6 mo (<i>n</i> = 5)	7–11 mo (<i>n</i> = 35)	12–24 mo (<i>n</i> = 60)
Stunting (no. of children)			
Normal	0	20	37
Stunted	5	15	23
Underweight (no. of children)			
Normal	5	26	47
Underweight	0	9	13
Wasting (no. of children)			
Normal	5	34	58
Wasted	0	1	2

TABLE 4. Child-feeding practices (*n* = 100)

Practice	% of children
Child breastfed exclusively	
Yes	9
No	91
Prelacteal feeds given (<i>n</i> = 91)	
Water	87
Fruit juice	36
Thin porridge	88
Cow's milk	23
Infant formula (Lactogen)	12
Powdered milk (Nido)	13
Mother's reason for introducing complementary foods (<i>n</i> = 91)	
Little milk from breasts	24
Resumed work	27
Advised by health workers	19
Food provides more nutrients	30

which complementary foods were introduced and the number of years of the mother’s schooling ($r = 0.296$, $p = .001$).

Although there was no significant association between degree of stunting and whether or not the child was exclusively breastfed, 88% of the stunted children were not exclusively breastfed for the first 6 months. Complementary foods were introduced to these stunted children at 2 to 3 months (68%), 4 months (22%), and 6 to 7 months (10%). There was a significant association ($p = .016$) between degree of stunting and breastfeeding status at the time of the survey. Of those children who were not currently breastfeeding ($n = 22$), 72.7% were stunted. There was no association between a child’s nutritional status and whether the mother worked outside the home. Although more than half (59.1%) of children whose mothers worked full-time ($n = 44$) were stunted, the association was not significant. However, there was a significant negative correlation between height-for-age z-scores of children and the number of hours per day mothers worked outside the home ($r = -0.275$; $p = .035$). The z-scores were found to be lower as the number of hours mothers worked away from home became greater.

Spot-check observations found that on the basis of all hygiene indicators observed, more than half of the households practiced good hygiene (table 5). Mothers performed most of the psychosocial practices investigated, that is, taking child to hospital and maternal and child health (MCH) clinics, cooking child’s food but not feeding the child, bathing the child and washing child’s clothes. However, alternative caregivers were more likely to cook for the children and feed them (64%) and to train them to stand, walk, and talk (60%) (table 6).

Discussion

Nutritional status

We assessed the nutritional status of children and child-care practices in households with children aged 6 to 24 months in urban Dar-es-Salaam. Nearly half (43%) of the children we studied were stunted. This prevalence was similar to the 43.8% reported by the Tanzanian

Demographic and Health Survey (TDHS) in 1999 [7]. All study children 6 months of age were stunted, as were nearly half of those aged 7 to 11 months and half of those aged 12 to 24 months. The prevalence rates of wasting (3%) and underweight (22%) in this study were slightly lower than those documented in 1999 by the TDHS (5.4% and 29.4%, respectively). A review of global anthropometric data has shown that the prevalence of stunting in sub-Saharan African countries is usually about twice that of underweight [13]. Stunting was the only nutritional status index with children in the severe category. Eleven percent of the children in this study were found to be severely stunted, as compared with 17.1% in the 1999 survey. We observed that chronic malnutrition, as indicated by the high rate of stunting, was a significant health problem.

Our data are different from those reported in the 1999 survey by the TDHS, probably because the 1999 data were based on average values from a large sample of children 6 to 60 months of age. In addition, our survey was carried out in 2003, when a number of factors could have contributed to a decrease in the rate of wasting and underweight since 1999 in the urban area. These factors include improved access to healthcare services and management of childhood illnesses.

Stunting reflects the cumulative effects of numerous insults experienced by children during pregnancy, infancy, and early childhood, beginning at birth and continuing through the initial 18 months, after which it is irreversible. Faltering in length extends through the first 40 months of life, whereas faltering in weight is concentrated between 3 and 12 months [13]. After 12 months of age, a child may be stunted and of low weight-for-age; however, the weight-for-height ratio rapidly improves. This suggests that after 12 months, weight gain can be adequate even while the process of stunting continues for another 2 years [13]. Until recently the extent to which faltering in length and weight follow distinctly different age-specific patterns that most likely reflect different causal mechanisms was not widely appreciated [13].

TABLE 5. Hygiene behaviors ($n = 100$)

Observation	% of households
Child is clean ^a	73
Mother or caregiver is clean ^a	77
Compound is swept	75
Latrine is swept or mopped	62

a. Observations were made of hair, face, nose, hands, nails, clothes, and feet.

TABLE 6. Psychosocial practices of mothers and alternative caregivers ($n = 100$)

Practice	% of mothers	% of alternative caregivers
Cooking child’s food	62	38
Cooking child’s food and feeding child	36	64
Washing child’s clothes	54	46
Bathing child	56	44
Taking child to maternal and child health clinic and hospital	90	10
Training child to stand, walk, and talk	40	60

The high rate of stunting of children at 6 months of age in this study is a clear indication of intrauterine growth retardation; however, we did not have records of birth length to substantiate this observation. Children's length at birth is rarely measured and recorded, unlike birth weight, which is routinely recorded. The high rate of stunting of children at 6 months of age could have been caused by harmful cultural practices that contribute to inadequate dietary intake during pregnancy and result in intrauterine growth retardation. Pregnant women living in Tanzanian coastal communities such as urban Dar-es-Salaam are generally advised by their elders to eat little food in order to avoid having a big baby, who will cause problems during childbirth. Without timely interventions, the child is born already short for his or her age and continues in this condition throughout early childhood, as we observed in nearly half of the children aged 7 to 11 months and half of those aged 12 to 24 months. With poor child-feeding practices (e.g., low rates of exclusive breastfeeding and early introduction of complementary foods of poor quality), such as those found in this study, the likelihood of growth faltering at 6 months or older is high. Stunting, accompanied by macronutrient and micronutrient deficiencies and high rates of infectious disease, is most prevalent in the first year of life [14]. The consequences of stunting include high susceptibility to infectious diseases due to lowered immunity caused by inadequate dietary intake, as well as delayed cognitive and motor development [13].

Feeding practices

A very low proportion of children (9%) in this study were exclusively breastfed for the first 6 months. Low rates of exclusive breastfeeding have also been documented by researchers in Tanzania [7, 15, 16]. In a 1999 TDHS survey, the proportion of children 6 to 24 months of age who were exclusively breastfed was 4.4% [7]. The rates of exclusive breastfeeding for children under 6 months of age during 1995–2002 have generally been low, not only in Tanzania (32%) but also in Kenya (5%), Zimbabwe (33%), and the sub-Saharan region (28%) [17]. The rate of breastfeeding in this study was high (78%); however, about one-third of children 12 to 24 months of age were not breastfed.

Early introduction of complementary foods was commonly practiced by the mothers, with the majority serving prepared porridge and water to their infants by the time they were 3 months of age. We observed that mothers were not following internationally recommended practices, which require exclusive breastfeeding up to 6 months, with introduction of complementary foods at 6 months while breastfeeding is continued [13, 18]. A significant ($p = .016$) association was observed between stunting and breastfeeding status. A high proportion of children who were not

breastfeeding were found to be stunted. Since at least 66% of children 12 to 24 months of age and an even higher percentage of younger children were still breastfeeding, it is possible that something other than early cessation of breastfeeding was responsible for the rate of stunting observed. Stunting could have been a result of intrauterine growth retardation, low rate of exclusive breastfeeding, early introduction of low nutrient-dense complementary foods, and a high morbidity rate. It has been observed elsewhere that linear growth begins to falter at birth even when breastmilk meets the energy requirements of the growing infant [13].

Early introduction of complementary foods and fluids tends to displace breastmilk consumption, causing a decrease in milk output due to decreased production. In this study, early introduction of complementary foods and fluids could have displaced consumption of breastmilk and hence its benefits. On the other hand, the foods and fluids consumed, in most cases, are of low nutrient density, and thus are not able to meet a child's nutrient requirements. In this study the most common fluids given to children were water and a thin, cereal-based porridge. Low breastfeeding rates caused by early introduction of complementary foods have been documented to be a major cause of severe malnutrition among children under 2 years of age in central Tanzania [16].

Morbidity

The high rate of morbidity observed in this study was mainly due to diseases such as malaria (accompanied by fever), diarrhea, cough, and cold. No significant association was found between illness and nutritional status of the infants and children in this study; however, significant associations between illness and wasting or stunting have been reported in the Philippines [19]. Early introduction of complementary foods such as those observed in the present study is usually accompanied by the introduction of contaminants and foreign microorganisms to the infant's gut. This leads to increased exposure to enteropathogenic bacteria, resulting in diarrheal diseases. Frequent episodes of diarrheal diseases reduce the availability of nutrients. Young children in Tanzania have about five episodes of diarrhea annually, accounting for about 23% of pediatric admissions at the national referral hospitals [20]. Early introduction of complementary foods and fluids also tends to displace breastfeeding and thus leads to inadequate nutrient intake, lowered immunity accompanied by frequent infections, and subsequent impaired growth.

Immunization rate

A high (80%) rate of attendance at MCH clinics was observed in the present study; however, as children

grew older the rate of attendance diminished, simply because older children were not brought to the clinics as frequently. Nearly all children (95%) had received all immunizations recommended for their age; those who had not been fully immunized had generally missed one or more of their diphtheria/pertussis/tetanus (DPT) vaccinations, which are given in a series of doses. A higher rate of attendance at MCH clinics in urban areas has also been observed in Tanzania [15].

Mother's level of education

The mother's educational level had no significant association with the likelihood of exclusive breastfeeding. However, there was a significant positive correlation between the number of years a mother spent at school and the age at which she introduced complementary foods to the child. The mean number of years of schooling for mothers in this study was relatively high (about 9 years), and the majority of mothers had a basic primary education. Nutrition is not taught as such in primary schools, and therefore most of the mothers would have lacked formal knowledge of child-feeding and care practices. A study in Lesotho showed that the association between maternal education and the child's nutritional status was independent of nutritional knowledge among poorer households, whereas among wealthier households the association was mediated through increased nutritional knowledge [21]. A similar independent effect of maternal education was reported in the Philippines [19].

Mother's work status

More mothers worked full-time than part-time, and a majority of those who were working were self-employed, working from home or at the local markets. About 27% of employed mothers were formally employed in the public or private sectors. The majority of the working mothers left their children in the care of alternative caregivers. Although a nonsignificant association was found between children's nutritional status and mothers' employment status, the prevalence of stunting was higher in children whose mothers worked full-time than in those whose mothers did not work full-time. Maternal employment may not be a constraint to child care, because mothers modified their work patterns to attend to their young children's needs [1]. The strategies by which mothers stop working, or work fewer hours, or take their infants to work may be successful in protecting their children but may seriously jeopardize their ability to generate income for the family [1]. The mean number of hours per day mothers worked full-time was high, and a majority of the mothers worked more than eight hours per day, which would make hiring an alternative caregiver for the child the best solution.

The benefits of having an alternative caregiver may be outweighed by the quality of child care he or she can provide, considering that most of the caregivers do not have experience and their level of education is low. In this study a significant negative correlation was found between children's nutritional status (length-for-age z-scores) and the number of hours the mothers worked outside the home. The z-scores decreased as the number of hours increased. With the mother working away from home most of the day, provisions for child care can be very important. The alternative caregivers were left to perform important care behaviors, such as preparing and cooking the children's food and feeding and training the children. The behavior of the caregiver has been documented to influence children's intake of complementary foods. Important caregiver behaviors include the level of encouragement provided to the child during feeding, the frequency of feeding, the quality of child-caregiver interaction, and the environment in which feeding takes place. If children are fed in places where there are many distractions, they do not consume the amount they would in environments more conducive to optimal eating [13]. Since most of the employed alternative caregivers are young and not mature enough to adhere to specific and regular care behaviors, their lack of responsiveness to the child during feeding and presumed lack of attention to feeding patterns could have reduced the food intake of the children, thus contributing to the chronic malnutrition observed in this study. No firm conclusions can be drawn regarding the behavior of the caregivers, because the actual practices were not studied.

Nutrition education that targets alternative caregivers may in the long run improve child-care practices. Trials in providing nutrition counseling to Brazilian mothers in health facilities resulted in positive responses in understanding and recalling breastfeeding and complementary feeding recommendations. Improvements in maternal knowledge about complementary feeding, the timely introduction of complementary foods, and the quality of foods and feeding practices resulted in significant increases in energy, nutrient intakes, and weight among children older than 6 months [22, 23].

Care resources

Household care resources were found to have no significant association with children's nutritional status and care received and thus may not limit mothers' ability to feed their children appropriately. The care resources included paternal marital status, educational level, occupation, and income; household size and quality; and ownership of assets. Similar findings were reported in another study carried out in Tanzania, in which household socioeconomic status, except for the ownership of a radio, had no significant association with child-feeding practices and nutritional status [15].

However, significant associations between household resources and care practices were found in Haitian communities [24].

Conclusions and recommendations

Our study assessed child-care practices and nutritional status of infants and young children in an urban setting and identified some constraints to good practices. The prevalence of chronic malnutrition and morbidity was high in the study population. Child-feeding practices were inadequate. Household care resources do not appear to influence children's nutritional status, whereas maternal employment and educational characteristics constrain good child-care practices. Alternative caregivers are taking a more important role in feeding and caring for children as mothers join the work force. Efforts to improve feeding practices and to relieve the constraints to the adoption of optimal practices could have a significant effect on child nutritional status in this population.

Continued emphasis on nutrition education before the child is born, during prenatal and antenatal visits, and during growth-monitoring visits could go a long way to motivating mothers to avoid the use of prelacteal feeds, maintain exclusive breastfeeding for a recommended period of time, introduce complementary foods at the appropriate time, and improve general child care. Contacts with mothers during vaccination could offer an opportunity for nutrition counseling. In addition to weight, length or height measurements should be routinely taken by health personnel during growth-monitoring visits so that they can detect early growth faltering. For all these recommendations to succeed, there is a need to strengthen the national health system's support for improved child feeding by coordinating activities with health professionals and ensuring that consistent support is given within the health system and communities.

Since few people attend colleges and universities that teach advanced courses in nutrition, teaching food and nutrition at the primary and secondary levels may reach a larger audience. This study provided no basis for conclusions regarding the behavior of the alternative caregivers, but we recommend that formative research be conducted to observe their actual practices. In addition, mothers, caregivers, and those who influence their decisions need nutrition and hygiene education messages that are easily understood and communicated in a manner that maximizes the likelihood of their being implemented.

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