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Abstract: Introduction: Optimal breastfeeding and complementary feeding have been proven to reduce malnutrition. Declining socio-economic environment is associated with poor feeding practices, high morbidity, and risk of malnutrition among children from urban poor families. Objective: The aim of this cross-sectional study was to assess child-feeding practices and morbidity prevalence among Harare urban-families living in low socio-economic areas. Methods: A health-facility based cross-sectional study was conducted in five clinics of Harare serving low socio-economic communities between July and August 2014. A structured interviewer-administered questionnaire assessing child-feeding practices was used to interview primary caregivers. Prevalence of diarrhea, influenza, malaria, measles, fever, and cough was assessed. Data were analysed using SPSS v21. Results: A total of 218 mother-child pairs attending growth monitoring were enrolled in the study: Seventy-five percent of the children were below two years; early introduction of solid foods (before six months) was observed in 81.4% of the children. Forty-nine percent of young children were fed at least four meals per day and 74% had been weaned onto family meals; Twenty-four percent of the children had diarrhea, 59% influenza, 1% mealses, 23% fever and 53% cough in the month preceding the survey. Conclusion: There is a high prevalence of suboptimal feeding practices and morbidity in low socio-economic urban communities of Harare. There is need to design child-feeding interventions for the urban community targeting all family members involved in decision-making.

Key words: Exclusive breastfeeding, complementary feeding, child-feeding practices, morbidity, Zimbabwe.

1. Introduction

Promoting breastfeeding, dietary diversity and appropriate complementary child-feeding practices are the most cost-effective strategies to combat under-nutrition, child morbidity and mortality in resource-constrained settings [1]. Child-feeding practices play an integral role in determining the nutritional status of a child [2, 3], inadequate quantity and poor quality of food given to children, particularly under the age of five years result in growth faltering [4]. The WHO published a set of recommendations to guide infant and young child feeding [5], and these recommendations include exclusive breastfeeding for six months, feeding of safe, nutritious and adequate complementary foods with continued breastfeeding up to two years of age and beyond [6]. Furthermore, infants and young children must be fed on a MAD (minimum acceptable diet) [7], consisting of a diverse diet and adequate meal frequency appropriate for age. An infant's diet is said to be diverse if the child is fed on at least five food groups [7]. Frequency is defined according to age group as follows: an infant is said to have adequate meal frequency if they receive solid, semi-solid, or soft foods at least twice a day for infants aged 6-8 months and at least three times a day for

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children aged 9-23 months. Non breastfed children aged 6-23 months are fed with a minimum meal frequency if they receive solid, semi-solid, or soft foods at least four times a day [8].

Factors influencing child malnutrition are broad and include the wider social and economic environment [9]. Inadequate nutrition knowledge among caregivers, and meagre socio-economic and environmental conditions are key determinants of child malnutrition [10]. Zimbabwe has experienced declining socio-economic conditions with consequent rising unemployment levels [11]. Whilst some sections of society have been able to cope through creative ways of generating income and employing various coping strategies [12, 13], in general this decline has impacted negatively on the urban poor who rely on a steady source of income to meet their food security requirements. Such rapid changes make it difficult for families to properly provide for and feed their families [5].

The last ZDHS (Zimbabwe Demographic Health Survey) of 2015 reported high levels of stunting (23%) but low prevalence of wasting (1%) among under-fives in Harare [14]. A very high proportion of children (98%) had ever been breastfed, with 52% being initiated within the first hour of birth. Only about a third (37%) had adequate minimum meal frequency. While the ZDHS is designed to yield nationally representative information it is important to zoom in on vulnerable sections of society to inform more targeted interventions. The objective of this study was therefore to investigate child-feeding practices in areas of low socio-economic status in Harare.

2. Methodology

2.1 Study Design and Setting

This was a cross-sectional retrospective study conducted in the city of Harare. Harare is the capital city of Zimbabwe with a total population of 2,123,132 [15]. The average household size is four and 74% of households are male headed. A third of the population (29%) are homeowners whilst 48% are lodgers [16]. The city is divided into four districts (Eastern, Southern, Northern and Western districts). At the time the study was conducted the city was divided into nine districts (northern, north eastern, eastern, south eastern, southern, south western, western, northwest, and central business district). The study was health-facility based. Using growth monitoring attendance figures, primary care clinics with the largest attendance of individuals from low socio-economic districts were purposively selected. These were Hatcliffe and Borrowdale Poly clinic from Northern District, Mbare Poly clinic from Southern District, Dzivarasekwa Poly clinic from North-Western District and Hatfield Poly clinic from South-Eastern District. In total this gave five poly clinics from four districts.

2.2 Study Participants

The following formula [17, 18] used to calculate sample size in cross-sectional studies was used:

$$N = z^2 p(1-p)/e^2$$

where:

N = sample size;

Z =confidence interval (which is at 95%, 1.96);

p = proportion of children aged 6-23 months living with their mothers who are fed according to the three IYCF feeding practices (breastfeeding status, number of food groups, meal frequency for Harare was 15.4%);

e = error level of precision (which is 5%).

The calculated sample size was 196. To adjust for attrition, a non-response rate of 10% was factored in to give a final sample size of 216 (approximately 44 mother-infant pairs per clinic). Eligible participants were enrolled as they came to attend the monthly growth monitoring programme. Researchers continued to visit the clinic for interviews until the sample size specifically calculated for the health facility was reached. The inclusion criteria were any mother with a child under the age of five years with no underlying health problems. We excluded mothers/caregivers and children who were recent visitors to the area. The study was conducted based on the ethical principles of

respect, justice and confidentiality summarized in the 2013 Declaration of Helsinki [19]. The study was approved by the Harare City Health Services Department. Written informed consent was obtained from all participants prior to study procedures.

2.3 Data Collection Instruments

A structured interviewer-administered questionnaire was used to interview caregivers on child-feeding practices from the time the child was born. The questionnaire was based on WHO IYCF indicators [6] and comprised questions demographic on characteristics of the caregiver, previous and current child-feeding practices as well as social, economic, and cultural factors that influenced the child-feeding practices. The questionnaire was pretested for ambiguity, validity and reliability at a clinic that was not participating in the study and revised accordingly. To assess morbidity, the caregiver was asked to recall if the child had been ill in the one month preceding the interview. This was confirmed using clinic card where possible. Height of the caregiver was measured to the last completed 1 mm using a stadiometer and weight to the nearest 0.1 kg using a Tanita scale (Tanita, IL, USA). BMI (body mass index) of the caregiver was determined by dividing the caregiver's weight in kg with the square of the height measurement in meters [20]. Data were entered into Microsoft Excel 2010 and analyzed using SPSS software package version 21 (Chicago, IL, USA). Frequencies and percentages were used to evaluate the feeding practices. Chi-square analysis was employed to test for association between categorical variables. Statistical significance was set at p < 0.05.

3. Results

3.1 Baseline Characteristics of the Children and Their Caregivers

A total of 218 caregiver-infant pairs were enrolled in the study between July and August 2014 after the primary caregiver had given consent to participate. The questionnaire response rate was 96.8%. Most of the children in this study (75%) were below 24 months of age (Table 1). Approximately 85% (n = 189) of caregivers

Table 1General characteristics of participants andhousehold, in Harare.

Characteristic	No.	%
Children's age status ($N = 218$)		
< 12 months	102	47.4
12-24 months	62	28.8
24-48 months	38	17.7
48-59 months	5	2.3
60+ months	8	3.7
Place of birth ($N = 218$)		
Home	14	6.4
Clinic	116	53.2
Hospital	86	39.4
Other	2	1
Residential status ($N = 218$)		
Low density	98	45
High density	116	53.2
Other	4	1.8
Employment status of caregiver ($N = 188$)		
Unemployed	141	75
Self-employed	34	18.1
Private company	12	6.4
Government employee	1	0.5
Maternal education ($N = 218$)		
No education	3	1.4
Primary	26	11.9
Secondary	180	82.6
Post-secondary	7	3.2
College or university	2	0.9
Income status ($N = 210$)		
< USD \$200	89	42.4
USD \$201-500	91	43.3
USD \$501-1,000	23	11.0
> USD \$1,000	7	3.3
Mother's marital status ($N = 218$)		
Single	9	4.1
Married	198	90.8
Divorced	2	0.9
Widowed	4	1.8
Co-habiting	5	2.3
Mother's BMI status (<i>N</i> = 210)		
18.5	8	3.8
18.5-25	135	64.3
> 25	67	31.9

had a secondary or higher level of education. Majority

of caregivers (75%) were unemployed. Most respondents (82%) reported to receive household monthly income of less than USD \$500. Of the total births 6% were home deliveries, whilst most (93%) were deliveries at a health facility. Slightly more than half of the respondents (53%) interviewed were from high-density areas. A significant proportion of the mothers (32%) were overweight. The range of the number of children in a family was between one and ten and most families (86.7%) comprised of three or fewer children.

3.2 Infant and Young Child-Feeding Practices

Breastfeeding was almost universal with 96.3% of the children reported to have been breastfed. Of those who had not ever breasted, this was attributed to the caregivers' HIV status (0.5%), use of formula milk (0.5%) and weaning (0.5%). A large proportion (61.5%)of children were initiated on breast milk within the first hour after birth, 26.6% initiated breastfeeding a few hours after birth and the remaining 8.7% did so a few days after birth. Only 11.5% of the children were fed on milk formula as a breast milk substitute. The dominating breast milk substitutes were Nan (56%) and cow's milk (28%). At the time of our study, 32% of the women interviewed had ceased breastfeeding. Most children (81.4%) had been introduced to complementary foods before they reached six months and almost a third (30.2%) had been introduced to solid/semi-solid foods within the first three months. Of the mothers who had ceased breastfeeding by the time the study was conducted, a large number (90.1%) had done so before the child reached two years of age. Most of the children (74.4%) were weaned onto available family foods. The second most common weaning food was porridge (23.3%) (Table 2).

3.3 Morbidity among Children

Child morbidity was high in this sample population as almost half (45%) of the children had been ill at least once during the month preceding the study.

Table 2Child-feeding practices for infants and youngchildren among Harare urban families.

Characteristics	No.	%
Age of child at cessation of breastfeeding $(N = 70)$		
< 3 months	2	2.9
3-6 months	2	2.9
6-12 months	9	12.9
12-24 months	50	71.4
24+ months	7	10
Was the child ever breastfed?		
Yes	210	96.3
No	4	1.8
Reasons for not breastfeeding		
HIV positive	1	0.5
Child weaned	1	0.5
Prefer infant formula	2	0.9
Age of child at initiation of $(N = 162)$		
complementary leeding ($N = 162$)		
< 3 months	49	30.2
3-5 months	83	51.2
6-9 months	29	17.9
> 9 months	1	0.6
Types of complementary foods given to ye children ($N = 150$)	oung	
Porridge	35	23.3
Sadza (thick porridge)	1	0.7
Mashed foods	1	0.7
Soups	1	0.7
Number of meals fed to the child per day $(N = 183)$		
One	10	5.5
Two	24	13.1
Three	59	32.2
Four	34	18.6
Five	2	1.1
On demand	54	29.5

Twenty-four percent (24%) of the children had been ill with diarrhoea. Other common diseases were influenza (59%), malaria (1%), measles (1%), fever (23%) and cough (53%). Most children (53.7%) had been ill with more than one illness and a few children (2%) had been ill with all five illnesses during the recall period (Fig. 1).

3.4 Child Care Practices

The mother was the main primary caregiver (90.4%) of the child at home. Other dominating child-minders



Fig. 1 Individual who influenced breastfeeding among mothers.

Responses were not mutually exclusive.

during the day were house maids (2%) and relatives (6%). Less than 1% of the children were being cared for by their fathers during the day. More than half of the mothers (55%) were influenced by a health care worker to breastfeed their child. Thirty-three mothers (15.1%) reported to have been influenced to breastfeed by more than one person.

A large proportion of caregivers (70.2%) reported that they had never attended any child-feeding awareness campaign. Ninety-five percent (95%) of the caregivers had valid growth monitoring cards for their children and 81.5% of these were recorded up to date. Most of the children (82%) did not attend preschool for various reasons. Major reasons were the child being too young (49.4%) whilst 17.9% of the parents could not afford the pre-school fees.

3.5 Determinants of Child-Feeding Practices

Choice to breastfeed or not was associated with marital status (p = 0.000) and mother's level of education (p < 0.000). Divorced mothers and those with at least a secondary education were less likely to have breastfed. The timing of breastfeeding initiation was associated with marital status of mothers (p = 0.007) and the

child's birthplace (p < 0.000). Married women and those who delivered in a health facility were more likely to initiate breastfeeding within the first hour of birth. Types of complementary foods fed to children were associated with mother's marital status (p =0.008). There was no significant association between child meal frequency with monthly income (p = 0.305), mothers' level of education (p = 0.692) and mothers' BMI (p = 0.712).

4. Discussion

We set out to investigate child-feeding practices and morbidity prevalence families in from low socio-economic districts in urban Harare. We found high prevalence of inadequate child-feeding practices as 81.4% had been introduced to complementary foods before six months and half had less than the recommended meal frequency. We used time at introduction of complementary foods as a proxy for exclusive breastfeeding. Less than 20% of caregivers interviewed can be said to have practiced exclusive breastfeeding. This points to low EBF rates. Despite various breastfeeding campaigns, exclusive breastfeeding is still not commonly practiced in many

low socio-economic countries [21]. In 2016 Zimbabwe national statistics estimated EBF prevalence of 40% in Zimbabwe [14]. In a recent study in Southern Zimbabwe EBF rate was low at 36% [22]. In the latter study older mothers, and those more economically independent, and with more than 2 children, were more likely to practice EBF, whilst mothers living in small houses (less than 2 rooms) and younger mothers were less likely to practice EBF. Context specific determinants of EBF for these districts of Harare must investigated be to come up with relevant interventions.

By no surprise morbidity was also highly prevalent in these communities. Low rates of EBF have detrimental effects on the nutritional and health status of children [23, 24]. This could have contributed to the increased morbidity among children in this sample population, as almost half of the children had been ill within the month prior to this study. In the absence of exclusive breastfeeding, most caregivers turn to mixed feeding, which has seen to increase the risk of illness [25].

We noted that there were no specific complementary foods given to children. Most children were weaned straight onto the family diet, eating the same foods as adults except for porridge, which was almost universal among respondents. Also more than half had an inadequate meal frequency. This shows that these urban families did not prepare child-specific foods or further prepare children's food derived from adult family meals that could cater for the needs of young children. These should be nutrient dense and soft enough for children to be able to ingest and digest efficiently [5]. The reason for absence of child-specific foods could be lack of knowledge among caregivers or the families' inability to afford child-specific foods however, this remains to be proven. Various studies in low socio-economic areas have also found less than optimum infant feeding practices [26-28]. However with appropriate interventions such as positive deviance this narrative can be changed [29].

Whilst in this study there was no association established between meal frequency and various socio-economic indicators and mothers' nutritional status, child-feeding practices can be influenced by multiple variables including social, economic, biological, cultural and political conditions [30]. Caregivers' knowledge on feeding of infants and young children is a crucial internal factor that has a great impact on child-feeding practices among households. Further studies must assess knowledge levels, attitude and perceptions as these are strong drivers of child nutrition status [31].

The limitation of this study was that it was health facility based, and this could have left out mothers who do not visit health facilities for growth monitoring. The results may therefore not be generalizable to the whole of Harare. Furthermore, we deliberately selected districts of low socio-economic status therefore results should be interpreted with caution. Α community-based study is recommended to capture all families in a more representative manner. As this was a health facility-based study, it is by no surprise that compliance to growth monitoring programme was high as shown by the high number of up-to-date child health card records. Using a cross-sectional study design means that we cannot establish causality however, as this is the first study to zoom in on child-feeding practices in Harare districts the results are important to inform future studies and urban programming.

As the results showed that a lot of family members participated in child-feeding decisions, there is need to design child-feeding interventions for infants and young children that target all family members who participate in decisions concerning child feeding. The health facility and health worker still play a very important role as shown by the fact that most mothers received education on IYCF from healthcare workers. Their role must be supported and strengthened.

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Conflict of Interest

We declare no competing interests.

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